

Research Article

A Quantitative Ethnobotanical Study of Plants Used by the Locals in Camiguin Island, Calayan, Cagayan, Philippines

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ABSTRACT

Traditional knowledge concerning plant utilization in the Philippines is common but is largely underappreciated. Assessment of plant resources by groups of people helps promote valorization of cultural heritage. However, particularly in the Camiguin Island of the North, Cagayan (not to be confused with the island province of Camiguin in Mindanao), the use of terrestrial plants remains unknown. As a response, this study aims to identify island terrestrial plants with ethnobotanical importance through semi-structured interviews. The data collected were then analyzed using quantitative ethnobotanical methods. A total of 70 species belonging to 65 genera and 44 families were surveyed from the 33 informants. The statistical analysis showed a significant difference between male and female informants in ethnobotanical knowledge. Lamiaceae was the most represented plant family with five species recorded. Leaves were the most used plant part (51%), congruent to previous ethnobotanical studies in the Philippines. Most medicinal preparations were done through decoctions (41.03%). Much of the medicinal plants surveyed were administered through topical medication (54.90%), and this is because the occupation of the people of Camiguin island mostly involves heavy physical activities. Thus, the probability of being wounded in the area is very high. It was found that *Vitex negundo* was the most used plant in Camiguin island with the used value of 0.15. Furthermore, five ailment/disease categories obtained a 100% fidelity level. This result indicates that the plants used for that disease category are considered the most preferred species. Respiratory diseases obtained the highest FIC value of 0.40, indicating species within that category are the best candidates to search for bioactive compounds. This documentation provides the first checklist of useful plants in Camiguin island and will serve as a basis for future ethnobotanical studies in the Philippines.

Keywords: Camiguin Island, Ethnobotany, Food, Medicinal plants, Philippines, Quantitative

Introduction

Valorization of traditional plant knowledge highlights the scope of ethnobotanical studies. The relationships between people and plants embed cultural history [1,2]. Plants also affect every aspect of man's existence [3]. Virtually traditional knowledge is passed down orally through generations and is vulnerable to oblivion [4].

The undocumented plant knowledge of indigenous peoples could lead to the loss of traditional practice using the plant community resources. Hence, the preservation of traditional knowledge is relevant. Ethnobotanical research can help preserve the traditional practices and belief systems among indigenous peoples or cultural communi-

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ties in the Philippines and other countries [5].

There are many plant ethnotaxa that are traditionally used in the Philippines. Many native communities use these resources for various nutritional and medicinal applications validated for safety and efficacy [6–11]. Traditional plants use has been proven to be a lucrative source of natural products with myriad biotechnological, pharmaceutical, and other economic and medical applications [12]. The pharmaceutical field has benefited from ethnobotanical studies by selecting the species that has medicinal properties to fill the inadequate pharmacopeia [13]. Proper management of culturally important medicinal plants must be observed to sustain the income of the locals using the plant community resources [14].

Information is gathered on the importance of indigenous plants and how the herbs and shrubs are cultivated [15]. The great diversity of plants provides food, clothing, shelter, fuel, medicine and was an integral part of the development of modern civilization [16]. Ethnobotanicals are key to drug discovery, but several ethnobotanical plants remain unidentified and unknown [17], particularly in the Philippines [18, 19].

Northern Camiguin Island, not to be confused with the Camiguin province in northern Mindanao, is a volcanic island (c. 166 km²) isolated from the rest of Luzon during the typhoon months since it is dangerous to cross because the winds of the island can be hostile and unpredictable (Figure 1). Mount Camiguin de Babuyan (712 m; Figure 1C), an active stratovolcano that erupted last 1857, is located [20]. Surrounded by the Babuyan Channel, the island is divided into Balatubat, Naguilian, and Minabel, with about 5000 native residents (Figure 1A). The island is home to diverse terrestrial and marine plants [21]. Historical records show 124 bird species from the island group, 56 of which were resident [22]. One threatened species (Yellow Bunting) and four near-threatened species have been recorded, while 13 subspecies of endemic birds to the Babuyan Islands were identified. Fifteen mammal species have been recorded, of which 11 were marine mammals [23, 24]. Few biodiversity studies have been conducted in Camiguin island, focusing on fauna. In addition, the exact number and the way how local people of the island utilize these important natural resources are also unknown. Considering this gap of knowledge, this study aims to document the ethnobotanical uses of terrestrial plant species found on the island

of Camiguin de Babuyan.

Material and Methods

Research ethics

A certificate of approval from the Far Eastern University (FEU) Ethics Committee was obtained to perform interviews with the informants. In addition, prior informed consents (PIC) were also obtained from each of the three barangays of the island. A gratuitous permit (R2-2018-11) issued by the Department of Environment and Natural Resources (DENR) Region II was also obtained to collect plant samples.

Study sites and interview

The study was conducted within the three Barangays of Camiguin Island, namely Balatubat, Minabel, and Naguilian (Figure 1A). The researchers used random and purposive sampling methods to select the informants, focusing on their traditional healers. 18–39 years old were considered young informants for the age grouping, while 40–84 years old were deemed to be old informants. Each participant was interviewed via semi-structured questionnaires in Tagalog and Ilocano, translating into English. The sample questionnaire used in this study followed a template [25] with slight modifications.

Data collection, plant identification, and herbarium deposition

The gathering of ethnobotanical data and plant collection was done a whole year round to observe plant species' phenology and seasonal variations. Each plant species collected during the interview was obtained to prepare herbarium, spirit, and silica-dried leaf materials used for molecular identification. Each sample is folded with newspapers and placed in a polyethylene bag. Denatured alcohol was poured into the bag to prevent abscisic acid activity from preserving the plants for processing. Each species' second or third youngest leaf was cut into pieces and placed in zip-lock bags with silica gel for molecular study [26]. Reproductive parts, including the flowers and fruits, were preserved at 70% ethanol to obtain a well-preserved spirit specimen. The collected plant samples were initially identified through available plant identification tools, references, and platforms like the Co's Digital Flora of the Philippines [27]. Authentication of the collected specimens was done by Mr. Danilo N. Tandang of the Phil-

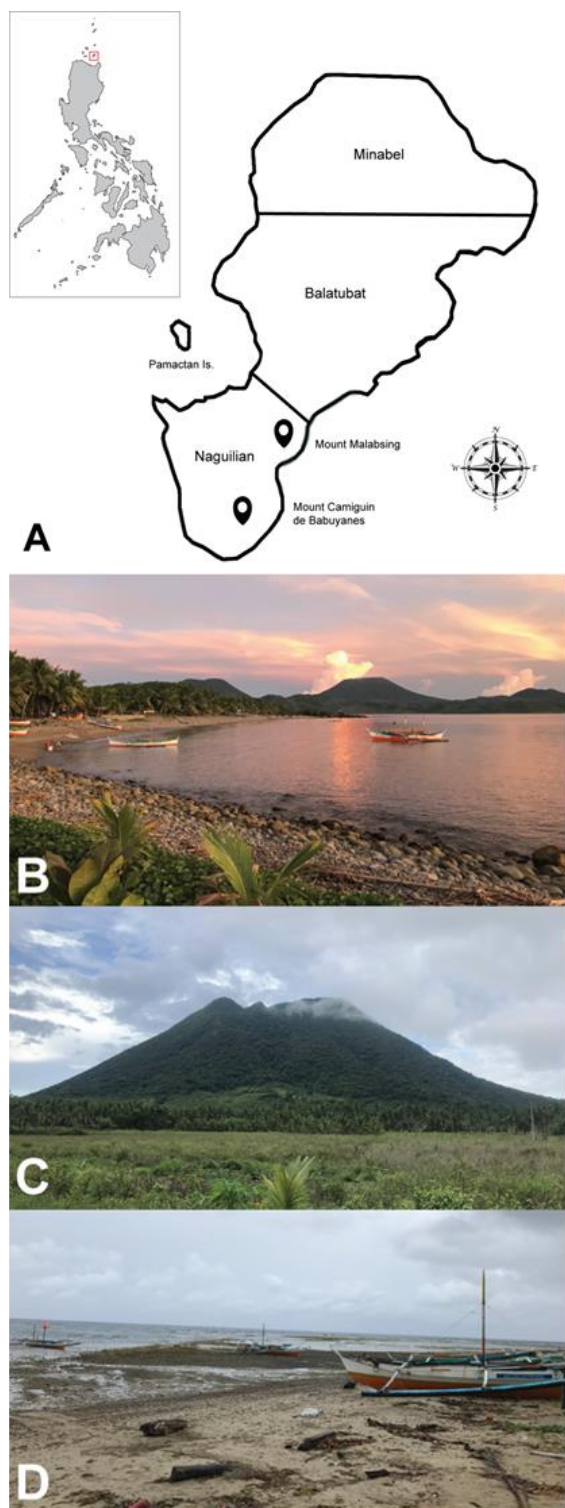


Figure 1. Camiguin Island. A. Map showing the boundaries between the three barangays (inset: location of the island in the Philippines). B. Balatubat port. C. Mount Camiguin de Babuyanes. D. Seashore of Barangay Minabel during low tide. (Photos by R.V.A. Docot).

ppine National Herbarium (PNH). All voucher specimens were deposited in the Far Eastern University Herbarium (FEUH) (see table 2 for the accession code of each specimen).

Data and statistical analyses

Statistical analysis was applied to the study to measure and compare the gathered data from the informants concerning the uses of terrestrial plants. The researchers determined if there is a significant difference between two or more groups such as age, sex, educational attainment, and location. Parametric inferential statistics such as one-way ANOVA using PASW Statistics v.18 [28] was used in this study with the level of significance at 0.05. This statistical analysis will provide a reasonable supposition about valid information for an entire population when only a subsample of people on the island are surveyed [29].

Plant use categories

The gathered data through survey interviews was used to classify the plants based on the categories acquired by the researchers. The given information by the informants was used to determine the diseases, symptoms, and their uses.

Use report

The surveyed and collected plant species was used for a distinctive purpose. If an informant uses the species in more than one purpose under the same category, it is considered as one use-report [30]. When at least two informants used the same plant for similar purposes, a multiple use-report is noted.

Use value (UV)

The use value (UV) provides a quantitative measure for the comparative importance of a species being used [18]. The value was based on the number of uses and the amount of people that cited a given plant. The value was computed on each species using the following formula: $UV = (\sum U_i)/N$; U_i was used as the number of use-reports mentioned by each informant for the given species, and N was used as the total number of informants in the area in which the survey was conducted [18,31–33].

Fidelity level (FL)

The fidelity level of each ailment/disease cate-

gory was calculated using the formula: $FL (\%) = (N_p/N) \times 100$. The N_p in the formula stands for the number of species with a particular use for a specific category, and N was the total number of use report of the species mentioned in the category. High FL values (near 100%) indicate that the identified plants have the same uses, while low FL values imply that the named plants were used for different purposes [18].

Informant Consensus Factor (FIC)

Only diseases were categorized based on the information provided by different informants and was calculated by using the Informants Consensus Factor [$FIC = NUR - NT / NUR - 1$]; NUR is the number of use reports in a particular category and NT is the number of taxa or species that are used in each category. FIC value ranges between 0 and 1, where 1 indicates the highest value [18]. It is important to produce more information about the use of medicinal plants [4]. FIC is measured to study the total usage of plant species according to culture applicability [31–33].

Results and Discussions

Demographic profile of the informants

A total of 33 informants were interviewed from the three barangays of the island namely Balatubat, Minabel and Naguillan. The highest number of informants were from Barangay Naguillan (20) whereas the lowest number came from Balatubat (3). Limited key informants were interviewed since most of the people were not in the island and due to bad weather condition during the conduct of interview and fieldwork. The researchers were advised to go back to mainland Luzon which changes the time allotted for the interview

or security reasons.

Statistical analysis

Statistical results of plant knowledge were assessed among the respondents when compared to age, sex, educational attainment, and location of the respondents were tabulated in Table 1.

Age

Results showed no significant difference ($p = 0.672$) between the age groups in terms of ethnobotanical knowledge. Therefore, the informants age does not affect their ethnobotanical knowledge. Elders (40 years old and above) have a higher mean rank compared to the young age group. Old age group are mostly practicing traditional medicine while the young age group usually stay at home.

Sex

Results showed that the sex of the respondents has significant difference ($p=0.003$) on the ethnobotanical knowledge. Male informants have more plant knowledge compared to females. Females in the island usually stay at home, while males are usually working in the forest to gather food, medicines, and other useful plants for livelihood and living. This is parallel with other ethnic groups in the Philippines that males have more plant knowledge [18, 31].

Educational attainment

There is no significant difference ($p = 0.884$) on the informant's educational attainment and ethnobotanical knowledge. Results revealed that informants who finished (or at least attended) primary level education have the highest mean rank.

Table 1. Demographic data with mean ranks and test statistics.

Factors	Variable	No. of Respondents	Mean Rank	Significant Difference
Age	Adolescents (18–39)	12	3.4	0.672
	Elders (40 and above)	21	3.8	
Sex	Male	15	5.2	0.003
	Female	18	2.4	
Educational attainment	Primary	9	3.818	0.884
	Secondary	18	3.812	
	Tertiary	6	3.2	
Barangay	Balatubat	3	2.0	0.460
	Minabel	10	3.4	
	Naguillian	20	4.1	

They cited more use reports than those who finished (or at least attended) secondary and tertiary level education primarily due to availability as they usually stay at home and utilize the plants available around them.

Location (Barangays/Villages)

There is no significant difference ($p = 0.460$) in the informants' plant knowledge among the three barangays or villages. Therefore, the location of the respondents on the island does not affect their ethnobotanical knowledge. Barangay Naguillan obtained the highest mean rank among the three barangays surveyed since Naguillan has intact vegetation or forests. More plants are available in this village, unlike in the other two barangays with limited vegetation.

Characteristics of the collected plant samples

Taxonomy and distribution

A total of 70 species belonging to 41 families were collected, five of which were not identified up to species level. The collection comprises 35 species native to the Philippines of which three are endemic, whereas the remaining are not native (Table 2). The most represented family is Lamiaceae with five species, followed by Annonaceae, Euphorbiaceae, Myrtaceae, and Zingiberaceae, all represented by four species.

The results are congruent with other ethnobotanical expeditions in the Southern part of Philippine archipelago [18,31–33]. Unlike in other localities, there is a significant difference of knowledge to participants living in an urbanized area with hospital, clinics, and pharmacies, giving the locals the opportunities to access over-the-counter drugs or medicines compared to rural areas [34].

Plant part used, preparation, mode of administration, and possible side effects

Most of the plants are accustomed to food and treatment of various ailments (Table 2). Based on the present study gathered data, leaves are the most utilized part (51%), followed by fruit (25%), stem (11%), flower (11%), and roots (1%). This corresponds to similar results reported in several ethnobotanical studies in Philippines [18,31–36].

The researchers observed that the informants utilize leaves to identify if the plant is used as medicine, insect repellent, food, industrial use, and decoration. Underground organs such as roots were less utilized based on the present study data

(1%), whereas the aerial organs were vastly used. The use of roots will cause the plant to die, so roots are less utilized to avoid mortality rate increase of plants [36].

The percentage of preparation and administration was computed by determining the number of each category divided by the total number of categories multiplied by 100. The leading process of preparation is by boiling or decoction (41.03%), followed by using fresh plants (34.62%), and crushing (24.36%). The data regarding plant parts used, preparation, and administration are summarized in Table 2.

The highest percentage of administration was obtained by topical medication (54.90%) through directly applying the extract on wound) followed by oral (43.30%) and inhalation (1.96%). The informants used both internal and external routes of administration to treat illness. Most people's occupation in Camiguin Island involves heavy physical activities such as fishing and gathering of woods in the forest. These common livelihoods increase the chance of being wounded. Since immediate medication is impossible in the forest, most locals utilize the plants around them as an alternative for wound medication.

Based on the survey among the locals, adverse or side effects of using their medicinal plants were not observed. Instead, the identified plants effectively treat their various health conditions and illness.

Use value

The highest use-value among the collected 71 species is 0.15, whereas the lowest is 0.03. *Vitex negundo* L. (lagundi) obtained the highest use value with five use reports, followed by *Artemisia vulgaris* L. (erbaka) and *Andrographis paniculata* (Burm.f.) Nees (white flower) both with 0.12 use-value. Plants with high use value are easy to obtain due to their commonality.

The food category obtained the highest number of plant species with 21 reports. The island is often cut from the rest of Luzon during the typhoon months of July to September and during the windy habagat (monsoon) months of October to January [21]. With this, transportation of goods, including food, is difficult, so people use the plants around them as an alternative. This explains the results why most of the plants surveyed were utilized as food.

Tabel 2. List of medicinal plants, parts used, use category, administration, uses, and use value among the locals of Camiguin Island, Cagayan, Philippines. The language of each common name is informed in parenthesis following the abbreviations of [42]. ^a Fr- Fruit; Lf- leaf; Fl- Flower; St- Stem; Pe- Petal; Rt- Root

No.	Family	Species	Common name	Accession no. of the voucher specimen	Distribution in the Philippines	Plant part used ^a	Administration of preparation	Diseases or purpose	Use value
1	Acanthaceae	<i>Justicia gendarussa</i> Burm.f.	puli puli (Ilk.)	FEUH 003135	Native	Lf	Drink decoction	Kidney stones	0.03
2	Acanthaceae	<i>Andrographis paniculata</i> (Burm.f.) Nees.	white flower (Eng.)	FEUH 003164	Not native	Lf	Drink decoction	Stomachache, Abortion and Malaria	0.12
3	Amaranthaceae	<i>Achyranthes aspera</i> L.	garem (Ilk.)	FEUH 003229	Not native	Lf	Apply extract on the wound	Wounds	0.03
4	Amaryllidaceae	<i>Allium tuberosum</i> Rottler ex Spreng.	kutsay (ManyLgs.)	FEUH 003154	Not native	Lf	Apply extract on wound; Used as ingredients for cooking	Wounds	0.09
5	Annonaceae	<i>Annona muricata</i> L.	guyabano (ManyLgs.)	FEUH 003137	Not native	Lf	Drink decoction	Kidney stones	0.09
6	Annonaceae	<i>Annona squamosa</i> L.	atis (ManyLgs.) ; dalayap (Ilk.)	FEUH 003142	Not native	Lf	Drink decoction	Fever and urinary tract infection	0.03
7	Annonaceae	<i>Uvaria</i> sp.	None	FEUH 003131	n/a	Fr	Eat chewed	Food	0.03
8	Apiaceae	<i>Centella asiatica</i> (L.) Urb.	marakobibi (Ilk.)	FEUH 003177	Native	Lf	Drink decoction	Cough	0.03
9	Apocynaceae	<i>Plumeria obtusa</i> L.	calachuchi (Eng.)	FEUH 003143	Not native	Lf, Fl	Apply the extracts to affected parts	Acne	0.06
10	Apocynaceae	<i>Tabernaemontana pandacqui</i> Poir.	busbusilak (Ilk.)	FEUH 003778	Native	Lf	Apply extracts on wound	Wounds	0.03
11	Apocynaceae	<i>Alstonia scholaris</i> (L.) R.Br.	dalipawan (Ilk.)	FEUH 003779	Native	Fr	Eat chewed	Food	0.09
12	Arecaceae	<i>Calamus</i> sp.	alanyog (Ilk.)	FEUH 003207	n/a	Fr	Eat chewed	Food	0.03
13	Arecaceae	<i>Pinanga insignis</i> Becc.	rasidan (Ilk.)	FEUH 003124	Native	Fr	Eat chewed	Food	0.03

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No.	Family	Species	Common name	Accession no. of the voucher specimen	Distribution in the Philippines	Plant part used ^a	Administration of preparation	Diseases or purpose	Use value
14	Aspleniaceae	<i>Asplenium nidus</i> L.	kapa kapa (Ilk.)	FEUH 003121	Native	Lf	Apply the extracts to affected parts	Edema	0.03
15	Asteraceae	<i>Artemisia vulgaris</i> L.	erbaka (Ilk.)	FEUH 003134	Not native	Lf	Apply directly on the wound; Drink decoction	Cough and Fever	0.12
16	Bixaceae	<i>Bixa orellana</i> L.	asuete (Ilk.)	FEUH 003130	Not native	Lf	-	Handicraft	0.03
17	Cactaceae	<i>Opuntia stricta</i> (Haw.) Haw.	Aloe vera (Eng.)	FEUH 003156	Not native	Pe	Apply the extracts to affected parts	Hair fall	0.03
18	Cannabaceae	<i>Celtis philippensis</i> Blanco	uratan (Ilk.)	FEUH 003162	Native	Fr	Eat chewed	Food	0.03
19	Caricaceae	<i>Carica papaya</i> L.	papaya (ManyLgs.)	FEUH 003780	Not native	Lf, Fr	Apply extracts on wound; Eat chewed; Drink decoction	Appendicitis and wounds	0.09
20	Combretaceae	<i>Terminalia catappa</i> L.	talisyay (ManyLgs.)	FEUH 003161	Native	Fr	Eat chewed	Food	0.03
21	Commelinaceae	<i>Tradescantia spathacea</i> Sw.	uki uki (Ilk.)	FEUH 003175	Not native	Lf	Drink decoction	Menstruation	0.03
22	Compositae	<i>Blumea balsamifera</i> (L.) DC.	subusob (Ibl, Ilk.)	FEUH 003179	Native	Lf	Use for bathing	Hygiene	0.03
23	Compositae	<i>Mikania cordata</i> (Burm.f.) B.L.Rob	kumot kumot (Ilk.)	FEUH 003180	Not native	Lf	Apply directly on the wound	Wounds	0.03
24	Cucurbitaceae	<i>Momordica charantia</i> L.	ampalaya (Tag.)	FEUH 003152	Native	Lf	Drink decoction	Diabetes	0.06
25	Dilleniaceae	<i>Dillenia philippinensis</i> Rolfe var. <i>philippinensis</i>	palale (Ilk.)	FEUH 003173	Native and endemic	Fr	Eat chewed	Food	0.06
26	Dilleniaceae	<i>Dillenia</i> sp.	dalandan (ManyLgs.)	FEUH 003174	n/a	Lf	Use for bathing	Bathing for new	0.06

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No.	Family	Species	Common name	Accession no. of the voucher specimen	Distribution in the Philippines	Plant part used ^a	Administration of preparation	Diseases or purpose	Use value
27	Ebenaceae	<i>Diospyros lanceifolia</i> Roxb.	balinagta (Ilk.)	FEUH 003128	Native	Fr	Eat chewed	born child Food	0.03
28	Euphorbiaceae	<i>Antidesma montanum</i> Blume var. <i>montanum</i>	bugnay (Ibg, Ilk.)	FEUH 003139	Native	Lf	Drink decoction	Fever	0.09
29	Euphorbiaceae	<i>Euphorbia hirta</i> L.	maragatas (Ilk.)	FEUH 003171	Not native	St	Apply the extracts to affected parts	Sore eyes	0.03
30	Euphorbiaceae	<i>Jatropha curcas</i> L.	tawa tawa (Ilk.)	FEUH 003153	Not native	Lf	Drink decoction	Dengue	0.03
31	Euphorbiaceae	<i>Hevea brasiliensis</i> (Willd. ex A.Juss.) Müll. Arg.	kuniber (Ilk.)	FEUH 003184	Not native	Lf	Apply directly on the wound	Wounds	0.03
32	Fabaceae	<i>Senna alata</i> (L.) Roxb.	andadasin (Ilk.)	FEUH 003168	Not native	Lf	Apply young leaves on a forehead	Fever	0.03
33	Fabaceae	<i>Pterocarpus indicus</i> Willd.	dun-gon/narra	FEUH 003179	Native	Lf	Apply young leaves on a forehead	Head Ache	0.03
34	Hydrangeaceae	<i>Hydrangea macrophylla</i> (Thunb.) Ser.	million flowers (Eng.)	FEUH 003182	Not native	Fl	Display around a house or building for ornamentation	Ornamental	0.03
35	Lamiaceae	<i>Ocimum basilicum</i> L.	tawas (Ilk.)	FEUH 003132	Native	Lf	Apply directly on the affected body parts	Sprain	0.03
36	Lamiaceae	<i>Premna odorata</i> Blanco	po-on (Ilk.)	FEUH 003133	Native	Lf	Apply the extracts to affected parts	Sprain	0.03
37	Lamiaceae	<i>Vitex negundo</i> L.	lagundi (Bik, BisPn., Ibg., Tag.)	FEUH 003136	Not native	Lf	Drink decoction	Malaria, Colds, Cough, Fever and Wounds	0.15

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No.	Family	Species	Common name	Accession no. of the voucher specimen	Distribution in the Philippines	Plant part used ^a	Administration of preparation	Diseases or purpose	Use value
38	Lamiaceae	<i>Coleus amboinicus</i> Lour.	oregano (Ilk, Sp, Tag)	FEUH 003150	Not native	Lf	Drink decoction; Used as ingredients for cooking	Cough and Cooking	0.09
39	Lamiaceae	<i>Coleus scutellarioides</i> (L.) Benth.	tamuras (Ilk.)	FEUH 003160	Native	Fr	Eat chewed	Food	0.03
40	Leguminosae	<i>Flemingia javanica</i> C.Y.Wu	garantinwan (Ilk.)	FEUH 003145	Not native	Lf	Apply directly on the wound	Wounds	0.03
41	Leguminosae	<i>Antidesma bunioides</i> (L.) Spreng.	barakbak (Ilk.)	FEUH 003157	Native	Fr	Eat chewed	Food	0.03
42	Lythraceae	<i>Lagerstroemia speciosa</i> (L.) Pers.	banaba (ManyLgs.)	FEUH 003230	Native	Lf	Apply the extracts to affected parts	Edema	0.06
43	Malvaceae	<i>Hibiscus rosa-sinensis</i> L.	gumamela (ManyLgs.)	FEUH 003146	Not native	Lf	Apply the pounded leaves to the affected area	Boils	0.03
44	Marantaceae	<i>Donax canniiformis</i> (G.Forst.) K.Schum.	banban (ManyLgs.)	FEUH 003126	Native	Fr	Eat chewed	Food	0.03
45	Menispermaceae	<i>Cissampelos pareira</i> L.	laplapsu (Ilk.)	FEUH 003183	Native	Lf	Drink decoction	Edema	0.06
46	Moraceae	<i>Artocarpus altilis</i> (Parkinson) Fosberg	pakak (Ilk, Ifg.)	FEUH 003122	Native	Fr	Used as ingredients for cooking	Diabetes	0.03
47	Myrtaceae	<i>Rhodomyrtus tomentosa</i> (Aiton) Hassk var. <i>tomentosa</i>	tungaw-tungaw (Ilk.)	FEUH 003127	Native	Fr	Eat chewed	Food	0.03
48	Myrtaceae	<i>Syzygium fenicis</i> (C.B.Rob) Merr.	barakbak (Ilk.)	FEUH 003781	Native and endemic	Lf	Eat chewed	Food	0.06
49	Myrtaceae	<i>Psidium guajava</i> L.	bayabas (BisC., Ilk, Tag.)	FEUH 003151	Not native	Lf, Fr	Drink decoction; Apply the extracts to	Cancer	0.03

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No.	Family	Species	Common name	Accession no. of the voucher specimen	Distribution in the Philippines	Plant part used ^a	Administration of preparation	Diseases or purpose	Use value
50	Myrtaceae	<i>Syzygium subrotundifolium</i> (C.B.Rob.) Merr.	tampuy (Ilk.)	FEUH 003158	Native and endemic	Fr	affected parts Eat chewed	Food	0.03
51	Pandanaceae	<i>Pandanus odorifer</i> (Forssk.) Kuntze	budak (Ilk.)	FEUH 003228	Native	Lf, St	-	Handicraft	0.03
52	Pandanaceae	<i>Pandanus</i> sp.	sarakat (Ilk.)	FEUH 003167	n/a	Lf	-	Handicraft	0.03
53	Pandanaceae	<i>Pandanus amaryllifolius</i> Roxb. ex Lindl.	pandan (Eng.)	FEUH 003149	Not native	Lf	Used as ingredients for cooking	Food	0.06
54	Phyllanthaceae	<i>Phyllanthus niruri</i> L.	sampa-sampalukan (Tag.)	FEUH 003181	Not native	Lf	Apply young leaves on a forehead	Head Ache	0.09
55	Piperaceae	<i>Piper betle</i> L.	gawed (Dgt., Ilk., Png.)	FEUH 003176	Native	Lf	Drink decoction	Cough	0.03
56	Plantaginaceae	<i>Scoparia dulcis</i> L.	parparaangan (Ilk.)	FEUH 003170	Not native	Lf	Drink decoction	Stomach Ache	0.03
57	Poaceae	<i>Eleusine indica</i> (L.) Gaertn.	antibiotic grass (Ilk.)	FEUH 003138	Native	Lf	Apply extract on the wound	Wounds	0.03
58	Poaceae	<i>Cymbopogon citratus</i> (DC.) Stapf	tanglad (Bik., Bis., Mbo, Tag.)	FEUH 003144	Not native	Lf	Apply leaves on stomach	Stomach Ache	0.03
59	Poaceae	<i>Maccaranga tanarius</i> (L.) Müll.Arg.	samak (Ilk.)	FEUH 003166	Native	Fr	Used for liquor making	Food	0.03
60	Rubiaceae	<i>Morinda citrifolia</i> L.	apatot (Ilk.)	FEUH 003159	Native	Lf	Drink decoction	Stomach Ache and Gastritis	0.03
61	Rubiaceae	<i>Guettarda speciosa</i> L.	None	FEUH 003165	Native	Lf	Drink decoction	Epilepsy, Diarrhea, and Wounds	0.03
62	Rutaceae	<i>Citrus</i> sp.	gagabutin (Ilk.)	FEUH 003147	n/a	Lf	Smell	Head Ache	0.03
63	Sapindaceae	<i>Pometia pinnata</i>	sida-i (Ilk., Ibg, Ivt.)	FEUH 003123	Native	Fr	Eat chewed	Food	0.03

Continue...

No.	Family	Species	Common name	Accession no. of the voucher specimen	Distribution in the Philippines	Plant part used ^a	Administration of preparation	Diseases or purpose	Use value
64	Sapindaceae	J.R.Forst. & G.Forst. <i>Le-pisanthes fruticosa</i> (Roxb.) Leenh.	dirig (Ibg, Ilk)	FEUH 003129	Native	Fr	Eat chewed	Food	0.03
65	Sapotaceae	<i>Chryso-phyllum cainito</i> L	kaimito (Ibg, Tag.)	FEUH 003169	Not native	Fr, Lf	Apply on forehead; Eat chewed	Fever	0.03
66	Urticaceae	<i>Pipturus asper</i> Wedd.	takop takop (Ilk.)	FEUH 003120	Native	Lf	-	Hand-craft	0.03
67	Zingiberaceae	<i>Zingiber officinale</i> Rosc.	pulang luya (ManyLgs.)	FEUH 003140	Not native	Fr	Apply the extracts to affected parts	Arthritis	0.03
68	Zingiberaceae	<i>Curcuma longa</i> L.	dilaw na luya (ManyLgs.)	FEUH 003141	Not native	Fr	Drink decoction	Cancer	0.03
69	Zingiberaceae	<i>Alpinia flabellata</i> Ridl.	banai (Ilk.)	FEUH 003172	Native	Lf	Drink decoction	Muscle pain	0.03
70	Zingiberaceae	<i>Kaempferia galanga</i> L.	disol (Ilk.)	FEUH 003155	Not native	Lf	Apply extract on the wound	Infectious Diseases	0.03

Tabel 3. Informant Consensus Factor (FIC) values of the ailments or diseases cured by the medicinal plants. Abbreviations: NUR: number of use report; NT: number of plant taxa; FL: Fidelity Level

Disease Categories	Reported diseases or uses under each UC	NUR	NT	FIC	FL (%)
Respiratory Diseases	Cough, Cold	11	7	0.4	100.00
Open Wounds	Wound, Swollen wound	7	7	0	58.33
Nervous System Diseases	Headache, Fever	6	6	0	75.00
Digestive Diseases	Stomachache, Tooth sensitivity	4	4	0	44.44
Parasitic Diseases	Malaria	4	4	0	28.57
Endocrine Diseases	Diabetes	2	2	0	50.00
Genitourinary Diseases	Kidney, Urinary Tract Infection	6	5	0.2	100.00
Postpartum Period	Menstrual Pain	4	4	0	100.00
Subcutaneous Tissue	Boil	1	1	0	100.00
Musculoskeletal Diseases	Spasm, Sprain, Arthritis	5	4	0.25	66.67
Cancer	Cancer	1	1	0	100.00
Circulatory System	Hypertension, High and Low Blood Pressure	4	3	0.33	57.14

Fidelity level

Medicinal plants were found to have the highest fidelity level (100%) on the five ailment/disease categories, namely respiratory, genitourinary, postpartum period, subcutaneous tissue, and

cancer diseases. However, parasitic diseases were noted to have the lowest FL with 28.57% as shown in Table 3. High FL values (near or 100%) indicate the most preferred species for that ailment/disease. Low FL values indicate multiple purposes, so

plants in this study were used for different purposes.

Informant consensus factor

The obtained FIC values varied from 0 to 0.40 with an average value of 0.24. The plants were tabulated, and the top 10 categories were listed in Table 3. Respiratory diseases obtained the highest FIC value of 0.40 with 11 use reports for seven plant species. The species with the highest use report was *Coleus amboinicus* Lour. (oregano) with 11 use reports. The high FIC value for respiratory diseases is probably due to the humid weather condition of the island causing respiratory problems such as cough or cold. Species with high FIC value are the best candidates to search for bioactive compounds [37]. Genitourinary diseases obtained the lowest FIC value of 0.20 with six use reports for five plant species used to cure urinary tract infections (UTI). The low FIC value for the category could be due to frequent drinking of water among the locals. Good hydration by drinking water adequately will help dilute the urine and ensure urination occurs more frequently, allowing bacteria to be flushed before it reaches the bladder causing infections [38].

Other ethnobotanical uses of plants such as handicrafts and ornamentals were not included in the use categories. Monitoring studies are vital to establishing the real profile of plant species in a protected area [39]. Traditional uses of plants may change through the passage of time in terms of usability, preference, and intensity [4,18]. Hence, conservation efforts and government initiatives must be recommended to maintain plant sustainability [40]. This can be made possible with the help of community-based environmental management together with the indigenous communities in saving forest resources [41].

Conclusion

This study showed that the people of Camiguin Island, Calayan, Cagayan use 70 species of terrestrial plants belonging to 41 plant families, 35 of which are native to the Philippines. This documentation of ethnobotanical knowledge in the island will consist of the inhabitants of Camiguin Island. This study will also allow their traditional knowledge to be recognized and utilized by the scientific community, such as drug discovery, resource management, policy-making studies,

conservation, and search for bioactive compounds using our native plants.

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