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Taxonomy of Ethnomedicinal Botanicals and Documentation of Ethnomedicinal Practices Traditionally Used by Three Selected Ethnolinguistic Communities in Mindanao, Philippines

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ABSTRACT

This study documents orally transmitted but never documented knowledge about ethnomedicinal (EMD) botanicals before they are lost as native healers die out and replaced by modern medical practitioners; the natural habitat lost due to the encroachment of fast-paced modern changes and consequent destruction of virgin forests. EMD practices traditionally used by three (3) ethnoliguistic communities (EC) in Mindanao, Philippines (Manobo, Talaandig and Higaonon) were observed and recorded, the EMD botanicals identified with the aid of their respective EMD practitioners (baylan, datu), photographed in situ, samples collected, herbarium-preserved and their taxonomy established. Results showed 108 species of EMD botanicals belonging to 95 genera and 52 families; 11 commonly used by the three EC, three (3) common among the Talaandig and Higaonon, 17 common among the Manobo and Higaonon, 22 used only by the Higaonon, 21 used only by the Manobo, 23 used only by the Talaandig. Emphasizing the importance of "sevens" (shoot, leaves, root, bark, fruit), 40 common ailments were treated through decoction, infusion, maceration, juice extraction and poultice. In conclusion, the three selected EC possess knowledge about EMD botanicals that are potential sources of medicinal

therapeutics. Confirmation of their efficacy is being investigated in the light of modern, evidence-based medicine.

Keywords - Ethnomedicine, indigenous knowledge, taxonomy, biodiversity, Manobo, Higaonon, Talaandig, ethnolinguistic communities, Philippines

INTRODUCTION

The Philippines is an archipelago comprising 7,107 islands categorized broadly into three main geographical divisions: Luzon, the largest land area in the north; Visayas, a group of islands at the central part; and Mindanao, the second largest land area located at the southern region. Ranked the "73rd largest independent nation," it has a "total land area, including inland bodies of water, of approximately 300,000 square kilometers (120,000 sq mi) located between 116° 40' and 126° 34' E. longitude and 4° 40' and 21° 10' N. latitude bordered by the Philippine Sea to the east, the South China Sea to the west, and the Celebes Sea to the south" (http://en.wikipedia.org/wiki/Philippines).

Many people groups which differ in modernity, cultural practices and spoken language comprise the population of the Philippines. Collectively called *lumad* are the upland and lowland tribes in Mindanao who have resisted the modernizing influence of the nations that colonized the country (i.e., Spain; and later, the United States). Among these are the *Manobo* and *Talaandig* tribes from the province of Bukidnon, and the *Higaonon* tribe of the province of Agusan which are the subjects of this study.

From these three selected ethnolinguistic communities (EC), this paper documents indigenous knowledge about EMD botanicals that had been orally transmitted but never documented, threatened to extinction with the passing of the traditional practitioners and the loss of natural habitat due to the encroaching of fast-paced modern changes with consequent destruction of virgin forests. The primary proponent of this study was a native-born *Talaandig* son of a respected *datu* who spoke the ethnic languages fluently and uniquely able to enter difficult and often dangerous villages deep in the mountains of Mindanao. Some of these places were accessible only via paths hacked through virgin forest and across deep ravines and fast flowing mountain streams. Propelled by authenticity, the proponent worked with the EMD practitioners themselves (*datu, baylan*) in their native tongue and cultural setting in which the tribal elders were pleased to transmit knowledge and practices to one of their own, a privilege not easily available to researchers from the outside. In addition to the preservation of indigenous culture and tradition and the current

global fascination in traditional and alternative medicine, the potential to identify new sources of medicinal therapeutics from botanicals not yet included in the list of Philippine medicinal plants lend significance to this study.

OBJECTIVES OF THE STUDY

The Philippines is one of the world's biologically richest places; however, its diverse ecosystem is being seriously threatened by natural and anthropogenic causes according to the country's Department of Environment and Natural Resource. Documentation of the biodiversity of Philippine fauna and flora is a prerequisite for conservation and sustainable harvesting of these irreplaceable yet vulnerable natural resources. Based on these concerns, the overall objective of this study is documentation of medicinal plants used in plant-based indigenous medicinal tradition; medicinal practices that have stood the test of time, orally transmitted, but never written but are now fast disappearing as native healers die out and are replaced by modern medical practitioners; and the natural habitat lost due to the encroachment of fast paced "political, economic, and cultural changes" with consequent destruction of virgin forests. Thus, the specific objectives of this study are as follows:

1. To identify with the help of the local practitioners (datu, male or baylan, female) the medicinal plants found nearby the indigenous settlements concealed deep among tropical forests at the Agusan, Kalatungan, Pantaron and Pinamantawan mountain ranges in Mindanao, Philippines.
2. To photo document these plants in their natural context to record then permanently for taxonomic purposes, collect, herbarium-preserve and classify them according to family, genera and species.
3. To assess the biodiversity of these medicinal flora and catalogue them according to altitude distribution, local distribution, and the IUCN status especially of those species uniquely found in these mountain areas alone.
4. To record and thereby preserve for posterity the plant-based healing traditions gained through centuries of experience that have been orally transmitted but never documented with an anticipated verification of their efficacy in future studies based on modern medical standards.

METHODOLOGY

Research Locale

The geopolitical administration in the Philippines begins with a *sitio* (village). A group of *sitio* composes the *community* (community). A group of *community* composes the towns and cities that in turn compose the provinces. This study, which started in June 2011, was conducted at five different *sitio* two of which were inhabited by the *Higaonon* tribe, two by the *Manobo* tribe and one by the *Talaandig* tribe.

Figure 1. Study locale. a) Malinawon, Esperanza, Agusan del Sur; b) Sagabalan, Esperanza, Agusan del Sur; c) Lapangon, Magkalungay, San Fernando, Bukidnon; d) Migtulod, Mt. Nebo, Valencia City, Bukidnon

The first two *sitio* were the Higaonon localities of Malinawon and Sagabalan in the town of Esperanza, province of Agusan del Sur along the base of the Agusan mountain range. *Sitio* Malinawon (Figure 1a) located at N 08° 39.721'E 125° 18.163' with an altitude of 356 meters above sea level (masl) or 1167 feet above sea level (fasl) was a 5 to 7-hr hike away from *Community* Kipunay, the nearest motor

vehicle-accessible community, about 3 to 4-hr motorcycle ride away from Gingoog, a city in the neighboring province of Misamis Oriental. *Sitio* Sagabalan (Figure 1b) located at N 08° 37.736' E 125° 16.019' with an altitude of 567 masl (1860 fasl) was a farther village deep in the mountains, about a 4 to 5-hr hike away from *Sitio* Malinawon. This would mean that if one is to go directly to Sagabalan, it would take 9 to 12 hr of walking through mountains covered with virgin forests alive with colorful and fragrant exotic flora but also inhabited by dangerous fauna including wild boars, monkeys, snakes and blood sucking insects and leeches.

The second two localities were the *Manobo Matig-Salug sitio* of Lapangon and Sto. Domingo along the base of the Pantaron and Pinamantawan mountain ranges in the province of Bukidnon. *Sitio* Lapangon (Figure 1c) located at N 07° 51.683' E 125° 28.237' with an altitude of 491 masl (1610 fasl) along the Pantaron mountain range was a 12-hr hike away from the nearest motorcycle-accessible locale, Community Magkalungay in the town of San Fernando in Bukidnon. *Sitio* Sto. Domingo in *Community* Lumintao, town of Quezon in Bukidnon was located at N 07° 46.474' E 125° 13.188' with an altitude of 1112 masl (3647 fasl) along the Pinamantawan mountain range, a 3 to 4-hr hike from the nearest vehicle-accessible locale, *Community* Buko of Valencia city in Bukidnon.

The last locality, *Sitio* Migtulod (Figure 1d) at *Community* Mt. Nebo in the city of Valencia in Bukidnon and inhabited by the *Talaandig* tribe was located at N 07° 56.883' E 124° 57.618' with an altitude of 1179 masl (3867 fasl), a 3-hr hike from the Mountain View College campus. The proponent of this study was born in this *sitio*. Although it was a relatively less primitive village compared to the other *sitio,* can be accessed by front wheel-drive vehicles and motorcycles during the dry season and had a public elementary school, similar to the other *sitio,* it had no electricity, running water or sewer system.

Informed Consent and Immersion

Previous to this study, the proponent had immersion experiences in the EC by serving as a SULADS[1] teacher for one and a half years at some of the *lumad sitio*

1 *SULADS,* an acronym for Socio-economic Uplift, Literacy, and Anthropological Developmental Services which also means brother/sister in the *Manobo* dialect is an international mission outreach based at the campus of Mountain View College. The organization operates training programs in the mountains of Bukidnon and beyond. Because of their extensive program, *SULADS* was named in 1997 by Former Philippine President Fidel V. Ramos as the Most Outstanding Literacy program in the Philippines and its program director, Daryl Famisaran was named the Most Outstanding Literacy Worker in the Philippines for 1997 (www.suladsinternational.org). In 2007 Mr. Famisaran was given recognition as a *"Bayaning Filipino"* by the 14th Congress of the Republic of the Philippines "for having succeeded in opening

in Agusan del Sur. For this study, the consent of the respective *datu* (male leader and ethnomedicine practitioner) and *baylan* (female ethnomedicine practitioner) from the EC was formally obtained through special meetings prior to the sampling. During the sampling, the researcher and research assistants worked at the different communities on different dates for documenting the EMD practices and identifying the EMD botanicals with personal assistance from the *datu* and *baylan* of the respective communities.

Gathering of Data and Documentation

Figure 2. *Datu and baylan* assisting Lagunday (with red jacket) in the identification of EMD botanicals used by the respective tribe.

The data were gathered by videotaping (DCR-SR42), photo-documenting (Canon EOS REBEL T1i, Canon Powershot A480) *in situ* (Figure 5) and interview of the *datu* and *baylan* from each EC in the respective dialect and cultural setting (Figure 2). The EMD practitioners together with the researcher and research assistants performed a transect collection of the EMD botanicals in the mountains close to their respective communities. *In situ* photo-documentation of the botanicals identified by the accompanying *datu* or *baylan* was employed to permanently record their natural context for taxonomic purposes.

the Socio-Economic Uplift Literacy Anthropological Development Studies or SULAD[S], providing education to the LUMADS in the mountains of Bukidnon who are willing to learn," the citation reads (http://www.senate.gov.ph/lisdata/65345793!.pdf). Daryl Famisaran is the adoptive father of Noel.

Figure 3. A *Talaandig datu* demonstrating to Lagunday the preparation of a decoction drink from a *Smilax sp. (Banag).* a) chopping the roots, b) boiling, c) prepared tonic

Figure 4. A Manobo baylan and another ethnomedical practitioner demonstrating the traditional use of ethnomedicinal plants. a) decoction drink, b) cataplasm using *Piper umbellatum* leaves, c) treating an eye problem using the juice extract of *Pennesitum polystachion (Indalawe),* d) treating a cut using crushed leaves

Figure 5. An EMD botanical photo documented *in situ*.
a) plant habit and habitat, b) flower, c) documenting the exact location with a global positioning system instrument, d) mature fruit. The exact species of this *Hedychium* plant remains unidentified for lack of published reference.

Figure 6. Photo documented preserved herbarium specimen *(Hedychium sp.)*

The study also photo-documented the EMD practioners demonstrating the techniques of decoction, maceration, infusion and poultice preparation of the botanicals for their respective traditional use (Figures 3and 4). The procedures were recorded hand-written in a laboratory notebook and were later appropriately encoded electronically for analyses and safekeeping. All the records (notebook, videotape and photo-documents) were deposited at the Center for Research of Mountain View College (MVC).

Classification, Identification, and Description of Plant Specimens

The specimens were taxonomically classified based on the work of Castro (2006), De Padua, et al., (1977, 1987), Kurian (2010), Madulid (2000), Pancho, (1983), Pancho, et al., (2006), Pelser, et al., (2011 onwards), Quisumbing (1978), Rummel (2009), So (1994) and Co (http://www.philippineplants.org). Taxonomy of difficult specimens was classified with the aid of assistants at the Herbarium Museum of the Central Mindanao University, Musuan, Bukidnon under Dr. Victor B. Amoroso and the curators at the Botany Division of the National Museum in Manila, Dr. Wilfredo F. Vendivil and Dr. Edwin R. Tadiosa.

Preparation of Herbarium Specimens

The specimens were collected following the plant press method of collection and preservation of plants by Claustro and Madulid (2005). Collected specimens were placed in plastic bags with collection number and pertinent information. The specimens with assigned collection numbers were trimmed, treated with 70% alcohol to prevent microbial growth and arranged between sheets of newspapers measuring 45x30 cm interspersed with cardboard. Specimens in the folded newspapers packed in a piled and pressed manner and were tied securely with plastic straw string. To facilitate drying, the packages were exposed under sunlight and later dried in a plant oven at the Biology Laboratory of MVC. The newspapers were changed as needed to prevent the growth of molds and attack of insects on the specimen. The collection numbers were entered in the data notebook with notes regarding the collector, date of collection, locality, common name, habitats and important morphological descriptions. The preserved herbarium specimens were deposited at the Center for Research Herbarium of MVC (Figure 6).

RESULTS AND DISCUSSION

Table 1. Species count of ethnomedicinal botanicals

Family	Genus total	Species total
ANGIOSPERM SPECIES		
ALLIACEAE	*1*	*2*
APOCYNACEAE	*2*	2
ARACEAE	*5*	*6*
ARALLIACEAE	*2*	*3*
ARECACEAE	*2*	*2*
ASTERACEAE	*10*	*10*
AMARYLLIDACEA	*1*	*1*
CHLORANTHACEAE	*1*	*1*
CLUSIACEAE	*1*	*1*
COMMELINACEAE	*1*	*1*
CONVOLVULACEAE	*1*	*1*
CRASSULACEAE	*1*	*1*
CUCURBITACEAE	*3*	*3*
CYPERACEAE	*2*	*3*
DENNSTAEDTIACEAE	*1*	*1*
DILLENIACEAE	*2*	*2*
DIPTEROCARPACEAE	*1*	*1*
EUPHORBIACEAE	*2*	*3*
FABACEAE	*2*	*2*
GESNERIACEAE	*2*	*2*
GNETACEAE	*1*	*1*
ICACINACEAE	*1*	*1*
JUNCACEAE	*1*	*1*
LAMIACEAE	*1*	*2*
LAURACEAE	*2*	*2*
LYTHRACEAE	*1*	*1*
MALVACEAE	*2*	*2*

MARANTACEAE	*1*	*1*
MELASTOMEACEAE	*1*	*1*
MORACEAE	*2*	*5*
MUSACEAE	*1*	*1*
MYRTACEAE	*1*	*1*
NEPENTHACEAE	*1*	*1*
PANDANACEA	*1*	*1*
PENTAPETACEAE	*1*	*1*
PIPERACEAE	*1*	*2*
POACEAE	*10*	*10*
RHAMNACEAE	*1*	*1*
ROSACEAE	*1*	*2*
RUBIACEAE	*3*	*3*
RUTACEAE	*1*	*1*
SMILACEAE	*1*	*1*
ULMACEAE	*1*	*1*
URTICACEAE	*5*	*5*
VITACEAE	*1*	*1*
VERBENACEAE	*1*	*1*
ZINGIBERACEAE	*3*	*4*
PTERIDOPHYTE FAMILIES		
CYATHEACEAE	*1*	*1*
MARATTIACEAE	*1*	*1*
POLYPODIACEAE	*1*	*1*
THELYPTERIDACEAE	*1*	*1*
GYMNOSPERM SPECIES		
ARAUCARIACEAE	*1*	*1*

The species count of EMD botanicals used by the selected EC is shown in Table l. Identified were 108 species belonging to 95 genera and 51 families. One (1) species was classified as gymnosperm, four (4) were classified as pteridophytes, and 103 were classified as angiosperms. Of the latter, the most abundant species belonged to family Poaceae (10 species), Asteraceae (10 species), Araceae (6 species) and

Moraceae (5 species), and Zingiberaceae (4). Five families had three (3) species each (Aralliaceae, Cucubertaceae, Cyperacear, Euphorbiaceae and Rubiaceae), 11 were represented by two (2) species each while all the rest of the families had only one (1) identified medicinal species. Of the108 identified EMD botanicals, only 100 were classified to the species level. Seven (7) specimens were taxonomically sterile because reproductive structures were not available during the sampling, thus they were only classified according to Genera. Although one (1) specimen had complete structures (Figures 5 and 6) and tentatively classified as belonging to genus *Hedychium*, family Zingeberaceae, its exact species placement remains undetermined due to lack of published references, suggesting a previously unidentified species possibly endemic to the region.

Table 2. Ethnomedicinal botanicals used solely by each of the three different ethnolinguistic communities

Manobo	Talaandig	Higaonon
1. *Acmella grandiflora*	1) *Ageratum conyzoides*	1. *Agathis philippinensis*
2. *Alocasia macrorrhizos*	2) *Allium odoratum*	2. *Alocasia zebrina*
3. *Amorphophallus campanulatus*	3) *Artemisia vulgaris*	3. *Amomum villosum*
4. *Bryonopsis laciniosa*	4) *Bryophyllum pinnatum*	4. *Bauhinia tomentosa*
5. *Chloranthus elatior*	5) *Catharanthus roseus*	5. *Calamus sp.*
6. *Cyperus brevifolius*	6) *Cissus adnata*	6. *Costus speciosus*
7. *Ficus nota*	7) *Coleus atropurpureus*	7. *Dendrocalamus sp.*
8. *Fimbrystylis sp.*	8) *Cratoxylum sp.*	8. *Derris sp.*
9. *Macaranga bicolor*	9) *Cucurbita maxima*	9. *Donax Cannaeformis*
10. *Mikania cordata*	10) *Cuphea carthagenensis*	10. *Elatostema sp.*
11. *Momordica charantia*	11) *Cymbopogon citratus*	11. *Ficus minahassae*
12. *Nepenthes sp.*	12) *Cyperus strigosus*	12. *Gnetum sp*
13. *Osmoxylon sp.*	13) *Diplazium esculenta*	13. *Homalomena rubescens*
14. *Pennisetum polystachyon*	14) *Gonostigia hirta*	14. *Macaranga hispida*
15. *Pollia thyrsiflora*	15) *Hedychium sp.*	15. *Mycetia javanica*
16. *Pterospermum niveum*	16) *Mackinlaya celibica*	16. *Myrmecodia tuberosa*
17. *Rubus rosaefolius*	17) *Medinilla magnifica*	17. *Nephelium lappaceum*
18. *Saccharum officinarum*	18) *Persea americana*	18. *Pandanus polycephalus*
19. *Schismatoglottis calyptra*	19) *Psidium guajava*	19. *Pentaphragma grandiflorum*
20. *Vetiveria zizanoides*	20) *Pteridium aquilinum*	20. *Phytocrene macrophylla*
21. *Zingiber zerumbet*	21) *Scleria sp.*	21. *Setaria italica*
	22) *Stachytarpheta jamaicensis*	22. *Shorea negrosensis*
	23) *Urena lobata*	23. *Ziziphus cumingiana*

Table 2 shows the EMD botanical species used solely by each of the three EC. Twenty-one (21) species were used solely by the *Manobo*, 23 by the *Talaandig* and 22 by the *Higaonon*.

Table 3. EMD botanicals shared among the three EC

MH*	MT*	TH*	MTH*
1. *Angiopteris evecta* 2. *Artocarpus blancoi* 3. *Chromolaena odorata* 4. *Coix lacryma-jobi* 5. *Curculigo orchioides* 6. *Dillenia indica* 7. *Ficus septica* 8. *Merremia peltata* 9. *Pinanga insignis* 10. *Poikilospermum suaveolens* 11. *Rhynchotechum discolor* 12. *Schefflera odorata* 13. *Schefflera trifoliate* 14. *Tetracera scandens* 15. *Trema orientalis* 16. *Uncaria tomentosa* 17. *Villebrunea rubescens*	1) *Alstonia scholaris* 2) *Bidens pilosus* 3) *Colocasia esculenta* 4) *Conyza sumatrensis* 5) *Dendrocnide stimulans* 6) *Elephantopus scaber* 7) *Eleusine indica* 8) *Piper umbellatum* 9) *Sida rhombifolia*	1. *Cyathea contaminans* 2. *Christella parasitica* 3. *Rubus moluccanus*	1) *Allium fistulosum* 2) *Axonopus compressus* 3) *Blumea balsamifera* 4) *Cinnamomum mercadoi Vidal* 5) *Coleus blumei* 6) *Crassocephalum crepidioides* 7) *Euphorbia hirta* 8) *Imperata cylindrical* 9) *Musa textilis* 10) *Piper betle* 11) *Pipturus arborescens*

*M, *Manobo*; H, *Higaonon*; T, *Talaandig*; combination letters signify ethnomedicinal botanicals shared by the designated tribes.

Botanical species commonly used for medicinal purposes by the three EC are shown in Table 3. Seventeen (17) species were used by both the *Manobo* and *Higaonon* tribes, nine (9) were common among the *Manobo* and *Talaandig*; only three (3) were common between the *Talaandig* and *Higaonon*, while 11 were commonly used by all the three tribes. Since all three tribes use the latter group of species, these probably represent a more effective remedy.

Table 4. Classification of ethnomedicinal botanicals with their medicinal potential based on publication status with indication of tribal usage of the unpublished species

Family	Genus	Species	Medicinal Potential Publication Status*	Tribal Usage**
ANGIOSPERM SPECIES				
ALLIACEAE	*Allium*	*Allium fistulosum*	**X**	**MTH**
		Allium odoratum L.	***P***	
APOCYNACEAE	*Alstonia*	*Alstonia scholaris* (L.) R. Br	***P***	
	Catharanthus	*Catharanthus roseus* (L.) G. Don	***P***	
ARACEAE	*Alocasia*	*Alocasia macrorrhizos*	***P***	
		Alocasia zebrinia C. Koch. & Hort. Veitch	**X**	**H**
	Amorphophallus	*Amorphophallus campanulatus* Blume.	***P***	
	Colocasia	*Colocasia esculenta* L. Schott	***P***	
	Homalomena	*Homalomena rubescens* (Roxb.) Kunth	***P***	
	Schismatoglottis	*Schismatoglottis calyptra* (Roxb.) Zoel. and Moritzi	***X***	**M**
ARALLIACEAE	*Osmoxylon*	*Osmoxylon sp.*	***X***	**M**
	Schefflera	*Schefflera trifoliata Merr. And Rolfe*	***P***	
		Schefflera odorata (Blanco) Merr. And Rolfe	***P***	
ARECACEAE	*Calamus*	*Calamus sp.*	***X***	**H**
	Pinanga	*Pinanga insignis* Becc.	***X***	**MH**
ASTERACEAE	*Acmella*	*Acmella grandiflora* (Turcz.) R.K.Jansen	***P***	
	Ageratum	*Ageratum conyzoides* Linn.	***P***	
	Artemissia	*Artemissia vulgaris* Linn	***P***	
	Bidens	*Bidens pilosa* Linn.	***P***	
	Blumea	*Blumea balsamifera* (Linn.) DC.	***P***	
	Chromolaena	*Chromolaena odorata* L.	***X***	**MH**

	Conyza	*Conyza sumatrensis* (Retz.) E. Walker	***X***	**MT**
	Crassocephalum	*Crassocephalum crepidioides* (Benth.) S. Moore.	***P***	
	Elephantopus	*Elephantopus scaber* Linn	***P***	
	Mikania	*Mikania cordata* (Burm. f.) B.L Robinson	***P***	
AMARYLLIDACEAE	*Curculigo*	*Curculigo orchioides* Gaertner	***P***	
CHLORANTHACEAE	*Chloranthus*	*Chloranthus elatior* R. Br.	***X***	**M**
CLUSIACEAE	*Cratoxylum*	*Cratoxylum sp.*	***X***	**T**
COMMELINACEAE	*Pollia*	*Pollia thyrsiflora* Blume) Bakh. F.	***X***	**M**
CONVOLVULACEAE	*Merremia*	*Merremia peltata* (Linn.) Merr.	***P***	
CRASSULACEAE	*Bryophyllum*	*Bryophyllum pinnatum* (Lam.) Kurz.	***X***	**T**
CUCURBITACEAE	*Bryonopsis*	*Bryonopsis laciniosa* (Linn.) Naud.	***P***	
	Cucurbita	*Cucurbita maxima* Duchene	***X***	**T**
	Momordica	*Momordica charantia* L.	***P***	
CYPERACEAE	*Cyperus*	*Cyperus strigosus L.*	***X***	**T**
		Cyperus brevifolius (Rottb.) Hassk.	***P***	
	Scleria	*Scleria sp.*	**X**	**T**
DENNSTAEDTIACEAE	*Pteridium*	*Pteridium aquilinum* (L.) Kuhn	***X***	**T**
DILLENIACEAE	*Dillenia*	*Dillenia indica* Linn.	***P***	
	Tetracera	*Tetracera scandens* (Linn.) Merr.	***P***	
DIPTEROCARPACEAE	*Shorea*	*Shorea negrosensis* Foxw.	***X***	**H**
EUPHORBIACEAE	*Euphorbia*	*Euphorbia hirta* Linn.	***P***	
	Macaranga	*Macaranga bicolor*	***X***	**M**
		Macaranga hispida	***X***	**H**
FABACEAE	*Bauhinia*	*Bauhinia tomentosa Linn*	***P***	
	Derris	*Derris sp.*	***X***	**H**
GESNERIACEAE	*Pentaphragm*	*Pentaphragma grandiflorum* Kurz.	***X***	**H**
	Rhynchotechum	*Rhynchotechum discolor* (Maximowicz) B.L. Burtt.	***X***	**MH**
GNETACEAE	*Gnetum*	*Gnetum sp.*	***X***	**H**

ICACINACEAE	*Phytocrene*	*Phytocrene macrophylla* (Bl.) Bl., Rumphia	***X***	**H**
JUNCACEAE	*Juncus*	*Juncus effuses* Linn.	***P***	
LAMIACEAE	*Coleus*	*Coleus atropupureus* Benth.	***P***	
		Coleus blumei Benth	***P***	
LAURACEAE	*Cinnamomum*	*Cinnamomum mercadoi* Vidal	***P***	
	Persea	*Persea Americana* Mill.	***P***	
LYTHRACEAE	*Cuphea*	*Cuphea carthagenensis* (Jacq.) J.F.Macbr.	***P***	
MALVACEAE	*Sida*	*Sida rhombifolia* Linn.	***P***	
	Urena	*Urena lobata* Linn.	***P***	
MARANTACEAE	*Donax*	*Donax cannaeformis* (Forst.) K. Schum.	***P***	
MELASTOMEACEAE	*Medinilla*	*Medinilla magnifica* Lindl.	***X***	**T**
MORACEAE	*Artocarpus*	*Artocarpus blancoi* Merr.	***P***	
	Ficus	*Ficus nota* (Blancoi.) Merr.	***P***	
		Ficus minahassae (Teijsm & de Vr.) Miq.	***P***	
		Ficus benjamina Linn.	***P***	
		Ficus hauli Blanco	***P***	
	Poikilospermum	*Poikilospermum suaveolens* (Blume) Merr.	***P***	
MUSACEAE	*Musa*	*Musa textilis*Née	***X***	**MTH**
MYRTACEAE	*Psidium*	*Psidium guajava* Linn.	***P***	
NEPENTHACEAE	*Nepenthes*	*Nepenthes sp.*	***X***	**M**
PANDANACEA	*Pandanus*	*Pandanus polycephalus* Lam.	***X***	**H**
PENTAPETACEAE	*Pterospermum*	*Pterospermum niveum* S. Vidal	***P***	
PIPERACEAE	*Piper*	*Piper umbellatum* Linn.	***P***	
		Piper bettle Linn.	***P***	
POACEAE	*Axonopus*	*Axonopus compressus* (Sw.) Beauv.	***X***	**H**
	Bambusa	*Bambusa sp.*	***P***	
	Coix	*Coix lacryma-jobi* L.	***P***	
	Cymbopogon	*Cymbopogon citratus* Stapf.	***P***	
	Imperata	*Imperata cylindrica* (L) P. Beauv.	***P***	
	Eleusine	*Eleusine indica* Gaerth	***P***	
	Pennisetum	*Pennisetum polystachyon* (L.) Schult.	***X***	**M**
	Saccharum	*Saccharum officinarum* L.	***P***	
	Setaria	*Setaria italica* (L.) P. Beauv	***P***	
	Vetiveria	*Vetiveria zizanoides* (L.) Nash	***P***	

RHAMNACEAE	*Ziziphus*	*Ziziphus cumingiana* Merr.	***X***	**H**
ROSACEAE	*Rubus*	*Rubus rosaefolius* Sm.	***P***	
		Rubus molocannus Linn.	***P***	
RUBIACEAE	*Mycetia*	*Mycetia javanica* Blume) Reinw. ex Korth.	***X***	**H**
	Uncaria	*Uncaria tomentosa* (Wild.) DC.	***X***	**MH**
	Myrmecodia	*Myrmecodia tuberosa* Jack	***P***	
RUTACEAE	*Nephelium*	*Nephelium Lappaceum* Linn.	***P***	
SMILACEAE	*Smilax*	*Smilax sp.*	***P***	
ULMACEAE	*Trema*	*Trema orientalis* (L.) Bl.	***P***	
URTICACEAE	*Dendrocnide*	*Dendrocnide stimulans* (L.f.) Chew	***X***	**MT**
	Elatostema	*Elatostema sp.*	***X***	**H**
	Gonostigia	*Gonostigia hirta*	***X***	**T**
	Pipturus	*Pipturus arborescens* (Link) C. B. Rob.	***X***	**MTH**
	Villebrunea	*Villebrunea rubescens*	***X***	**M**
VITACEAE	*Cissus*	*Cissus adnata* Roxb.	***P***	
VERBENACEAE	*Stachytarpheta*	*Stachytarpheta jamaicensis* (L.) Vahl	***P***	
ZINGIBERACEAE	*Amomum*	*Amomum villosum* Lour.	***X***	**H**
	Costus	*Costus speciosus* (J.Konig.) Sm.	***P***	
	Hedychium	*Hedychium sp.*	***X***	**T**
	Zingiber	*Zingiber zerumbet* (L.) Smith	***P***	
PTERIDOPHYTE SPECIES			***P***	
CYATHEACEAE	*Cyathea*	*Cyathea contaminans* (Hook) Copel.	***X***	**TH**
MARATTIACEAE	*Angiopteris*	*Angiopteris evecta* (G. Forst) Hoffm.	***X***	**MH**
POLYPODIACEAE	*Diplazium*	*Diplazium esculentum* (Retz.) Sw.	***P***	
THELYPTERIDACEAE	*Christella*	*Christella parasitica* (L.) Leveille	***X***	**TH**
GYMNOSPERM FAMILIES			***P***	
ARAUCARIACEAE	*Agathis*	*Agathis philippinensis* Warb.	***P***	

**Note: Medicinal potential publication status is based on the following references:Medicinal Plants of the Philippines* (Quisumbing 1978), *Healing Wonders of Herbs (*Ladion 1985*), Amazing Healing Plants* (Kurian 2010), *Handbook on Philippine Medicinal Plants* (Padua et al., 1977, 1987) *and Philippine Medicinal Plants*

on Primary Health Care Volume 1 (Rummel 2009). *(***X**, no existing publications; **P**, publication available)

**See Table 3 for legend

Table 4 presents the medicinal potential of the identified EMD botanicals. Medicinal potential indicate the publication status based on the following resources: *Medicinal Plants of the Philippines* (Quisumbing 1978), *Healing Wonders of Herbs (*Ladion 1985*), Amazing Healing Plants* (Kurian 2010), *Handbook on Philippine Medicinal Plants* (Padua et al., 1977, 1987) *and Philippine Medicinal Plants on Primary Health Care Volume 1* (Rummel 2009).

Forty-two (42) of the 108 species identified are not yet included in the list of Philippine medicinal plants based on the above references. Of these, three (3) species (*A. fistulousm, M. textilis,* and *P. arborescens*) were used by the three EC, four (4) were common to the *Manobo* and *Higaonon* tribes (*P. insignis, C. odorata, R. discolor, U. tomentosa, and A. evecta*), two were common to the *Manobo* and *Talaandig* tribes (*C. sumatrensis and D. stimulans*) and two were common to the *Higaonon* and *Talaandig* tribes (*C. contaminans* and *C. parasitica*), fourteen used by the *Hogaonon* alone, seven (7) used by the *Manobo* alone while nine (9) were used by the *Talaandig* tibe alone. These botanicals have the potential to be source of new medicinal therapeutics subject to empirical confirmation of the efficacy.

Table 5. Comprehensive list of ethnomedicinal botanicals from the three ethnoliguistic communities indicating which tribe use, the ailments treated, plant part used and preparation/application

Species	***Used by****	***Local Name***	**Ailment Treated**	**Plant Part Used**	**Preparation/ Application**
Acmella grandiflora (Turcz.) R.K.Jansen	*M*	*Alas-alas*	Toothache	Flower	Direct application of crushed leaves totooth cavity
Agathis philippinensis Warb.	*H*	*Salumayag*	Alcohol intoxication	Bark	Decoction drink
Ageratum conyzoides Linn.	*T*	*Salapante*	Hemorrhoid	Shoot	Topical application of the juice extract of crushed shoot to the anus
				Roots	Decoction drink
Allium fistulosum	*T*	*Sibuyas*	Hair Fall	Leaves	Juice extract of the crushed leaves is rubbed on the scalp
	H				
	M				

Allium odoratum L.	*T*	*Ganda yampipi*	Cough	Leaves	Leaf poultice on the back and on the chest
Alocasia macrorrhizos	*M*	*Bagyang*	Skin diseases	Stalk	Topical application of the juice extract on the affected body region through rubbing
			Toothache	Leaves	Leaves wrapped by gabi leaves (*C. esculenta*) and unidirectionally rubbed topically on the region where the pain is localized
Alocasia zebrinia C. Koch. & Hort. Veitch	*H*	*Lampusaw*	Amenorrhea	Leaves	Leaf poultice on the abdomen
Alstonia scholaris (L.) R. Br.	*M*	*Malagatas*	Stomachache	Bark	Decoction drink
	T	*Taparak*	Post-partum		
Amomum villosum Lour.	*H*	*Olo-olo*	Headache	Rhizomes	Decoction drink
Amorphophallus campanulatus Blume.	*M*	*Kalawit't busaw*	Inflammation	Stalk	Poultice on the affected body region
Angiopteris evecta (G. Forst) Hoffm.	*M*	*Maraba*	Fractures, Joint problems	Fiddlehead	Poultice on the dislocated joint or fractured bone
	H	*Andawigay*			
Artemisia vulgaris	*T*	*Hilbas*	Tonic	Shoot	Infusion drink
Artocarpus blancoi Merr.	*H*	*Tagpok*	Appetite stimulator	Roots	Decoction drink
	M	*Togop*	Galactogogue	Roots	
Axonopus compressus (Sw.) Beauv.	*M*	*Konay*	Tonic	Whole plant	Decoction drink
			Skin diseases	Leaves	Ash poultice to the affected body region
	H	*Tiyog-tiyog*	Wounds and cuts		Crushed plant is applied as poultice
	T	*Kohonan*		Shoot	Same as the *Higaonon* except a little amount of kerosene fuel is added
Bauhinia tomentosa	*H*	*Kalibang-banga-nay*	Tonic	Stem	Decoction drink

Blumea balsamifera (Linn.) DC.	*H*	*Bagasulay*	Headache	Leaves	Infusion drink
			Urinary problems		
	M	*Iso*	Cough		
	T	*Bagasulay*			
Bryonopsis laciniosa (Linn.) Naud.	*M*	*Kotoy't kakak*	Insect/ arachnid (spiders) bites	Leaves	Juice extract from leaves taken as drink
Bryophyllum pinnatum (Lam.) Kurz.	*T*	*Katakata*	Headache	Leaf	Cataplasm on the forehead
Catharanthus roseus (L.) G. Don	*T*	*Kumintang*	Birth control	Roots	Decoction drink for women
Chloranthus elatior R. Br.	*M*	*Manalak*	Post-partum remedy	Roots	Decoction drink for women
Calamus sp.	*H*	*Tobo*	Wounds and cuts	Stem	The juice of the vine is applied directly into the wound or cut
Christella parasitica (L.) Leveille	*H*	*Agpalos*	Sore eyes	Fronds	The juice extract from crushed fronds is directly applied to the affected eye
	T	*Pako-pako*	Stomachache	Roots	Decoction drink
Chromolaena odorata L.	*M*	*Hagonoy*	Wounds/ cuts	Leaves	Juice extract from crushed leaves is directly applied to the wound or cut
			Toothache	Leaves	Crushed leaves is mixed with *apog* (ash from burned snail shell) and directly applied into the teeth cavity
	H		Wounds/ cuts	Leaves	Juice extract of the crushed leaves is directly applied
Cinnamomum mercadoi Vidal	*M*	*Karingag*	Headache	Bark	Decoction drink
	H	*Kalingagan*	Headache	Leaves	
	T	*Karingag*	Tonic		
Cissus adnata Roxb.	*T*	*Tambal ho kidney*	Urinary problems	Tendril	Decoction drink

Coix lacryma-jobi L.	*M*	*Olibon*	Urinary problems	Roots	Decoction drink
	H	*Aglay*			
Coleus atropurpureus Benth.	*T*	*Tambal ho bitok*	Purgative	Shoots	Cataplasm
				Roots	Decoction
Coleus blumei Benth.	*H*	*Atay-atay*	Cough	Leaves	Maceration drink
	T				Maceration drink (use seven leaves and seven roots for infants)
	M				Juice drink
Colocasia esculenta L. Schott	*T*	*Labog*	Skin irritations	Stalk	The stalk is exposed to fire and rubbed on the affected area at a tolerable heat
Conyza sumatrensis (Retz.) E. Walker	*T*	*Bangkaw-bangkaw*	Chest pains	Stem	Ash poultice in the chest
			Ringworm	Leaves	Juice extract from leaves is applied directly on the affected area
	M	*Sagbot*	Stomachache	Roots	Roots are chewed to ingest the juice extract, also prepared as a decoction drink
Costus speciosus (J.Konig.) Sm.	*H*	*Antawasi*	Cough	Stem	Decoction drink
			Appetite stimulator	Shoot	
			Fever		
			Tonic	Stem	
			Sore eyes		Juice extract is directly applied to the affected eye
Crassocephalum crepidioides (Benth.) S. Moore.	*H*	*Kaduyag*	Wound/cut	Leaves	Juice extract is directly applied to the wound or cut
	T	*Karangaan*			
	M	*Salobo*			
Cratoxylum sp.	*T*	*Gikayan*	Tonic	Roots	Decoction drink
Cuphea carthagenensis (Jacq.) J.F.Macbr.	*T*	*Kanding-kanding*	Stomachache	Whole plant	Decoction drink
			Headache		
			Measles		
Cucurbita maxima Duchene	*T*	*Kalabasi*	Inflammation	Flower	Flower poultice to the inflamed region

Curculigo orchioides	*M*	*Taluangi*	Pre-partum remedy	Leaves	Decoction drink
	H		Ulcer	Stalk	Decoction drink of seven slices of the stalk
Cyathea contaminans (Hook) Copel.	*H*	*Anunutong*	Enlarged lymph nodes	Fiddlehead	Poultice of crushed fronds applied to the affected region
			Inflammation		
	T		Edema	Fronds	Steam inhalation
Cymbopogon citratus (DC. Ex Nees) Stapf	*T*	*Tanglad*	Anemia	Whole plant	Decoction drink
Cyperus strigosus L.	*T*	*Panyopanyo*	Tonic	Roots	Decoction drink
Cyperus brevifolius (Rottb.) Hassk.	*M*	*Salangkimot*	Measles	Roots	Decoction drink
			Tonic	Roots	
			Wounds	flower	Juice extract from crushed flower is applied directly into the wound
Dendrocalamus sp.	*H*	*Bulakaw*	Sore eyes	Water trapped in the culm	Eye wash
Dendrocnide stimulans (L.f.) Chew	*M*	Sogo	Irritations by stinging nettles	Roots	Juice extract from the roots is applied directly into the affected region
	T	*Sagai*			
Derris sp.	*H*	*Bagonok*	Urinary problems	Stem	Decoction drink
Dillenia indica L.	*H*	*Kulambog*	Cough and colds	Roots	Decoction drink
			Appetite stimulator	Stem	
			Vomiting	Bark	
	M	*Kalagtimonoy*	Cough	Fruit	Taken orally
				Water trapped in the shoot	
Diplazium esculenta (Retz.) Sw.	*T*	*Pako*	Loose bowel movement	Roots	Decoction drink

Donax cannaeformis (Forst.) K. Schum.	*H*	*Bamban*	Body pains	Rhizomes	Poultice
Elatostema sp.	*H*	*Banay-banay*	Fracture, joint dislocation	Leaves	Cataplasm to the affected bone or joint
Elephantopus scaber Linn	*M*	*Dila't Kalabaw*	Stomachache	Root	Decoction drink
	T	*Kaulod*	Wounds/ cuts	Leaves	Juice extract from the leaves is applied directly into the wound or cut
Eleusine indica Gaerth	*M*	*Dila't aso*	Tonic	Whole Plant	Decoction drink
	T	*Bangat*	Post-partum	Roots	
Euphorbia hirta Linn.	*M*	*Magalumansad*	Sore eyes	Stem (milky latex)	Milky latex is directly applied to the affected eye
	H	*Tawa-tawa*	Headache	Whole plant	Decoction drink
	T				
Ficus benjamina Linn.	*H*	*Balete*	Tonic	Stem	Decoction drink
				Roots	
	T		Fractures and joint Problems	Bark	Bark poultice at the affected joint or fractured bone with a splint
	M				
Ficus minahassae (Teijsm & de Vr.) Miq.	*H*	*Logimit*	Loose bowel movement	Bark	Chewing or decocoction (mix with the bark of *T. orientalis (Hig.: andalugong)*
			Ulcer		
Ficus nota (Blancoi.) Merr.	*M*	*Puli*	Headache	Fruit	The fruit is eaten
			Galactogogue	Roots	Decoction drink for mothers
Ficus septica Linn.	*M*	*Timbog*	Post-partum	Root	Decoction drink for mothers
			Joint problems	Bark	Poultice to the affected joint or fractured bone
	H	*Ilalama*		Root	Decoction drink
Fimbrystylis sp.	*M*	*Sod-sod*	Hair fall	Leaves	Juice extract from pounded leaves are applied directly to the scalp
Gnetum sp.	*H*	*Sagola-blab*	Purgative	Bark	Decoction drink

Gonostigia hirta (Blume.) Miquel	*T*	*Kulahian*	Hair growth	Shoot Stem	Crushed shoot and stem applied by rubbing on the scalp
Hedychium sp.	*T*	*Lumoluyaw*	Post-partum	Rhizomes	Decoction drink
			Tonic		
			Birth control		Decoction drink of seven slices of the rhizome for seven days
Homalomena rubescens (Roxb.) Kunth	*H*	*Payaw*	Cough	Roots Leaves	Decoction drink
Imperata cylindrica (L) P. Beauv.	*H*	*Salaysay*	Stimulate teeth growth	Roots	Decoction drink
	M	*Kalan*	Post-Partum		
	T	*Salaysay*	Stimulate teeth growth	Stolon (roots)	Maceration drink of seven stolons
			Measles		
			Amenorrhea		
Macaranga bicolor	*M*	*Balanguti*	Visual Problems	Leaves	Juice extract mixed with the juice extract of the flower of *B. pilosos (Man.: Pilok-pilok)* is applied directly into the affected eye
Macaranga hispida	*T*	*Hinaplan*	Post-Partum	Roots	Root decoction is mixed with decoction from *Migtunong* roots *(unidentified sp. From the Talaandigs)* and is taken as drink for mothers who just gave birth
	H	*Hindang*	Stomach ache	Bark	Decoction drink
Medinilla magnifica Lindl.	*T*	*Kalibas*	Scabies	Leaves	Decoction drink
Merremia peltata (Linn.) Merr.	*H*	*Budakan*	Ulcer	Stem	Juice from the stem is taken as drink
			Wound	Leaves	The juice extract from the leaves is directly applied to the wound to stop bleeding
	M	*Burakan*	Headache	Shoot	Decoction drink and seven leaves are applied as cataplasm in the forehead

Mikania cordata (Burm. f.) B.L Robinson	*M*	*Lobo-lobo*	Wounds/ cuts	Leaves	Juice extract is directly applied to the wound or cut
Momordica charantia L.	*M*	*Tabaring*	Tonic for infants	Leaves	The leaves are exposed to the fire until wilted and is squeezed directly into the infants mouth
*Musa textilis*Née	*M*	*Abaka*	Wounds/ cuts	Male bud (bell)	Juice extract derived from the bell is applied directly into the wound or cut
	H		Skin allergies	Pseudostem	Juice extract from the pseudostem is applied directly into the affected region
			Fever		Pounded pseudostem is applied as poultice around the neck
	T		Headache/ fever	Leaves	Decoction drink
Mycetia javanica (Blume) Reinw. ex Korth.	*H*	*Makapusa*	Loose bowel movement	Roots	Decoction drink
			Tonic for infants		
Myrmecodia tuberosa	*H*	*Tambal ho hupong*	Edema	Stem	Decoction bathe
Nepenthes sp.	*M*	*Mangabang*	Post-partum remedy	Pitcher	Charcoal drink
Nephelium lappaceum (L.) Mant.	*H*	*Balangas*	Stomachache	Bark	Maceration drink
					Decoction drink
Osmoxylon sp.	*M*	*Manimpolon*	Tonic	Root	Decoction drink
Pandanus polycephalus Lam.	*H*	*Baloy*	Joint dislocation	Shoot	Poultice of pounded shoot applied to the dislocated joint or fracture bone
Pennisetum polystachyon (L.) Schult.	*M*	*Indalawit*	Blurred vision and eye irritations	Shoot	Juice which is extracted from the shoot through squeezing after exposure to fire is applied directly into the affected eye
Pentaphragma grandiflorum Kurz.	*H*	*Biga-ok*	Tonic to infants	Whole Plant	Decoction drink
Persea americana Mill.	*T*	*Avocado*	Tonic	Leaves	Decoction drink

Phytocrene macrophylla (Bl.) Bl., Rumphia	*H*	*Malusaging*	Urinary problems	Roots	Decoction
	H	*Tadawag*	Skin diseases	Shoot	Decoction
	M	*Bubo*	Post-partum		
Piper bettle Linn.	*T*	*Manmanika*	Cough	Stem	Juice extract is taken as drink
	M	*Manika*		Leaves	Leaves are exposed to fire until wilted and applied as leaf poultice on the chest and back
	H		Wounds and Cuts		Juice extract from the leaves is directly applied to the wound or cut
Pipturus arborescens (Link) C. B. Rob.	*H*	*Alamay*	Stomachache	Leaves	Decoction drink
	M	*Landog*	Inflammation	Bark	Poultice from a pounded bark to the inflamed region
	T	*Alamay*			
Piper umbellatum-Linn. *Var.subpeltatum* (Wild.) C. DC.	*M*	*Balanguti*	Hyperacidity	Leaves	Cataplasm of seven leaves wilted in the fire in the abdominal region
			Body odor		Juice extracts from crushed leaves is applied topically
Poikilospermum suaveolens(Blume) Merr.	*M*	*Hanopol*	Cough	Bark	Decoction drink
	H				
Pollia thyrsiflora (Blume) Bakh. F.	*M*	*Mata't ulobang*	Edema	Leaves	Bathe from the leaves decoction mixed with the leaves decoct of *P. Umbellatum (Man.: Balanguti)*
Psidium guajava Linn.	*T*	*Bayabas*	Stomachache	leaves	Decoction drink
Pterospermum niveum S. Vidal	*M*	*Bayog*	Insomnia	Stem	Decoction drink
Pteridium aquilinum (L.) Kuhn	*T*	*Sigpang*	Inflammation	Shoot/ stem	Poultice crushed shoots and stems to the inflamed region

Rhynchotechum discolor (Maximowicz) B.L. Burtt.	*H*	*Maitom*	Burns	Bark	Poultice
	M	*Hapoy-hapoi*	Wounds/ cuts	Leaves	Juice topical application
Rubus rosaefolius Sm.	*M*	*Sambugaw't lako*	Amenorrhea	Roots	Decoction drink
Rubus moloccanus Linn.	*T*	*Logimit*	Tonic	Shoots	Shoots are chewed to ingest the juice extract
	H	*Sapinit*	Toothache/ post-partum	*Roots*	Decoction drink
Saccharum officinarum L.	*M*	*Tiro*	Poisoning	Stem	Juice extract is mixed with raw eggs and is taken orally
Schefflera odorata (Blanco) Merr. And Rolfe	*H*	*Magaw-panga (Hig.)*	Snake, insect and other animal bites.	Roots	Decoction drink
	T	*Pamamah-andi*	Tonic		
	M	*Tagima*			
Schismatoglottis calyptra (Roxb.) Zoel. And Moritzi	*M*	*Apusaw*	Wounds/ cuts	Stalk	Decoction drink
			Galacto-gogue	Flower	Cooked and eaten
Setaria italica (L.) P. Beauv.	*H*	*Dawa (Hig.)*	Measles	Roots	Decoction drink
Sida rhombifolia L.	*T*	*Eskubiya*	Post-partum	Roots	The root decoction is mixed with the root decoction of *E. indica* and taken as drink
	M				
Schefflera trifoliata Merr. And Rolfe	*H*	*Buliya*	Hematuria	Stem	Juice from the vine is taken as drink
			Stomach ache		Decoction drink
	M	*Bilya*	Amenorrhea	Roots	Decoction drink
Scleria sp.	*T*	*Talahid*	Blood in vomit	Shoots	Decoction drink
			Loose bowel movement	Roots	
Smilax sp.	*T*	*Banag*	Tonic	Roots	Decoction drink
Stachytarpheta jamaicensis (L.) Vahl	*T*	*Kanding-kanding Lawihan*	Post-partum	Roots	Decoction drink

Shorea negrosensis Foxw.	*H*	*Lawaan*	Cough	Roots	Decoction drink
Tetracera scandens (Linn.) Merr.	*H*	*Tukas*	Appetite stimulation	Roots	Decoction drink
	M	*Kalagti-monoy*	Urinary problems		
Trema orientalis (L.) Bl.	*H*	*Andalu-gong*	Stomach-ache	Bark	Decoction drink
			Loose bowel movement		The inner bark is scraped and mixed with the scraped inner bark of *F. minahassae (Hig.: Logimit)* and is then chewed to ingest the juice extract
			Abdominal problem		
	M		Skin dis-eases		Decoction bathe
Uncaria tomentosa (Wild.) D.C.	*H*	*Kawilan*	Wounds and cuts	Stem	Decoction drink
				Leaves	
	M	*Kawilaw*	Pulmonary Problems (TB)	Stem	Juice drink
			Mouth sore	Claws	Charcoal poultice
Urena lobata Linn	*T*	*Salindu-kot*	Hyperacid-ity	Roots	Decoction drink
			Measles	Leaves	Juice extract from the leaves is applied topi-cally in the affected region
Villebrunea rube-scens	*H*	*Salin-ubod*	Wounds and cuts	Bark	Poultice to the wound
					Decoction topical ap-plication and decoc-tion drink
	M	*Linow-ubod*	Post-Partum	Roots/ Leaves	Decoction drink
			Tonic		
Vetiveria zizanoides (L.) Nash	*M*	*Bantong*	Hair growth	Leaves	Juice extract from the pounded leaves and stem is applied di-rectly on the scalp
				Stem	
Zingiber zerumbet (L.) Smith	*M*	*Saluwak-suwak*	Hair fall	Flower	The slimy sap from the inflorescence is directly applied to the scalp.
Ziziphus cumingia-na Merr.	*H*	*Kawila*	Bloody stool	Stem	Decoction drink

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Emphasizing the importance of "sevens" (7 shoot, 7 leaves, 7 root) in their medicinal application, 40 common ailments (Table 4) were treated through decoction, infusion, maceration, juice extraction and poultice (Table 5 and Figures 3 and 4). The parts used, their preparation for treatment and which tribe used them are given in Table 5.

Table 6. Reported common ailments and the species used for treatment by the different tribes.

Common ailments	***Species used for treatment***	**Used by***	**Number of species used**
Alcohol intoxication	*Agathis philippinensis*	H	1
Amenorrhea	*Alocasia zebrina*	H	4
	Imperata cylindrica	T	
	Robus rosaefolius	M	
	Schefflera trifoliata	M	
Anemia	*Cymbopogon citratus*	T	1
Anti-inflammatory	*Amorphophallus campanulatus*	M	5
	Cythea contaminans	H	
	Cucurbita maxima	T	
	Pipturus arborescens	MT	
	Pteridium aquilinum	T	
Appetite stimulator	*Artocarpus blancoi*	H	4
	Dillenia indica	H	
	Homalomena rubescens	H	
	Tetracera scandens	H	
Birth control	*Catharanthus roseus*	T	2
	Hedychium sp.	T	
Bloody stool	*Ziziphus cumingiana*	H	1
Blood in vomit	*Scleria sp.*	T	1
Body odor	*Piper umbellatum*	M	1
Burns	*Rhynchotechum discolor*	H	1
Chest pains	*Conyza sumatrensis*	T	1

Cough and colds	*Allium odoratum*	T	10
	Blumea balsamifera	MT	
	Coleus blumei	MTH	
	Costus speciosus	H	
	Dillenia indica	MH	
	Homalomena rubescens	H	
	Piper bettle	MT	
	Poikilospermum suaveolens	MH	
	Shorea negrosensis	H	
	Uncaria tomentosa	M	
Edema	*Cyathea contaminans*	T	4
	Myrmecodia tuberosa	H	
	Piper umbellatum	M	
	Pollia thyrsiflora	M	
Eye problems	*Dendrocalamus sp.*	H	5
	Christella parasitica	H	
	Euphorbia hirta	M	
	Macaranga bicolor	M	
	Pennisetum polystachyon	M	
Fractures and Joint Problems	*Angiopteris evecta*	MH	5
	Elatostema sp.	H	
	Ficus benjamina	MT	
	Ficus septica	MH	
	Pandanus polycephalus	H	
Galactogogue	*Artocarpus blanco*	M	2
	Schismatoglottis calyptra	M	
Hair fall/Hair Growth	*Allium fistulosum*	MTH	5
	Fimbrystylis sp.	M	
	Gonostigia hirta	T	
	Vetiveria zizanoides	M	
	Zingiber zerumbet	M	

Head ache/fever	*Amomum villosum*	H	8
	Blumea balsamifera	H	
	Bryophyllum pinnatum	T	
	Cinnamomum mercadoi	MH	
	Euphorbia hirta	TH	
	Ficus nota	M	
	Merremia peltata	M	
	Musa textilis	T	
Hematuria	*Schefflera trifoliata*	H	1
Hemorrhoid	*Ageratum conyzoides*	T	1
Hyperacidity	*Curculigo orchioides*	H	5
	Merremia peltata	H	
	Piper umbellatum	M	
	Trema orientalis	H	
	Urena lobata	T	
Insomnia	*Pterospermum niveum*	M	1
Loose bowel movement	*Diplazium esculenta*	T	4
	Ficus minahassae	H	
	Mycetia javanica	H	
	Trema orientalis	H	
Malaria	*Alstonia scholaris*	M	1
Measles	*Cyperus brevifolius*	T	4
	Imperata cylindrica	T	
	Setaria italic	H	
	Urena lobata	T	
Mouth sore	*Uncaria tomentosa*	M	1
Nausea/Vomiting	*Dillenia indica*	H	2
	Scleria sp.	T	
Poisoning	*Saccharum officinarum*	M	1

Post-partum treatments	*Chloranthus elatior*	M	10
	Eleusine indica	T	
	Hedychium sp.	T	
	Imperata cylindrica	M	
	Macaranga hispida	T	
	Nepenthes sp.	M	
	Pinanga insignis	H	
	Robus moloccanus	H	
	Stachytarpheta jamaicensis	T	
	Villebrunea rubescens	M	
Pre-natal therapy	*Curculigo orchioides*	M	1
Purgative	*Coleus atropurpureus*	T	2
	Gnetum sp.	H	
Skin disease/skin irritations	*Alocasia macrorrhizos*	M	8
	Colocasia esculenta	T	
	Conyza sumatrensis	T	
	Dendrocnide stimulans	MT	
	Medinilla magnifica	T	
	Musa textilis	H	
	Pinanga insignis	H	
	Trema orientalis	M	
Snake, Insect and animal bites	*Bryonopsis laciniosa*	M	2
	Schefflera odorata	H	
Stomach ache and abdominal pains	*Alstonia scholaris*	M	11
	Christella parasitica	T	
	Conyza sumatrensis	M	
	Cuphea carthagenensis	T	
	Elephantopus tomentosus	M	
	Macaranga hispida	H	
	Nephelium lappaceum	H	
	Pipturus arborescens	H	
	Psidium guajava	T	
	Schefflera trifoliata	H	
	Trema orientalis	H	
Teeth growth	*Imperata cylindrica*	MTH	1

Tonic	*Artemisia vulgaris*	T	10
	Axonopus compressus	M	
	Bauhinia tomentosa	H	
	Cinnamomum mercadoi	T	
	Cratoxylum sp.	T	
	Cyperus brevifolius	M	
	Cyperus strigosus	T	
	Eleusine indica	M	
	Ficus benjamina	H	
	Hedychium sp.	T	
Tonic for infants	*Momordica charantia*	M	3
	Mycetia javanica	H	
	Pentaphragma grandiflorum	H	
Toothache	*Acmella grandiflora*	M	4
	Alocasia macrorrhizos	M	
	Chromolaena odorata	M	
	Rubus moloccanus	H	
Urinary problems	*Blumea balsamifera*	H	6
	Cissus adnata	T	
	Coix lacryma-jobi	MH	
	Derris sp	H	
	Phytocrene macrophylla	H	
	Tetracera scandens	M	

Wounds and cuts	*Axonopus compressus*	TH	13
	Calamus sp.	H	
	Chromolaena odorata	MH	
	Crassocephalum crepidioides	MTH	
	Cyperus brevifolius	M	
	Elephantopus tomentosus	T	
	Merremia peltata	H	
	Mikania cordata	M	
	Musa textilis	M	
	Rhynchotechum discolor	M	
	Schismatoglottis calyptras	M	
	Uncaria tomentosa	H	
	Villebrunea rubescens	H	

Table 6 lists the illnesses treated with the EMD botanicals. For lack of verified diagnoses, the common terms are used to describe the conditions being treated. Thirteen (13 species) were reported to be traditionally used in treating wounds and cuts; 11 for stomach ache and abdominal pains; 10 species each as tonic, post-partum remedy and as treatment for cough/colds; eight (8) species for headache/fever; six (6) species for urinary problems; five (5) species each for inflammation, hair fall, eye problems, joint problems and hyperacidity; four (4) species each for amenorrhea, loss of appetite, edema, loose bowel movement, measles, and toothache; two (2) species for birth control, milk secretion stimulation, nausea and vomiting, as purgative, snake and insect bites, one (1) each for alcohol intoxication, anemia, bloody stool, blood in the vomit, body odor, burns, chest pain, hematuria, hemorrhoid, insomnia, malaria, mouth sore, poisoning, pre-natal therapy and teeth growth.

It is interesting to note that although the three EC used some common plants, they were sometimes used to treat different ailments. For example, *Musa textilis* is used for headache by the *Talaandig*, for skin diseases by the *Higaonon*, while the *Manobo* used it for wounds and cuts. Other examples can be found in Tables 5 and 6. In addition, each tribe had their own unique usage for the botanical species. For example, one species used for treating alcohol intoxication, bloody stool, burns and hematuria was reported only by the *Higaonon*. This tribe also reported the use of one species for hematuria and four (4) different species for appetite stimulation. The other two tribes did not report the use of EMD plants for these conditions. Only the *Talaandig* reported the use of one species for treating blood in vomit, chest pains and

hemorrhoid, and two species for birth control and purgative. The other two tribes did not report the use of any of the botanical species for these conditions. Only the *Manobo* reported the use of one species to treat body odor, insomnia, malaria, mouth sore, poisoning and pre-natal therapy and two for stimulation of milk secretion (galactogogue); the other two tribes did not report the use of any of the species for these conditions. For coughs and common colds, most of the species used were shared by the three EC. All the three EC reported the use of the same species for the stimulation of teeth growth. All the other illnesses were treated with similar EMD botanical species.

CONCLUSIONS

In conclusion, the three selected EC possess unwritten and undocumented traditional knowledge about EMD botanicals. Several species were not found in the list of medicinal plants in the Philippines and could be potential sources of new medicinal therapeutics. Confirmation of their efficacy is being investigated in the light of modern, evidence-based medicine. The taxonomic placement of one specimen (*Hedychium sp.*) has not been established and could potentially be a new species endemic to the region.

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