

Plants and Culture: Plant utilization among the local communities in Kabayan, Benguet Province, Philippines

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The Cordillera region occupies a mountainous and forested area in the northern most part of the Philippines. With a favorable temperate climatic regime, the region is endowed with a rich and diverse flora and fauna. Moreover, the region is inhabited by local communities with a diverse culture. With an intimate interaction with the environment, the communities have developed inherent indigenous uses of the plant resources around them. The main aim of this project is to determine the useful plants in Kabayan, Benguet province and document the traditional knowledge that are associated with the useful plants, Kabayan is one of the 13 municipalities in Benguet province. The municipality is predominantly peopled by three ethnolinguistic groups namely: *Ibaloi*, *Kankanaey* and *Kalanguya*, that demonstrate inimitable indigenous knowledge on plant utilization. Ethnobotanical survey was conducted using a structured questionnaire which was used as a guide for the individual interviews and focused group discussions. Plant uses range from food, shelter, clothing, rituals, medicine and many more. They also preserve their dead using various plant extracts. This indigenous knowledge is currently endangered because these are held by the older generation and if not documented, this ethnobotanical knowledge will be irreversibly lost.

Keywords: Cordillera region, Ethnobotanical use, *Ibaloi*, *Kalanguya*, *Kankanaey*, Traditional knowledge

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With a temperate climate, the Cordillera Central Range is habitat to a distinctive flora and fauna as well as home to indigenous groups with a diverse culture. Their everyday activities in all facets of their life are guided by their beliefs and cultural practices. Because the indigenous groups are entwined with the environment, they also possess an enormous indigenous knowledge on how to utilize their natural resources. The uses of plants can range from food, shelter, clothing and many more. Moreover, local communities have been using herbal remedies for several decades yet to date, most of these medicinal plants have only been barely documented. These medicinal plants have been tried and tested by their ancestors and are orally transmitted to the younger generation. Cultural practices also involve the use of plants, which are also used in ritual activities, either as offering or ritual paraphernalia. In most areas in the Cordillera, indigenous groups have high respect for their dead hence plants are also used in the preservation of the dead, including mummification. The use of plants in mummification in Kabayan is

discussed in another paper. Plant utilization patterns may be present among indigenous tribes in the country however to date, there is lack of complete ethnobotanical documentation or data that can be used to compare the similarities and differences on plant utilization across the different indigenous groups.

Ethnobotanical uses of plants

Despite the richness in indigenous knowledge in the Philippines, very few remarkable ethnobotanical documents have been written and published. Earlier studies focused on well-known minority groups such as the *Negratoes* and *Tasadays*¹⁻³ the *Ifugao*⁴⁻⁵ and the *Bontoc*⁶. Likewise, earlier studies on medicinal plants in various parts of the Philippines have also been written⁷⁻¹⁰. In the Cordillera region, a valuable work that provides a relatively comprehensive account of medicinal folklore of the Cordillera region has been published¹¹. This book contains local names and traditional uses of plants by the different Cordillera indigenous groups. While this literature is considered a valuable contribution to ethnomedicine by local communities in the region, phytochemical studies and toxicity tests of the identified medicinal plants is

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wanting. Recent ethnobotanical works in the Cordillera region demonstrate a documentation of the traditional uses of plants by various local communities such as the *Ibaloi* in Tabaaan Norte¹², the *kalanguya* in Tinoc, Ifugao¹³⁻¹⁴ and the people in Bayabas, Sablan, Benguet¹⁵. Additionally, an equally valuable work provides a list of plants and their uses among local communities in Apayao¹⁶. These studies include lists of useful plants and how these are used in the various local communities.

In the past decade, finding solutions to emerging diseases and health problems had led to a plethora of published related materials¹⁷⁻²⁷. Most of the results of these works show the importance of plants for the treatment of various ailments. In Africa and other countries, medicinal and aromatic plants are reservoirs of curative elements in the treatment of various diseases such as malaria, diabetes and many more²⁸. The traditional knowledge on medicinal plants that are inherent in local communities is a very important source of information that continually provides the present-day herbal remedies.

Of late, studies have been done on the isolation and determination of important substances in medicinal plants. One of recent studies screened 12 species of plants in India using phytochemical analyses²⁹. Additionally, the aqueous and methanol extracts of the plants were also evaluated for antibacterial activity against medically important bacteria. Results revealed the presence of alkaloids and flavonoids in relatively greater amounts can contribute to their potency. Phytochemical screening of the therapeutic importance from *Strychnos potatorum* L.f. was also elucidated by Mallikharjuna *et al.*³⁰ In this study, secondary metabolites from the root, stem, bark, and seeds of *S. potatorum* involved the preliminary screening, quantitative determination and the qualitative thin layer chromatographic separation. High Performance Liquid Chromatography (HPLC) was used to determine the alkaloid profile of the seed. Results showed that the plant has a curative effect which can be attributed to the presence of various secondary metabolites such as alkaloids, flavonoids, glycosides, phenols, saponins, sterol and lignin.

With the shifting trend of society towards the use of plants in the treatment of various diseases and other purposes, this paper focused on the identification of the useful plants in Kabayan, Benguet province and document the traditional knowledge that are associated with the useful plants.

Methodology

Site of the study

Kabayan, the site of this study, is one of 13 municipalities in Benguet Province with 13 barangays (Fig. 1). It is a fourth-class municipality with a population of 15,260 (Kabayan profile). It spans an area of 24,269 hectares³¹. Currently, the people of Kabayan belongs to three of the indigenous groups in the Cordillera region, Luzon, Philippines namely *Ibaloi*, *Kalanguya*, and *Kankana-ey*, Vegetable farming is the primary source of income of the community.

It is believed that the first settlers of Kabayan came from the Pangasinan area following the Agno river, and settled in a barangay called Baloy, Itogon. When an epidemic struck Baloy, the settlers moved upstream and occupied one of the barangays in Kabayan called Embosi³². This group that moved upwards to Embosi from Baloy are then called *Ibaloi*, the prefix *i* attached to a noun means 'coming from'.

The *Ibalois* presently predominates almost all parts of Kabayan. The other indigenous group, the *Kalanguyas* believed to have originated from the neighboring municipality, Ahin of Tinoc, Ifugao, also found settlement in Kabayan. The lesser percentage of the population comes from various adjoining barangays and municipalities as a result of intermarriage.

Kabayan got its name from the word *kabaayan*, a local term which means "from the place" where *baay* or *baai*, a leguminous vine which once predominated the place. Interestingly, Kabayan is popularly known for its fire mummies that can still be found in various burial caves and rock.

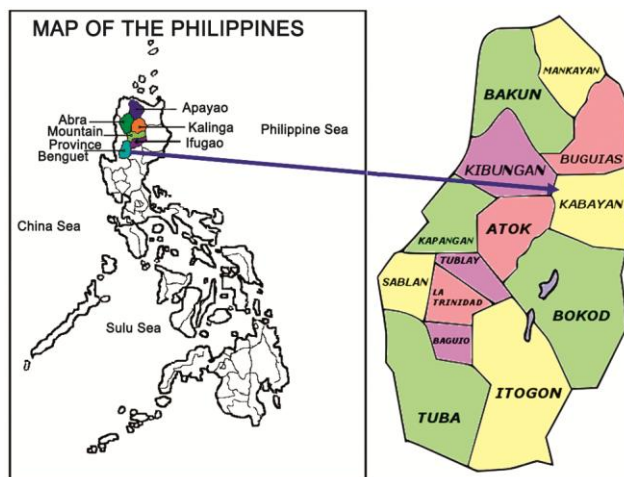


Fig. 1 — Location of the study area

Ethnobotanical survey/notes and focused group discussions (FGDs)

Prior to the conduct of the study, the research project was first presented in a meeting with the municipal and barangay officials of Kabayan, Benguet province. Permit to interview and conduct the project was sought from the mayor in consultation with the elders. Ethnomedicinal knowledge was obtained through interviews and focused group discussions with key informants and local residents. A semi-structured questionnaire was prepared for the purpose and was used as a guide during the conduct of the interviews and FGDs. Key informants were identified and interviewed with the help of the local officials. Interviews were conducted in selected barangays. There were 107 respondents who participated in the various interviews and focused group discussions, the age ranged from 12 to 99 yrs old, of which 40 were males and 67 were females. One of them is a female healer in one barangay and had provided a lot of information on medicinal plants.

Plant collection, identification and documentation

Based on the interviews, plants that are useful to the local community were recorded and summarized in Tables 1-8. The useful plants were classified according to the uses. Samples of the plants including those used in rituals and preservation of the dead were collected for identification. Representative sample of each plant was pressed, dried, labeled correctly and deposited at the UP Baguio herbarium.

Results and discussion

Ethnobotanical uses of plants by local communities in Kabayan, Benguet province vary from food, medicine, construction materials, ornamental, rituals and preservation of the dead, and other uses. Plants that are used for medicinal purposes have been bio-assayed against available bacteria to provide scientific basis for their use. Moreover, the traditional plant-based remedies and the details of their collection, preparation and administration were also recorded. The Tables 1-8 below show the different uses of plants among the local people of Kabayan, Benguet province.

The food plants

Table 1 summarizes the plants that were enumerated by the participants that are used for food. There are 53 food species belonging to 43 genera and 32 families. Two families namely Brassicaceae and Solanaceae are well represented, with six species each, followed by Cucurbitaceae which was

represented by four species, while Fabaceae, Poaceae and Rosaceae represented by three species each. The dominant plant part that is considered edible is the fruit and the leaves. Most of the food plants are cultivated with just a few species that are harvested from the wild. Examples of the latter are the wild berries, *Rubus moluccanus*, *R. rosaefolius* and blueberries, locally called *agusip*. Indigenous vegetables include *amti* (*Solanum nigrum*), *angbad* (*Bidens pilosa*) and banana blossom or young fruit. The five most cited plant used for food are *Daucus carota* (46), *Colocasia esculenta* (41), *Ipomoea batatas* (39), *Brassica rapa* var. *capitata* (35), *Musa paradisiaca* (35) and *Solanum lycopersicum* (25). Most of these food plants are cultivated.

Medicinal plants of Kabayan

Cognizant to the importance of searching for less expensive but equally if not more effective plant-based medicines, and the desire to contribute to the documentation of the traditional uses of plants in the Philippines, this study also aims to document the ethnomedicinal knowledge among the local community in Kabayan, Benguet province.

Tables 2&3 provide a summary of the folkloric use of plants for the treatment of various illnesses and ailments in Kabayan, Benguet. Interestingly, there are 47 medicinal species belonging to 43 genera and 32 families. The use value (UV) was calculated to demonstrate the relative importance of the species known locally³³.

The formula of use value is as follows: $UV = \sum U/n$, where UV indicates the use value of individual species, U is the number of recorded uses for that species and indicates the number of informants who reported that species. The use value of each species varied. As to frequency citation, the top five cited plants with folkloric medicinal uses arranged from highest to lowest are: *bayabas* (65), *papaya* (48), *oregano* (45), *tangan-tangan* (32) and *sambong* (23), with number of citations in parentheses. Each of the medicinal plants have varied uses in the treatment of disease/ailment/s. The most common illnesses treated by the medicinal plants are skin-related such as wounds, scabies, and burns; respiratory-related illnesses such as cough and colds; other illnesses include headache, stomach ache, diarrhea, stomach ulcer, anemia, sore throat and eyes, cancer and many more.

The most used plant parts are the leaves, perhaps because of its availability and relative abundance. In Fig. 2, 80 % of the plant parts are utilized for the

Table 1 — Plants used for food by the local community of Kabayan, Benguet province

Family	Scientific name	Local/common name	Edible parts	Citation Frequency
Alliaceae	<i>Allium odorum</i> L.	<i>kutsay</i>	leaves	6
	<i>Allium cepa</i> L.	<i>sibuyas</i>	bulb and leaves	10
Anacardiaceae	<i>Mangifera indica</i> L.	<i>manga</i>	fruit	19
Annonaceae	<i>Annona muricata</i> L.	<i>guyabano</i>	fruit	3
Apiaceae	<i>Daucus carota</i> L.	carrots	roots	46
Araceae	<i>Colocasia esculenta</i> (L.) Schott.	<i>aba (fruit); pising (leaves)</i>	rhizome and leaves	41
Arecaceae	<i>Cocos nucifera</i> L.	<i>niyog</i>	fruit	6
Asteraceae	<i>Bidens pilosa</i> L.	<i>angbad</i>	shoots	3
	<i>Lactuca sativa</i> L.	<i>lettuce</i>	leaves	13
Brassicaceae	<i>Brassica oleracea</i> L. var. <i>italica</i> Plenck.	<i>broccoli</i>	leaves	10
	<i>Brassica oleracea</i> L. var. <i>botrytis</i> L.	cauliflower	leaves	24
	<i>Brassica rapa</i> L. var. <i>pekinensis</i> (Lour) Kitam.	<i>pechay</i>	leaves	21
	<i>Raphanus raphanistrum</i> L. subsp. <i>sativus</i> (L.) Domin.	<i>radish</i>	roots	5
	<i>Brassica rapa</i> L. var. <i>capitata</i> L.	<i>repolyo</i>	leaves	35
	<i>Nasturtium officinale</i> R.Br.	<i>tungsoy</i>	stems and leaves	9
Bromeliaceae	<i>Ananas comosus</i> (L.) Merr.	<i>pinya</i>	fruit	3
Caricaceae	<i>Carica papaya</i> L.	<i>papaya</i>	fruit	15
Chloranthaceae	<i>Sarcandra glabra</i> (Thunb.) Nakai.	<i>itcha</i>	leaves	2
Convolvulaceae	<i>Ipomoea batatas</i> (L.) Lam.	<i>docto/camote</i>	tuber and shoot	39
Cucurbitaceae	<i>Cucurbita maxima</i> Duchesne	<i>carabasa</i>	fruit	17
	<i>Momordica charantia</i> L.	<i>parya, ampalaya</i>	fruit and leaves	15
	<i>Cucumis sativus</i> L.	<i>pepino</i>	fruit	2
	<i>Sechium edule</i> Sw.	<i>sayote</i>	shoot and fruit	30
Dioscoreaceae	<i>Dioscorea alata</i> L.	<i>ube</i>	root tuber	6
Ericaceae	<i>Vaccinium myrtilloides</i> Miq.	<i>agusip, blueberry</i>	fruit	5
Euphorbiaceae	<i>Manihot esculenta</i> Crantz	<i>kamoteng kahoy/cassava</i>	roots	17
Fabaceae	<i>Phaseolus lunatus</i> L.	<i>beans</i>	seeds and pod	22
	<i>Cajanus cajan</i> (L.) Huth	<i>cardis</i>	seeds	1
	<i>Phaseolus vulgaris</i> L.	<i>Patani/ domeng</i>	legume	5
	<i>Pisum sativum</i> L.	<i>sweet peas</i>	fruit or legume	2
Lauraceae	<i>Persea Americana</i> Mill.	<i>avocado</i>	fruit	8
Musaceae	<i>Musa paradisiacal</i> L.	<i>Banana/ saba</i>	fruit and blossom (young fruit)	35
Myrtaceae	<i>Psidium guajava</i> L.	<i>bayabas</i>	fruit	13
Passifloraceae	<i>Passiflora edulis</i> Sims.	<i>masaplora</i>	fruit	3
Poaceae	<i>Oryza sativa</i> L.	<i>bagas, rice</i>	grain	18
	<i>Zea mays</i> L.	<i>mais/corn</i>	grains	3
	<i>Bambusa spp.</i>	<i>rabong/bamboo shoot</i>	young shoot	2
Rosaceae	<i>Fragaria vesca</i> L.	<i>strawberries</i>	fruit	6
	<i>Rubus moluccanus</i> L.	wild berry	fruit	4
	<i>Rubus rosifolius</i> Sm.	wild berry	fruit	4
Rubiaceae	<i>Coffea Arabica</i> L.	<i>kape</i>	seeds	6
Rutaceae	<i>Citrus reticulata</i> Blanco	<i>orange</i>	fruit	3
	<i>Citrus grandis</i> Osbeck	<i>suha</i>	fruit	8
Sapotaceae	<i>Pouteria campechiana</i> (Kunth) Baehni	<i>chesa</i>		2
Solanaceae	<i>Solanum nigrum</i> L.	<i>anti</i>	shoots	5
	<i>Solanum lycopersicum</i> L.	<i>kamatis</i>	fruit	25
	<i>Solanum tuberosum</i> L.	<i>patatas</i>	tubers	22
	<i>Capsicum annum</i> L.	<i>sili</i>	fruit	7
	<i>Capsicum frutescens</i> L.	<i>sili labuyo</i>	fruit	6
	<i>Solanum melongena</i> L.	<i>tarong</i>	fruit	13
Winteraceae	<i>Drimys piperita</i> Hook f.	<i>hawal</i>	leaves and fruits	3
Woodsiaceae	<i>Diplazium esculentum</i> (Retz) Sw.	<i>paco</i>	fiddlehead or shoot	14
Zingiberaceae	<i>Zingiber officinale</i> Roscoe	<i>laya</i>	rhizome	11
Number of family: 32	Number of genera: 43			
	Number of species: 53			

Table 2 — Medicinal plants used by the local community in Kabayan, Benguet province

Family	Scientific name	Local name	Plant parts used	Local Uses/Ailments or diseases cured	Citation Frequency	Use Value
Acoraceae	<i>Acorus calamus</i> L.	<i>bengaw / bangaw</i>	leaves	The scent of crushed leaves and roots can reduce headache.	7	0.14
Alliaceae	<i>Allium odorum</i> L.	<i>kutsay</i>	leaves	Crushed leaves are applied as poultice on affected area to relieve muscle pain and reduces inflammation.	16	0.13
Aloaceae	<i>Aloe vera</i> L.	<i>aloe vera, sabila</i>	leaves	Leaves are applied as poultice on burns; leaf extract is applied on scalp to grow hair.	2	1
Annonaceae	<i>Annona muricata</i> L.	<i>guyabano</i>	leaves	Decoction of leaves is given during diarrhea and cancer.	13	0.15
Araceae	<i>Colocasia esculenta</i> Schott	<i>aba</i>	tubers	Tubers can be powderized and applied on wounds.	2	2
Arecaceae	<i>Areca catechu</i> L.	<i>buwa /bua</i>	fruit	Fruit can be chewed and juice swallowed to expel worms; chewing the fruit strengthens teeth; it is one of the mix in betel nut chewing.	9	0.33
Asteraceae	<i>Blumea balsamifera</i> DC.	<i>sambong, subusob</i>	leaves	Decoction of leaves is given during cough, gastritis, stomach ulcer and as wash for wounds.	23	0.17
	<i>Eupatorium adenophorum</i> Spreng.	<i>baluwet</i>	leaves	Crushed leaves are applied as poultice on wounds.	1	1
	<i>Tithonia diversifolia</i> A. Gray	<i>mirasol / marapait</i>	leaves	Crushed leaves are applied as poultice on wounds.	19	0.05
Athyrioideae	<i>Diplazium esculentum</i> (Retz.) Sw.	<i>paco</i>	leaves	Decoction of leaves is given during cough and UTI.	5	0.4
Brassicaceae	<i>Nasturtium officinale</i> R.Br.	<i>tungsoy</i>	leaves	Leaves can be cooked and eaten to reduce hypertension.	4	0.25
Caprifoliaceae	<i>Viburnum odoratissimum</i> Ker-Gawl.	<i>Ildog</i>	leaves, stem	Stem from boiling the leaves and stem can treat sore eyes.	11	0.09
Caricaceae	<i>Carica papaya</i> L.	<i>papaya</i>	leaves	Decoction of leaves is given during kidney ailments and cough.	48	0.5
Chloranthaceae	<i>Sarcandra glabra</i> (Thunb) Nakai	<i>Gipas, Gipah</i>	leaves	Decoction of leaves is given during stomach ache and UTI; it is also used as wash for wounds; diuretic.	17	0.18
Convolvulaceae	<i>Ipomoea batatas</i> (L.) Lam.	<i>camote tops</i>	shoots	Cooked shoots is eaten as viand to treat anemia.	7	0.25
Cucurbitaceae	<i>Momordica charantia</i> L.	<i>ampalaya</i>	leaves	Decoction of leaves is given to somebody with cancer and diabetes.	7	0.29
Dennstaedtiaceae	<i>Pteridium aquilinum</i> (L.) Kuhn.	<i>alam-am</i>	leaves	Crushed leaves are applied as poultice on wounds.	1	1
Equisetaceae	<i>Equisetum ramosissimum</i> Desf.	<i>putputod</i>	all parts	Decoction of all parts is given during UTI and kidney ailments.	9	0.22
Euphorbiaceae	<i>Jatropha curcas</i> L.	<i>tangan-tangan</i>	leaves	Crushed leaves are applied as poultice on affected area to relieve muscle pain.	32	0.03
Fabaceae	<i>Phaseolus lunatus</i> L.	<i>patani, domeng</i>	leaves	Crushed leaves are applied as poultice on wounds and rashes caused by <i>Tinia flava</i> .	10	0.2
	<i>Senna alata</i> (L.) Rozb.	<i>acapulko</i>	leaves	Crushed leaves are applied as poultice on scabies and other skin diseases.	11	0.18
Lamiaceae	<i>Mentha arvensis</i> L.	<i>yerba buena/ biks plant</i>	leaves	Decoction of leaves is given during cough.	10	0.1
	<i>Origanum vulgare</i> L.	<i>oregano</i>	leaves	Decoction of leaves is given during cough.	45	0.02
	<i>Vitex negundo</i> L.	<i>lagundi</i>	leaves	Decoction of leaves is given during cough and colds.	19	0.11
Lauraceae	<i>Persea Americana</i> Mill.	<i>avocado</i>	leaves	decoction of leaves is given during cough, colds and diarrhea	2	1.5

Contid...

Table 2 — Medicinal plants used by the local community in Kabayan, Benguet province (*Contid...*)

Family	Scientific name	Local name	Plant parts used	Local Uses/Ailments or diseases cured	Citation Frequency	Use Value
Melastomataceae	<i>Melastoma polyanthum</i> Blume.	<i>baksi</i> (<i>Melastoma</i>)	leaves	Decoction of leaves is given during cough.	1	1
Moringaceae	<i>Moringa oleifera</i> Lam.	<i>malunggay</i>	leaves	Cooked leaves are eaten as viand to treat anemia.	4	0.25
Musaceae	<i>Musa paradisiaca</i> L.	<i>banana, saba</i>	pseudostem, leaves	Pseudo-stem and leaves are applied directly on the head to abate fever; boiled raw fruit when eaten can treat diarrhea.	6	0.33
Myrtaceae	<i>Eucalyptus tereticornis</i> Sm.	<i>eucalyptus</i>	leaves	Decoction of leaves is given during cough, fever and asthma.	15	0.2
	<i>Psidium guajava</i> L.	<i>bayabas</i>	leaves, shoots	Decoction of leaves is given during diarrhea and cough; it can also be used as wash for wounds; shoots are chewed and the juice swallowed to treat ulcer and diarrhea.	65	0.06
Pinaceae	<i>Pinus kesiya</i> Royle ex Gordon	<i>pine tree</i>	bark	Ashes from burnt bark can be mixed with water and given during diarrhea; decoction from the bark is given during UTI.	6	0.33
Piperaceae	<i>Piper betle</i> L.	<i>gawed</i>	leaves	Leaves are heated, spread with coconut oil and applied on upper back to treat cough.	15	0.17
Pittosporaceae	<i>Pittosporum resiniferum</i> Hemsl.	<i>shael/dail</i>	leaves	Decoction of leaves is given during diarrhea, LBM, cough; it is also used as wash for wounds.	14	0.29
Plantaginaceae	<i>Plantago major</i> L.	<i>lanting</i>	leaves	Decoction of leaves is given during UTI, and liver ailments, can also help kill cancer cells.	8	0.38
Poaceae	<i>Cymbopogon citratus</i> Stapf.	<i>lemon grass</i>	leaves	Decoction of leaves is given during cough.	17	0.06
	<i>Saccharum officinale</i> Salisb.	<i>Unas/ sugar cane</i>	stem	The stem can be chewed as source of energy.	1	1
Polypodiaceae	<i>Crypsinus taeniatus</i> (SW) Copel.	<i>sarsarapa</i>	leaves	Crushed leaves can be chewed during toothache.	1	1
Rubiaceae	<i>Coffea Arabica</i> L.	<i>cape</i>	leaves	Decoction of leaves is given during diarrhea.	2	0.5
Rutaceae	<i>Citrus limon</i> (L.) Burm f.	<i>lemon</i>	leaves	Decoction of leaves is given during cough and colds.	2	1
	<i>Citrus microcarpa</i> Bunge.	<i>calamansi</i>	fruit	Fruit juice mixed with honey can cure cough and sore throat.	5	0.4
Sapotaceae	<i>Chrysophyllum cainito</i> L.	<i>star apple</i>	leaves	Decoction of leaves is given during diarrhea.	5	0.2
Solanaceae	<i>Capsicum frutescens</i> L.	<i>sili</i>	leaves	Crushed leaves are applied as poultice on wounds and bruises.	9	0.22
	<i>Physalis minima</i> L.	<i>batuwang</i>	leaves	Decoction of leaves is given during cough.	2	0.5
	<i>Solanum tuberosum</i> L.	<i>patatas</i>	leaves	Decoction from leaves and stem can be used as disinfectant for wounds and tuber extract is applied on wounds to facilitate healing.	5	0.2
Urticaceae	<i>Gonostegia hirta</i> (Blume) Miq.	<i>nangel</i>	leaves	Crushed leaves are applied as poultice on wounds.	6	0.17
Zingiberaceae	<i>Zingiber officinale</i> Roscoe	<i>laya</i>	rhizome	Decoction from the pounded rhizome can be given during colds, cough and sore throat; a poultice from the crushed rhizome can reduce inflammation of the skin.	9	0.44
	<i>Leptosalenia haenki</i> C. Presl.	<i>Penawel</i>	leaves	Crushed leaves are applied as poultice on wounds.	4	0.25
Number of family: 32	Number of Genera: 43 Number of species: 47					

Table 3 — Important plant species used to treat common illnesses and ailments by use category

Illnesses/Ailments Category	Species	Number of species
Head-related ailments (headache, tooth ache, baldness, strengthens teeth, toothache)	<i>Acorus calamus</i> L., <i>Areca catechu</i> L., <i>Crypsinus taeniatus</i> (SW) Copel, <i>Zingiber officinale</i> Roscoe.	4
Skin and muscle- related ailments (hair grower, muscle pain, inflammation, wounds, bruises, sore eyes, skin rashes, scabies)	<i>Allium odorum</i> L., <i>Aloe vera</i> L., <i>Colocasia esculenta</i> Schott , <i>Blumea balsamifera</i> DC, <i>Eupatorium adenophorum</i> Spreng, <i>Leptosalenia haenki</i> C. Presl <i>Tithonia diversifolia</i> A. Gray, <i>Viburnum odoratissimum</i> Ker Gawl, <i>Sarcandra glabra</i> (Thunb) Nakai, <i>Pteridium aquilinum</i> (L.) Kuhn, <i>Jatropha curcas</i> L, <i>Phaseolus lunatus</i> L, <i>Senna alata</i> (L.) Rozb., <i>Psidium guajava</i> L., <i>Pittosporum resiniferum</i> Hemsl, <i>Capsicum frutescens</i> L, <i>Solanum tuberosum</i> L., <i>Gonostegia hirta</i> (Blume) Miq.	18
Stomach-related ailments (diarrhea, expectorant, gastritis, stomach ulcer)	<i>Annona muricata</i> L., <i>Areca catechu</i> L., <i>Blumea balsamifera</i> DC, <i>Persea Americana</i> Mill. <i>Musa paradisiaca</i> L., <i>Psidium guajava</i> L., <i>Pinus kesiya</i> Royle ex Gordon, <i>Pittosporum resiniferum</i> Hemsl., <i>Pittosporum resiniferum</i> Hemsl., <i>Coffea Arabica</i> L.	10
Respiratory ailments (cough, fever, colds, sore throat and asthma)	<i>Blumea balsamifera</i> DC, <i>Diplazium esculentum</i> (Retz.) Sw, <i>Carica papaya</i> L., <i>Mentha arvensis</i> L, <i>Origanum vulgare</i> L., <i>Vitex negundo</i> L., <i>Persea Americana</i> Mill., <i>Melastoma polyanthum</i> Blume, <i>Eucalyptus tereticornis</i> Sm, <i>Psidium guajava</i> L., <i>Piper betle</i> L., <i>Pittosporum resiniferum</i> Hemsl, <i>Cymbopogon citratus</i> Stapf., <i>Citrus limon</i> (L.) Burm f., <i>Citrus microcarpa</i> Bunge, <i>Physalis minima</i> L.,	16
Kidney diseases (UTI, cancer, diuretic)	<i>Annona muricata</i> L., <i>Diplazium esculentum</i> (Retz.) Sw, <i>Carica papaya</i> L., <i>Sarcandra glabra</i> (Thunb) Nakai, <i>Equisetum ramosissimum</i> Desf, <i>Pinus kesiya</i> Royle ex Gordon, <i>Plantago major</i> L.	7
Heart –related diseases and ailments (hypertension)	<i>Nasturtium officinale</i> R.Br,	1
Liver-related ailments (cancer, diabetic)	<i>Momordica charantia</i> L, <i>Plantago major</i> L.,	2
Blood-related ailments (anemia)	<i>Ipomoea batatas</i> (L.) Lam,	1
Energy source, facilitate healing of wounds	<i>Saccharum officinale</i> Salisb., <i>Solanum tuberosum</i> L.	2

Table 4 — Plants that are used for rituals and preservation of the dead by the local community of Kabayan, Benguet province

Family	Scientific name	Local/ common name	How the plant is used	Citation Frequency	Use Value
Acoraceae	<i>Acorus calamus</i> L.	<i>bengaw</i> / <i>bangaw</i>	A piece of the root is pinned on children's especially babies clothes to drive away bad spirits.	7	0.14
Agavaceae	<i>Cordyline fruticosa</i> (L) A. Chev.	<i>dangla</i>	Leaves are used as <i>palaspas</i> , is whisked in the air and is believed to drive away evil spirits during rituals.	3	0.33
Araceae	<i>Colocasia esculenta</i> Schott.	<i>aba</i>	All plant parts are offered during rituals together with <i>camote</i> .	9	0.11
Arecaceae	<i>Cocos nucifera</i> L.	<i>niyog</i> / <i>coconut</i>	Leaves are used as <i>palaspas</i> , just like the leaves used during palm Sunday, is whisked in the air and is believed to drive away evil spirits during rituals.	10	0.1
Cyatheaaceae	<i>Cyathea contaminans</i> Copel.	<i>tibanglan</i> / <i>giant fern</i>	The shoot can be used as substitute for head and is offered during rituals. The <i>Igorots</i> in general were head hunters in the olden times and has to offer a human head from a neighbouring village when a member of the community is sick as part of healing.	2	0.5
Leguminosae	<i>Phaseolus lunatus</i> L.	<i>Patani/ kapani</i> / <i>atab</i> / <i>domeng</i>	Decoction from the leaves is used to wash the dead body during the initial mummification process.	18	0.05
Moraceae	<i>Ficus nota</i> Merr.	<i>diwdiw</i>	The wood is used as firewood and other construction; the bark or fiber can be used for tying, decoction of the leaves or extract is used to wash the dead body to be mummified.	6	0.67
Myrsinaceae	<i>Embelia philippinensis</i> A.DC.	<i>Supidak/ besudak</i>	Decoction from the leaves or extract is used to wash the dead body during the initial mummification process; the woody stem is used as firewood.	10	0.2

Contid...

Table 4 — Plants that are used for rituals and preservation of the dead by the local community of Kabayan, Benguet province

Family	Scientific name	Local/ common name	How the plant is used	Citation Frequency	Use Value
Myrtaceae	<i>Psidium guajava</i> L.	<i>bayabas</i>	The branch is sharpened and used as substitute for dagger or knife to butcher pigs offered during rituals; the branches and leaves are burned to produce smoke for preserving the dead which is seated on a death chair, the smoke also gets rid of bacteria or organisms that will decay the corpse; decoction of the leaves is used to wash the dead body.	25	0.16
Pinaceae	<i>Pinus kesiya</i> Royle ex Gordon	<i>saleng / pine tree</i>	The wood can be carved into coffins, bowls, spoons, pig bowl, and firewood.	26	0.19
Poaceae	<i>Oryza sativa</i> L.	rice made into wine (<i>tapuy</i>)	Fermented rice is made into rice wine and is an inevitable element in any ritual.	20	0.05
Poaceae	<i>Miscanthus sinensis</i> Andersson	<i>Sapsap/ rono branch</i>	The leaves can be used as mat, called <i>apay</i> , to lay the butchered pig so it does not get soiled; knotted <i>sapsap</i> leaves, called <i>puchon</i> in Ifugao, has many symbols, when placed at the front gate, it means no entry to the house or village, when placed within the rice fields, the community claim that it brings good harvest.	13	0.15
Rosaceae	<i>Rubus rosifolius</i> Sm.	<i>siit</i>	Branch is placed inside a coffin prior to putting the dead body to drive away bad spirits and is removed when the dead body is already placed inside.	4	0.25
Solanaceae	<i>Nicotiana tabacum</i> L.	<i>tabaco</i>	The leaves are offered during rituals together with rice wine; smoke from lighted tobacco is blown on the mouth and face of dead body during the initial stages of mummification because it is claimed that it can expel worms from the internal organs.	7	0.29
Zingiberaceae	<i>Zingiber officinale</i> Roscoe.	<i>laya /agat</i>	The rhizome when placed inside a rock and heated was used to create a hole that can accommodate the coffins; it is also placed in an empty coffin prior to putting the dead body to disinfect it.	7	0.29

Number of Genera: 15
Number of Families: 14 Number of species: 15

treatment of various illnesses while the other plant parts are lesser used. About 5 % of the respondents reported that fruits are used for various illnesses. The low value can be attributed to the seasonal availability of fruits.

Plants used in rituals and preservation of the dead including mummification

Table 4 shows a list of plants that are used in rituals. There are 15 plant species that were identified by the participants that belong to 12 families that are used in ritual practices and preservation of the dead including those that were presumably used in mummification. Some of the plants are used as ritual offerings, like *aba* (*Colocasia esculenta*) and *tapuy* or rice wine made from special rice varieties. Some of the identified plants are used as paraphernalia during ritual festivities such as *bayabas* (*Psidium guajava*) wood which is sharpened, termed as *iwik*, to butcher the pig. *Rono* (*Miscanthus* sp.) or banana (*Musa paradisiaca*) leaves are bundled together, thick enough to serve as mat to lay the butchered pig on the ground. In most ritual festivities, camote (*Ipomoea*

batatas) and *aba* are served with rice. The plain boiled pork is usually served with *sili* (*Capsicum frutescens*) and salt as seasoning.

Tapuy or rice wine, made from the best rice varieties, is an inevitable component during festivities. It is usually served on a coconut shell serving as a bowl, first to the *mambunong* or the shaman priest and the elders and then to anyone interested to partake of the *tapuy*. With the sweet and savory taste of *tapuy*, anyone who drinks this wine will become brave to talk and attempts to say anything, which add up to the merry making. Since most of the activities of people are centered on appeasing the gods and spirits, tobacco that is usually bought from the market is also offered with rice wine during rituals because it is believed that the spirits become delighted by the offerings, hence will not inflict pain or hurts over the entire village. Additionally, there are also plants that are used to protect the people from evil spirits. The stem of an aromatic plant, *Acorus calamus*, is pinned on one's

Table 5 — Plants used for construction and carving purposes by the local community of Kabayan, Benguet province

Family	Scientific name	Local/common name	How the plant is/are used	Citation Frequency	Use Value
Anacardiaceae	<i>Mangifera indica</i> L.	<i>mangga</i>	The wood can be made into furniture, lumber for construction, posts, studdings, fence.	9	0.56
Arecaceae	<i>Cocos nucifera</i> L.	<i>niyog</i>	Wood is used as fence, and posts; the halved shell of coconut fruit is used as a bowl or cup, spoons can also be carved from the fruit shell.	11	0.44
	<i>Daemonorops mollis</i> Merr.	<i>uway / rattan</i>	Used for tying posts, and together with <i>kawayan</i> are used in making baskets.	3	1
Betulaceae	<i>Alnus betula</i> Mill.	<i>alnus</i>	Wood is used as posts and firewood.	4	1
Lauraceae	<i>Persea Americana</i> Mill.	<i>avocado</i>	Wood is used as fence, posts, firewood.	6	0.75
Leguminosae	<i>Desmodium viridiflorum</i> DC.	<i>baay/baai</i>	For tying.	1	1
Mimosaceae	<i>Leucaena leucocephala</i> (Lam) de Wit.	<i>ipil-ipil</i>	Wood is used as fence, posts, firewood.	4	1.5
Moraceae	<i>Ficus nota</i> Merr	<i>diwdiw</i>	The wood is used in making bowls (<i>chuyo</i>) or pigpen (<i>sacdong</i>).	9	0.22
Musaceae	<i>Musa paradisiacal</i> L.	<i>saba / banana</i>	The pseudostem or stalk can be cut and used as plates and serving plate for rice during ritual activities; likewise, the big leaves can also be used as plates, for wrapping delicacies like <i>suman</i> , or mat for butchered pig.	13	0.39
Myrtaceae	<i>Psidium guajava</i> L.	<i>bayabas</i>	The main trunk and branches are used for construction.	9	0.11
Pinaceae	<i>Pinus kesiya</i> Royle ex Gordon	<i>saleng / Pine tree</i>	Timber is used as posts, walls, flooring, studding, ceiling joists, doors and window frames, etc.; furniture and kitchen paraphernalia like bowls, spoons, are also made from the wood, branches can serve as firewood and fence; pine wood as many uses in the old times, coffins are also carved from pine wood.	107	0.13
Poaceae	<i>Bambusa vulgaris</i> Schrad ex J.C. Wendl.	<i>kawayan/ bamboo</i>	The hollow stem called culm, can be used as cup substitute; the stem can be sliced thinly and used as tying material; the stem is used for many purposes like fence, water pipe, baskets, etc.	56	0.11
	<i>Imperata cylindrical</i> (L) P. Beauv.	<i>cogon / gulon</i>	Used as roofing material.	9	0.11
	<i>Miscanthus sinensis</i> Andersson	<i>rono / sapsap</i>	Used for roofing, wall thatches and flooring material.	6	0.5
Verbenaceae	<i>Gmelina arborea</i> Roxb.	<i>gmelina</i>	Wood is used as fence, posts, and firewood.	3	1.5
Number of Families: 12	Number of Genera: 15				
	Number of species: 15				

clothes, especially babies' clothes to drive away evil spirits.

In the Cordillera, most local communities have high respect for their dead hence they preserve the dead bodies. Initial preservation is by bathing the body with a decoction of guava leaves and applied with other herbal extracts. Guava has been proven to be a disinfectant hence, are used to wash or bath the body before the application of plant extracts³⁴. Other plants that are used by other local communities in the Cordillera to help preserve the dead are *camahit* or the cherry tomatoes, *Solanum lycopersicum* var. *cerasiforme* and gooseberry, *Physallis minima*. The juice from the fruits of these plants is applied directly on the body.

Based on the interviews and focused group discussions, four plants were mentioned to have been

used in mummification namely; guava (*Psidium guajava*), *diwdiw* or *tibig* (*Ficus nota*), patani (*Phaseolus lunatus*), and *besudak* (*Embelia philippinensis*). In Fig. 3, the most used plant in preserving the dead body for mummification is *Ficus nota* or *diwdiw*. This has a use value of 0.67 (Table 3). This plant has been mentioned several times during the interview. Next plant with high use value is *Cyathea contaminans* or giant fern which is currently used as substitute of a head and offered when there is a sick person. Historically, when a person is sick, it was believed that the only offering to bargain for the sick person to get well is a human head, which in the old times, may be taken from a neighboring village member. Other ritual plants have relatively similar use values.

Table 6 — Ornamental and plants used as hedges by the local community of Kabayan, Benguet province

Family	Scientific name	Local / common name	Citation Frequency
Agavaceae	<i>Cordyline fruticosa</i> (L) A. Chev.	<i>dangla</i> ^b	2
Alliaceae	<i>Agapanthus africanus</i> Hoffmanns	<i>agapanthus</i> ^a	1
Alstroemeriaceae	<i>Alstroemeria aurea</i> Graham	<i>alstromeria</i> ^a	2
Araceae	<i>Anthurium andraeanum</i> Linden	<i>anthurium</i> ^a	4
	<i>Zantedeschia aethiopica</i> (L) Spreng	<i>calla lily</i> ^a	5
Asteraceae	<i>Dahlia</i> hybrid	<i>dahlia</i> ^a	2
	<i>Leucanthemum X superbum</i>	<i>daisy or shasta</i> ^a	9
	<i>Tithonia diversifolia</i> A. Gray	<i>Sunflower, marapait</i> ^b	8
Cactaceae	<i>Pereskia grandiflora</i> hort. ex Pfeiff	<i>rose cactus</i> ^a	12
Chloranthaceae	<i>Sarcandra glabra</i> (Thunb.) Nakai	<i>gipas</i> ^b	2
Crassulaceae	<i>Schlumbergera cultivars</i>	<i>crab cactus</i> ^a	5
Euphorbiaceae	<i>Euphorbia pulcherrima</i> Willd ex Klotzsch	<i>poinsetia</i> ^a	4
Fabaceae	<i>Leucaena leucocephala</i> (Lam) de Wit.	<i>ipil-ipil</i> ^b	2
Lamiaceae	<i>Coleus blumei</i> Benth.	<i>mayana</i> ^a	3
Malvaceae	<i>Malvaviscus penduliflorus</i> DC.	<i>gumamela</i> ^a	10
Myrtaceae	<i>Eucalyptus tereticornis</i> Sm.	<i>eucalyptus</i> ^a	1
Nyctaginaceae	<i>Bougainvillea spectabilis</i> Willd.	<i>bougainvillea</i> ^a	4
Orchidaceae	<i>Denrobium</i> sp	<i>orchids</i> . ^a	12
Poaceae	<i>Phyllostachys aurea</i> Reviere & C. Reviere	<i>bamboo</i> ^b	8
Rosaceae	<i>Rosa</i> sp.	<i>rose</i> ^a	3
Verbenaceae	<i>Duranta repens</i> L.	<i>golden bush</i> ^b	9
Number of Families: 18	Number of species: 21	^a Ornamental plant	
	Number of Genera: 21	^b Hedge plant	

Plants that are used for various construction purposes are summarized in Fig. 4 and Table 5. The most used wood for construction purposes is the *saleng* or pine wood which received 107 citations. Its versatility is reflected in the many uses like coffin, furniture, house construction materials, fence, firewood, kitchen paraphernalia and many more. The next useful plant for construction and other uses is the *kawayan* or bamboo which also has varied uses.

Plants that are used as ornamentals are presented in Table 6. This list includes those that are being cultivated by the local communities, for beautification and used as horticultural crops. Most of the cultivated ones are sold in the market for additional income aside from their vegetable produce. The other plants are planted in their surroundings; others are used as hedges like the *gumamela*, *bamboo*, *dangla*, *golden bush* and others. The most popularly sold cut flower, not only in Kabayan is the *Alstroemeria aurea*, which is usually commonly seen in the flower markets especially on All saints' day.

As mentioned in the introduction, local communities in the Cordillera have enormous uses of plants because they are closely entwined with the environment. Table 7 shows how the local communities in Kabayan make use of plants for various purposes other than those mentioned above, such as source of dye, amulet, body ornament and for

broom making. Soft brooms are made from *buybuy* or tiger grass while stick brooms can be made from the midrib of coconut leaves. Other uses or perhaps special uses of some plants are also reflected in the table below. The last table, Table 8 demonstrates the general use reports for each of the use categories by the local community in Kabayan. The Factor of Informant Census (F_{ic}) was computed as the number of use citations in each category (Nur) minus the number of species (Nt), divided by the number of use citations in each category minus 1³⁵, the formula is $F_{ic} = \frac{Nur - Nt}{Nur - 1}$. The higher values denote that there is no disagreement on the consensus presented by the respondents as to the uses of the plants.

From the data presented in the above tables, indigenous uses of plants in Kabayan are varied. The plants and its uses among Cordillera indigenous groups reflect similarities and are comparable with other indigenous groups in the country. While there are plant uses that are unique to each indigenous group, for example the plants used in ritual practices, this is probably because of the unique culture of each group. Moreover, the practice of mummification was only identified among selected indigenous groups, namely the *Ibaloi*, *Kalanguya* and *Ifugao*. How they were able to make use of herbs to preserve their dead, which still exists to these days, is something that is admirable of their ingenuity.

Table 7 — Other uses of plants like broom making, source of dye, amulet and body ornament, clothes, home décor and other uses by the local community of Kabayan, Benguet province

Family	Scientific Name	Local/ common name	How the plant is/are used	Citation Frequency	Use Value
Acoraceae	<i>Acorus calamus</i> L.	<i>bangaw/ bengaw</i> ^e	Roots are pinned on children's clothes to drive away evil spirits.	25	0.04
Alliaceae	<i>Allium sativum</i> L.	<i>bawang</i> ^g	Bulbs are crushed and applied on bitten area.	3	0.33
Arecaceae	<i>Cocos nucifera</i> L.	<i>niyog</i> ^d	The midrib of the coconut leaves are made into broomstick.	18	0.09
Asteraceae	<i>Bidens pilosa</i> L.	<i>pulet</i> ^h	Shoots are eaten as vegetable; the leaf juice can be mixed with ground sticky rice to make rice yeast called <i>bubod</i> which is used as starter in making rice wine or <i>tapuy</i> .	1	0.5
Bixaceae	<i>Bixa orellana</i> L.	<i>atsuete</i> ^c	The water where the seeds are soaked is mixed with cooked food to add color.	7	0.14
Bromeliaceae	<i>Ananas comosus</i> (L.) Merr.	<i>pinya</i> ^h	The fibers can be used like threads for sewing and leaves can be woven for various purposes.	1	0.5
Caesalpinaceae	<i>Cassia alata</i> L.	<i>acapulko</i> ^g	Crushed leaves are applied as poultice on snake bite or dog bite.	3	0.67
Caricaceae	<i>Carica papaya</i> L.	<i>papaya</i> ^g	Fruit or leaf sap is directly applied on snakebite.	15	0.13
Euphorbiaceae	<i>Jatropha curcas</i> L.	<i>tangan-tangan</i> ^g	Crushed leaves are applied as poultice on snake bite or dog bite.	8	0.25
Moringaceae	<i>Moringa oleifera</i> Lam.	<i>malunggay</i> ^g	Crushed leaves are applied as poultice on insect bites.	2	0.5
Musaceae	<i>Musa paradisiaca</i> L.	<i>saba</i> ^f	The stalk with leaves is used during weddings as decoration.	2	
Myrsinaceae	<i>Embelia philippinensis</i> A.DC.	<i>supidak / besudak</i> ^h	The leaves are sour and can be made into wine. It can also be used to make sour soups or <i>sinigang</i> .	2	0.5
Myrtaceae	<i>Psidium guajava</i> L.	<i>bayabas</i> ^g	Crushed leaves are applied as poultice on snakebites, dog bites or insect bites.	3	1
	<i>Psidium guajava</i> L.	<i>bayabas</i> ^h	The branches are burned to make smoked meat or <i>kinuday</i> , a tasty bacon-like meat. The smoke from guava leaves facilitate drying and enhances the flavour of the meat.	5	0.2
Pandanaceae	<i>Freycinetia multiflora</i> Merr.	<i>pangdan</i> ^f	Leaves are used for protection, wrap around the body; the fibrous roots can be made into clothes.	2	1
Poaceae	<i>Coix lacryma-jobi</i> L.	<i>Takay/ katjan/ katnai</i> ^f	The seeds are sewn together to make rosary, necklace or bracelets; the stems are used for curtains.	28	0.14
	<i>Miscanthus sinensis</i> Andersson	<i>Sapsap</i> ^h	The <i>sapsap</i> , which is a bundle of <i>Miscanthus</i> leaves used in rituals, when placed in rice fields will bring good harvest.	3	0.33
	<i>Thysanolaena maxima</i> Kuntze	<i>buybuy /tiger grass</i> ^d	The inflorescence are woven into soft broom.	15	0.09
Rutaceae	<i>Citrus limon</i> (L.) Burm.f.	<i>Lemon</i> ^c	The leaves are boiled until the water will have color.	1	1
Zingiberaceae	<i>Zingiber officinale</i> Roscoe. ^e	<i>laya</i> ^h	The crushed rhizome is mixed with meat to make soup and given to a mother who just gave birth to enhance the production of milk and reduce pain after birthing.	4	0.25

Number of Families: 17

Number of Genera: 18

Number of species: 19

^cSource of dye ^dPlants used for broom making ^eAmulet ^fBody ornament, clothes and home décor^gTreatment of snakebite/dogbites/insect bites ^hOther uses

Table 8 — Number of use reports, percentage of use categories and factor of informant census (F_{ic})

Categories/Codes	Number of use report	Percentage (%)	No. of species	Factor of Informant Census (F _{ic})
Food plants	653	35.15	53	0.92
Medicinal plants	532	28.63	47	0.92
Plants that are used for rituals and preservation of the dead	167	8.98	15	0.92
Plants used for construction and carving purposes	250	13.46	15	1
Ornamental and plants used as hedges	108	5.81	21	0.81
Other uses of plants like broom making, source of dye, amulet and body ornament, clothes, home décor, etc.	148	7.97	19	0.88
Total	1858	100	170	

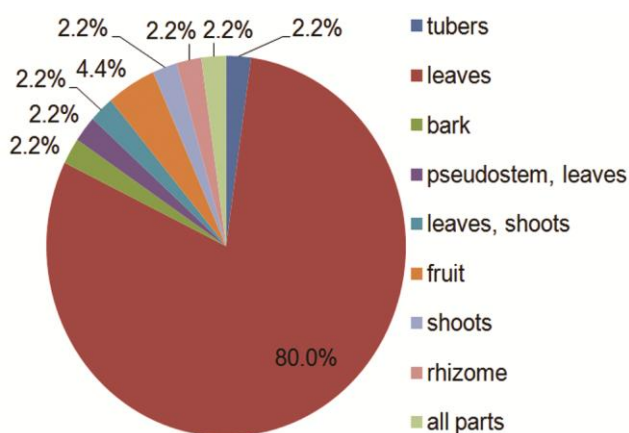


Fig. 2 — Plant parts used for various medicinal purposes

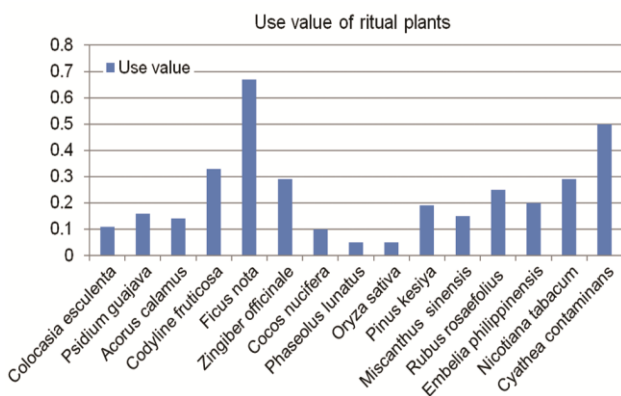


Fig. 3 — Use value of plants that are used in ritual activities in Kabayan, Benguet Province

Generally, plants are a useful source of bioactive compounds which can be used in the development of potential drugs. Conversely, antibacterial screening is just the beginning of drug discovery, hence, much is still left for future studies. One essential aspect of drug discovery is the isolation and structure elucidation of the bioactive component of the plants.

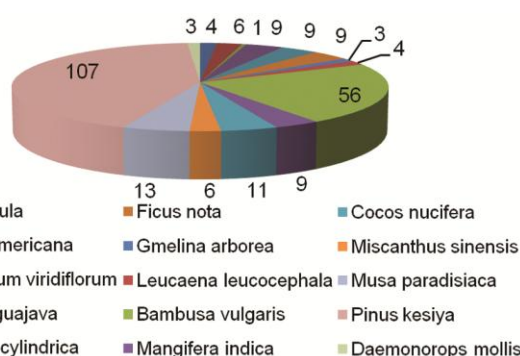


Fig. 4 — Citation frequency of plants that are used as construction materials in Kabayan, Benguet Province

Conclusion

The Cordillera Central range in general and Kabayan in particular which is our study site, provides a limitless diversity of plants that have various uses. Likewise, indigenous communities have a vault of countless traditional ethnobotanical knowledge, which if harnessed and studied further can provide promising uses for the growing population. Moreover, the traditional knowledge of medicinal plants can be validated by providing scientific basis. For the plants used to preserve the dead, further studies can be conducted to provide a complete scientific proof. Although there are initial studies on this aspect, a continuing study can validate the role of plants in the preservation of the dead and can perhaps be tapped as substitute for formalin in embalming.

The antibacterial screening results which is initially started but will be reported in a separate document also suggest that a number of plants from the Cordillera can serve as potential source of bioactive compounds, waiting to be harnessed to produce drugs for the treatment of a number of diseases, for preservation of the dead and many others. Drugs that

can be developed from plants could be useful in the prevention of diseases. Further research is considered necessary especially in the isolation and identification of the active components present in the extracts. Eventually, these bioactive components can be developed for pharmaceutical use. Generally, drug discovery entails a tedious and lengthy process hence, a continued financial support for research on medicinal plants is mandatory to harness and maximize the use of our plant resources.

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