

Ethnobotanical survey of medicinal plants used by the Agta community in Gonzaga, Cagayan, Philippines

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Abstract. *Guimbuayan VB, Cordero CS, Alejandro GJD. 2025. Ethnobotanical survey of medicinal plants used by the Agta community in Gonzaga, Cagayan, Philippines. Biodiversitas 26: 6316-6334.* Traditional knowledge of medicinal plants remains an integral part of primary healthcare systems in the Philippines, especially among indigenous communities. This study aimed to document the medicinal plant species used by the Agta indigenous peoples of Gonzaga, Cagayan, Philippines. From August 2024 to February 2025, 34 key informants were selected through purposive sampling and interviewed using a semi-structured questionnaire. Data were analyzed to determine the most culturally important species using Use Value (UV) and Informant Consensus Factor (ICF). Disease categories were classified in accordance with the World Health Organization International Classification of Diseases, 11th Revision (WHO-ICD 11). The Agta community reported 81 medicinal plant species, representing 74 genera and 37 families, with Poaceae being the most represented family (nine species). Leaves were the most commonly used plant part (41%), and decoction (43%) was the most frequent mode of preparation. *Myristica* sp. and *Vitex arvensis* were the most cited species, with UVs of 0.88 and 0.62, respectively. The highest ICF value (1.0) was recorded for disease category 5 (endocrine, nutritional, or metabolic diseases), followed by the Disease Categories 12 (Diseases of the Respiratory System) and 18 (Pregnancy, childbirth or the puerperium) and with ICF values of 0.76 and 0.71, respectively. This study provides the first documentation of the medicinal flora used by the Gonzaga Agta, offering a comprehensive inventory that underscores its dual significance for safeguarding cultural heritage and guiding future pharmacological research.

Keywords: Agta, ethnobotany, Gonzaga, Philippines, traditional knowledge

Abbreviations: FL: Fidelity Level, ICF: Informant Consensus Factor, Nt: Number of species used for a particular category by all informants, Nur: Number of use reports in each category, UV: Use Value

INTRODUCTION

Plants are the foundation of life on Earth, sustaining human health, livelihoods, and ecosystems (FAO 2019). Of the world's angiosperm species, many possess recognized medicinal properties, and a large proportion of the global population continues to rely on plant-based medicines for primary healthcare (Schippmann et al. 2005; WHO 2019a, b). In the Philippines, where healthcare access is often limited in rural and remote areas, traditional healing systems based on medicinal plants remain a crucial component of community health (Maramba-Lazarte 2020). These plant-based systems are not merely alternatives to modern medicine but function as integrated health strategies embedded within local cultural, ecological, and spiritual frameworks.

Reflecting the nation's rich ethnomedicinal heritage, the Philippine Traditional Knowledge Digital Library on Health has documented thousands of medicinal plant preparations and hundreds of traditional healers across ethnobotanical studies (WHO 2019a, b). Over 1,500 plant species are actively used in traditional medicine, addressing conditions ranging from common ailments to serious

illnesses (Cordero et al. 2022). Such extensive utilization underscores the Philippines as one of Southeast Asia's important reservoirs of ethnomedicinal knowledge, shaped by long-standing interactions between diverse cultures and highly heterogeneous ecosystems.

The Philippines' remarkable cultural diversity further enriches its ethnobotanical traditions, with 111 Indigenous Cultural Communities and Indigenous Peoples comprising 222 subgroups across the archipelago (NCIP 2019). Among them, the Agta, also known as Aeta, Ati, Ayta, and Ata, are regarded as among the earliest inhabitants of the country, consisting of 25 to 34 distinct tribal groups (Headland 1987; Padilla 2013). Many maintain close relationships with their natural environments through traditional medicinal knowledge and practices. This close association with forested landscapes has historically enabled the Agta to develop sophisticated plant-based healing systems grounded in empirical observation, intergenerational transmission, and ecological familiarity.

Several ethnobotanical surveys have been conducted among different Ayta communities. Examples include the Aetas of Bataan and Pampanga (Tantengco 2018; Bagunu et al. 2019), the Kanawan Aetas of Morong (Antonio and

Tuason 2022) and Hermosa (Pablo 2019), Bataan, the Nabuclod Aetas of Mount Pinatubo (Datiles and Heinrich 2013; Ragrario et al. 2013), the Dumagats of Casiguran, Aurora (Canceran et al. 2021), and the Aytas of Peñablanca, Cagayan (Cauilan et al. 2021). In the Visayas, surveys have focused on the Ati of Barotac Viejo, Iloilo (Madulid et al. 1989), Malay, Aklan (Cordero et al. 2020), and Tobias Fornier, Antique (Cordero and Alejandro 2021). These studies reveal the continued reliance of Ayta communities on medicinal plants for both curative and preventive healthcare. However, significant gaps remain in documentation, particularly among Ayta groups in the northernmost regions of Luzon. As a result, the spatial coverage of ethnobotanical knowledge remains uneven, limiting broader synthesis and comparative analysis across regions.

The Agta of Gonzaga, Cagayan inhabit forested foothills where plant resources remain relatively accessible, yet traditional knowledge is increasingly at risk. Evidence from the Nabuclod Aetas of Mount Pinatubo shows that younger generations may not be inheriting medicinal knowledge, threatening its continuity (Datiles and Heinrich 2013). Safeguarding this knowledge is vital both as cultural heritage and as a basis for scientific and sustainable development, as pharmacological work on plants used by Ayta communities has identified bioactive compounds with therapeutic potential (e.g., Olivar et al. 2018; Cauilan et al. 2021). However, acculturation, modernization, and declining youth interest are accelerating knowledge loss (Aswani et al. 2018; Tantengco et al. 2018; Malapane et al. 2024). Without timely documentation, valuable information on species use, preparation techniques, and cultural significance may disappear irreversibly.

This study provides the first systematic ethnobotanical documentation of the Agta in Gonzaga, Cagayan, addressing an underrepresented community in Philippine ethnobotanical literature. It contributes by (i) safeguarding threatened

indigenous knowledge, (ii) generating baseline information to support conservation and community health initiatives, and (iii) offering comparative insights for national and international ethnobotanical research. By focusing on a relatively undocumented Agta group, the study strengthens the representativeness of ethnomedicinal records in northern Luzon. Accordingly, the study aims to: (i) document medicinal plant species used by the Agta; (ii) identify plant parts utilized; (iii) describe preparation methods and modes of administration; and (iv) determine culturally significant species using informant consensus analysis.

MATERIALS AND METHODS

Study area

The ethnobotanical survey was carried out in the Agta community of Sitio Bagsang, Barangay Santa Clara, Gonzaga, Cagayan Province, Philippines, from August 2024 to February 2025. The site (18.2430°N, 122.0435°E; 154.5 m a.s.l.; Figure 1) lies in the foothills of Mount Cagua within the northern Sierra Madre Mountain Range and was selected because of the community's long-standing medicinal plant traditions. The area spans 567.43 km², is largely agricultural, and has a humid tropical climate with substantial rainfall for most of the year.

Data collection instruments and procedures

Medicinal plant data were obtained using purposive sampling and snowball referral. Purposive sampling is a non-probability approach that deliberately selects participants with relevant expertise (Bullard 2024), while snowball sampling is a chain-referral method in which initial eligible informants recruit other qualified participants (Naderifar et al. 2017).

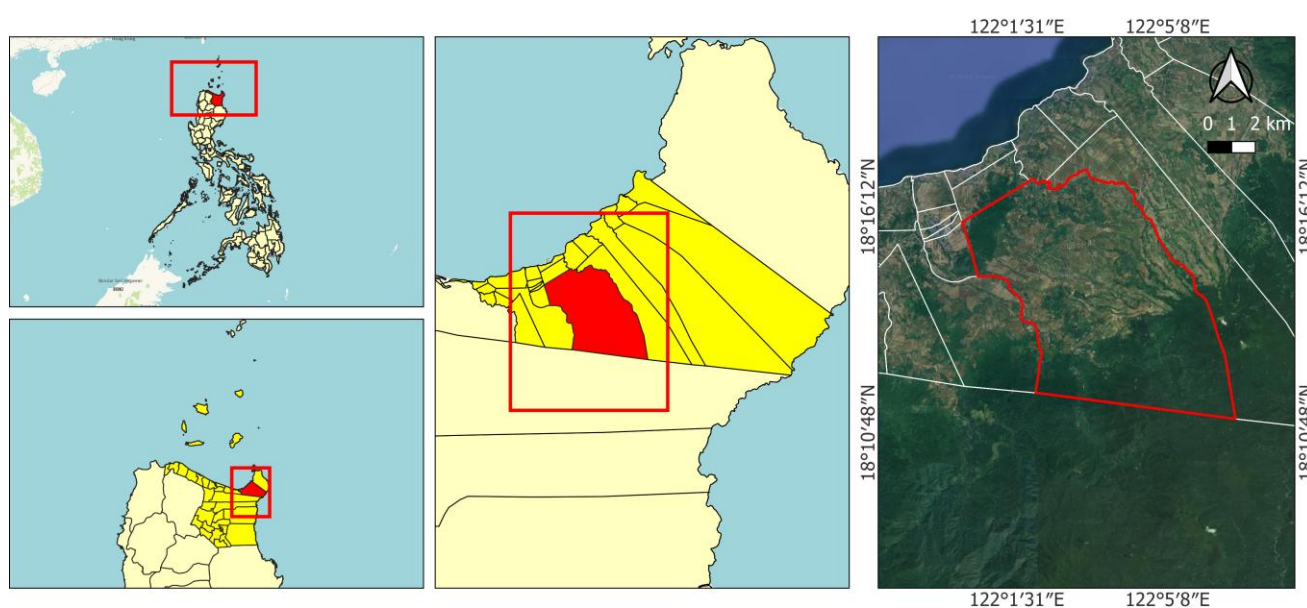


Figure 1. Map of Gonzaga, Cagayan and the location of the study site in Santa Clara, Gonzaga, Cagayan, Philippines

Key informants comprised the tribal chieftain, traditional healers, community elders, and household heads. Data were collected via semi-structured interviews using a two-part questionnaire: (i) socio-demographic details and (ii) Agta ethnomedical knowledge. The instrument included open- and closed-ended items on local plant names, plant parts used, preparation methods, modes of administration, and ailments treated. Use reports were elicited through free-listing, followed by guided prompts to confirm species identity and details of preparation and therapeutic use. The questionnaire was adapted from Cordero et al. (2021, 2022), previously applied in ethnobotanical studies among the Ati and other indigenous peoples in the Visayas, and was prepared in Ilokano with an English translation. Neutral, open-ended wording was used to avoid leading questions, and responses were validated through follow-up interviews and guided field walks.

A total of 34 Agta informants (aged 21-72 years) were interviewed at their convenience from August 2024 to February 2025. All informants identified as farmers cultivating fruits and vegetables for sale in lowland markets. One Agta informant also serves as a Barangay Health Worker (BHW), reflecting some access to government healthcare through Rural Health Units (RHUs). However, the community remains relatively isolated, with the municipal town proper reachable only after 20-30 minutes of travel by motorcycle or private vehicle. Because of this isolation, nearly all households continue to rely on medicinal plants, and both male and female household heads were found to be generally knowledgeable.

Sampling frame and selection procedure

The study was conducted among the Agta community of Gonzaga, Cagayan, which has an estimated population of 178 individuals based on records from the National Commission on Indigenous Peoples (NCIP) Region 02 census 2024-2025. A total of 34 key informants were selected through purposive sampling, a widely recognized approach in ethnobotanical research for identifying individuals with extensive traditional knowledge. Informants were identified with the assistance of NCIP field officers and tribal leaders, who served as community gatekeepers. To ensure equitable household representation, at least one participant from each household included in the sampling frame was interviewed, allowing the study to capture a wider range of knowledge systems within family units.

The initial list of participants was expanded using a snowball referral technique to ensure that diverse and highly knowledgeable individuals were represented. The final composition of participants included 1 tribal chieftain, 8 traditional healers, 12 community elders, and 13 household heads (Table 1). Inclusion criteria required that participants (a) be of Agta ancestry and residents of the study area for at least ten years, (b) be recognized by community members for their knowledge of medicinal plants, and (c) voluntarily participate under the Free, Prior, and Informed Consent (FPIC) guidelines. Individuals below 18 years of age or without direct experience in

traditional plant use were excluded. All identified informants consented to participate, resulting in a 100% response rate.

Data saturation was used as an additional guiding principle in determining the adequacy of the sample size. Saturation was considered reached when no new medicinal plants, preparation methods, or culturally relevant information emerged during successive interviews. The point of saturation occurred after the 30th interview, and the remaining four interviews were conducted to confirm redundancy and ensure the robustness of the dataset. A summary (Table S1) illustrates the cumulative number of species cited per interview, demonstrating the point at which new information ceased to emerge. This approach follows established ethnobotanical practices for assessing informational completeness (Guest et al. 2006; Tongco 2007; Albuquerque et al. 2014).

Medicinal plant collection and identification

Medicinal plant samples were collected with the assistance of knowledgeable community members or by informants themselves when the plants were available near their homes or home gardens. Each specimen was photographed, and herbarium samples were prepared by collecting branches with reproductive parts when available. Samples were inserted into newspapers, immersed in denatured alcohol, then pressed, dried, and mounted on herbarium sheets with proper labels. Plant specimens were identified to the lowest possible taxonomic level using standard morphological keys and verified through comparison with authenticated herbarium specimens and online databases such as Plants of the World Online (2025) (<https://powo.science.kew.org/>) and Co's Digital Flora of the Philippines (<https://www.philippineplants.org/>). These databases were also consulted to confirm plant family and scientific names. Identification of herbarium specimens was validated by qualified taxonomists, Mr. Danilo Tandang from Philippines National Museum (PNH) and Ms. Nina Alfeche, from the University of Santo Tomas, and the verified specimens were deposited in the University of Santo Tomas Herbarium and Herbarium Sorsogense. In several cases, particularly for taxa such as *Myristica* sp. and *Mallotus* sp., identification was limited to the genus level due to the absence of reproductive structures (flowers or fruits) at the time of collection. For these taxa, molecular identification through DNA barcoding is recommended for future verification and reference.

Ethical considerations

Prior to the conduct of the study, a Certification Precondition (IKSP Control No. R2-*IKSP-2025-06-043*) was secured from the National Commission on Indigenous Peoples (NCIP) Region II. The research was carried out in full compliance with the provisions of Republic Act No. 8371, also known as the Indigenous Peoples' Rights Act (IPRA) of 1997, which safeguards the rights of Indigenous Cultural Communities/Indigenous Peoples (ICCs/IPs) to their ancestral domains and Indigenous Knowledge Systems and Practices (IKSPs). A series of community consultative meetings were conducted to ensure adherence to ethical and participatory research protocols. These

included the Pre-FPIC (Free and Prior Informed Consent) conference, disclosure conference, memorandum of agreement signing, and an output validation meeting, during which the study results were presented to the community elders for review and feedback. In accordance with the agreement, a copy of the final manuscript will be provided to the community as part of the reciprocal sharing of research outputs and to promote transparency and benefit-sharing.

Data analyses

To quantify ethnobotanical data, three indices were calculated: Use Value (UV), Informant Consensus Factor (ICF) and Fidelity level (FL). The UV, which measures the relative importance of each species, was calculated as $UV = U/N$, where U is the number of use reports for a species and N is the total number of informants (Cordero et al. 2022). A higher UV indicates greater cultural significance (Abe and Ohtani 2013). The ICF was used to assess agreement among informants for specific disease categories, using the formula $ICF = (N_{ur} - N_i) / (N_{ur} - 1)$, where N_{ur} is the number of use reports and N_i is the number of species cited (Cordero et al. 2022). Values closer to 1 reflect stronger consensus and suggest consistent, potentially effective use of plants (dela Cruz and Ramos 2006; Dapar et al. 2020). The FL was calculated to determine the specificity of plant use for particular ailments, using the formula $FL (\%) = (N_p / N) \times 100$, where N_p is the number of informants reporting the use of a species for a particular ailment and N is the total number of informants citing the species (Cordero et al. 2025). Higher FL values indicate greater agreement among informants on the preferred species for a specific use.

RESULTS AND DISCUSSION

Informant demographics

Thirty-four Agta adults (21-72 years old) participated in the ethnobotanical survey (Table 1), with women comprising 62% of the sample. Most participants had little or no formal schooling, and farming was the primary livelihood, particularly among men.

Diversity of medicinal plants

A total of 81 medicinal plant species were documented in Gonzaga, Cagayan, representing 74 genera and 37 families (Table S1). The most represented families were Poaceae (9 species), Asteraceae (7), Euphorbiaceae (6), and Rutaceae (4), while eight other families-including Apocynaceae, Lamiaceae, Arecaceae, Fabaceae, Moraceae, Menispermaceae, Zingiberaceae, and Cyperaceae-each contributed three species. The remaining 25 families were represented by one or two species (Figure 2). Eight additional taxa reported by informants were not collected and are listed in Table S2.

Herbs and grasses dominated the flora (47%), followed by trees (31%), shrubs (16%), and climbers (6%) (Figure 3). Regarding habitat, nearly half of the species (49%) were cultivated in home gardens, 35% were collected from the wild, and 16% were sourced from both cultivated and wild habitats (Figure 4). Wild plants were commonly found along mountain trails, in dry riverbeds, and as weeds in rice fields, while cultivated species were maintained for ornamental, culinary, and medicinal purposes.

Table 1. Demographic profile of the Agta informants in Barangay Santa Clara, Gonzaga, Cagayan, Philippines

Social group	Description	No. of informants total (n: 34)	Percentage from the total (%)
Sex	Male	13	38
	Female	21	62
Age	21-35	13	38
	36-50	12	36
	51-72	9	26
Educational attainment	No Formal education	17	50
	Elementary	16	47
	Secondary	1	3
Civil status	Married	31	91
	Widowed	3	9
Occupation	Housewife	20	59
	Farmer	13	38
	Barangay Health Worker (BHW)	1	3
Social role	Tribal chieftain	1	3
	Traditional healers	8	24
	Community elders	12	35
	Household heads	13	38

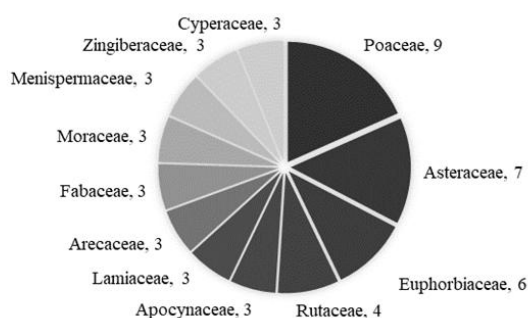


Figure 2. Medicinal plant families with the highest number of species represented

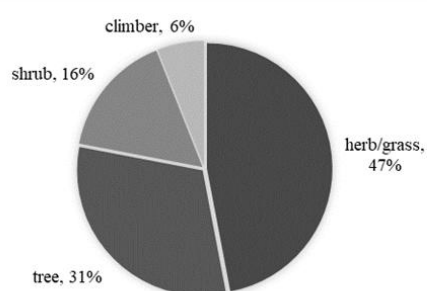


Figure 3. Growth habits of documented medicinal plants

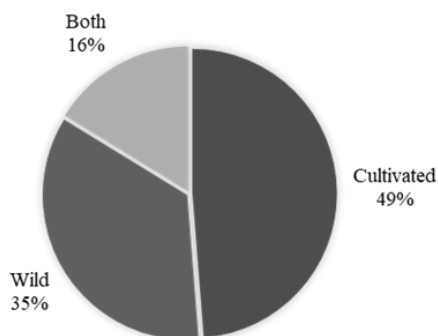


Figure 4. Collection sites and locations of medicinal plants used by the Agta

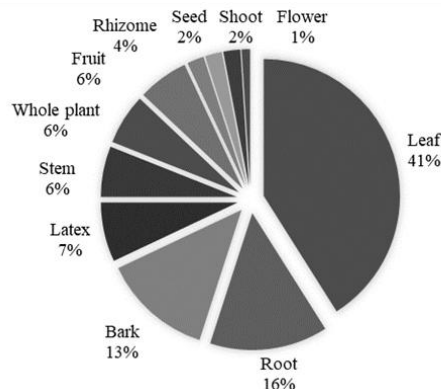


Figure 5. Plant parts of medicinal species used by the Agta

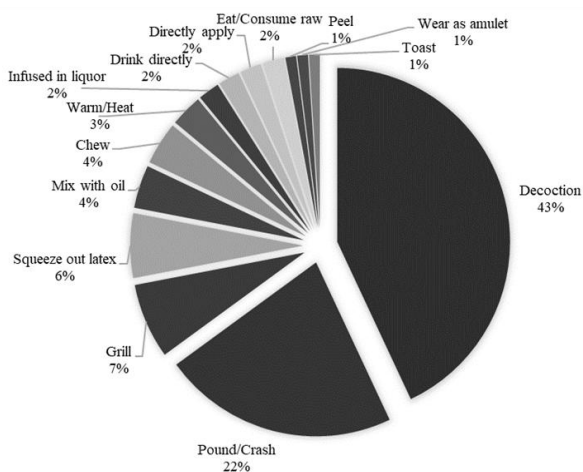


Figure 6. Modes of preparation and administration of medicinal plants used by the Agta

Plant part used and preparation methods

The Agta primarily utilized leaves (41%) for medicinal purposes, followed by roots (16%), bark (13%), and latex (7%), while stems, fruits, and whole plants each accounted for 6%, and less frequently used parts included seeds, rhizomes, shoots (ubod), and flowers ($\leq 2\%$) (Figure 5). This indicates a preference for renewable and easily accessible plant parts.

Decoction was the predominant preparation method (43%), followed by pounding or crushing (22%), reflecting widespread oral and topical applications (Figure 6). Other methods-grilling (7%), squeezing latex (6%), chewing or mixing with oil (4%), and warming/heating (3%)-were less frequent. Rare practices ($\leq 2\%$) included mixing with liquor, drinking directly, topical application, consuming raw, peeling, toasting, or wearing as amulets.

Several preparations were influenced by cultural beliefs. For example, *Hyptis capitata* Jacq. was worn as an amulet to ward off spirits. Decoctions of *Vitex arvensis* Gentallan, Sengun & M.B.Bartolome, *Psidium guajava* L., *Citrus × aurantifolia* (Christm.) Swingle, *Citrus maxima* (Burm.) Merr., and *Citrus reticulata* Blanco were specifically used to treat pasma-a condition attributed to

sudden exposure to cold or wet conditions after heat or fatigue-via steam inhalation or gulgol (pouring a decoction of boiled medicinal plants over the head). These examples demonstrate how preparation methods are shaped by both medicinal efficacy and cultural practices, integrating ethnobotanical knowledge with community beliefs.

Quantitative ethnobotanical indices

Use value (UV)

The Use Value (UV) was applied to quantify the relative importance of each plant species based on the Agta community's knowledge and cultural significance (Table 2). The species with the highest UV was *Myristica* sp. (0.88), reflecting its wide applications for abdominal bloating, postpartum care, stomachache, headache, and relapse. Bark decoctions were consumed to treat stomachache, grilled fruit was chewed or mixed with water for abdominal bloating and relapse, and leaf decoctions were ingested or added to water for bathing (gulgol) to relieve headache and support postpartum care.

The second highest UV was *V. arvensis* (0.62), which, together with *Blumea balsamifera* (L.) DC (UV = 0.35), was frequently cited for respiratory and febrile conditions. Leaf decoctions managed cough, while fever, flu, *pasma*, colds, and asthma were treated orally or through steam inhalation. Other notable species included *Senna alata* (L.) Roxb. (0.35), used for skin conditions such as scabies, ringworm, and athlete's foot, and *Citrus × microcarpa* Bunge (0.35).

Additional species with moderate UVs included *Arcangelisia flava* (L.) Merr. and *Fibraurea tinctoria* Lour. (0.32), *Artemisia vulgaris* L. (0.29), and four species with a UV of 0.26: *Coleus amboinicus* Lour., *Homalomena philippinensis* Engl., *Homonola riparia* Lour., and *Buddleja asiatica* Lour. These plants were primarily used for gastrointestinal, respiratory, and postpartum conditions, highlighting the central role of species with higher UVs in the Agta medicinal repertoire.

Informant Consensus Factor (ICF)

Eleven disease use categories were documented (Table 3), with ICF values ranging from 0.40 to 1.00, indicating varying levels of informant agreement. The highest

consensus (ICF = 1.00) occurred for endocrine, nutritional, and metabolic disorders, where all use reports referred to a single species, *Cymbopogon citratus* (DC.) Stapf. High ICF values were also recorded for respiratory disorders (0.76), pregnancy/childbirth-related conditions (0.71), and digestive diseases (0.68), reflecting many use reports concentrated on a few key taxa. Respiratory ailments were mainly treated with *V. arvensis*, *B. balsamifera*, *H. philippinensis*, and *C. × microcarpa*; pregnancy-related uses centered on *Myristica* sp. and *H. riparia*; and digestive disorders commonly involved *Myristica* sp., *Sapindus saponaria* L., *A. flava*, and *F. tinctoria*.

Conversely, lower ICF values (0.40-0.53) were recorded for skin diseases, musculoskeletal conditions, injuries/poisonings, and traditional or cultural practices. These categories featured more diffuse taxonomic usage, indicating a wider diversity of medicinal plants with less shared consensus among informants. This pattern suggests either a broader repertoire of acceptable remedies or less established cultural consensus for those ailments.

Several taxa emerged as multi-use and culturally salient. In particular, *Myristica* sp., *V. arvensis*, and *C. citratus* exhibited high citation frequencies across multiple disease categories, suggesting their importance in local ethnomedicinal knowledge and practice.

Table 2. Medicinal plants utilized by the Agta informants showing the highest number of uses and Use Values (N = 34)

Local name	Scientific name	No. of disease categories	Main uses/disease categories	No. of uses reported (U)	Use Value (UV)
Butaw	<i>Myristica</i> sp.	3	Relapse, stomachache, postpartum care, headache, bloating	30	0.88
Dangla	<i>Vitex arvensis</i> Gentallan, Sengun & M.B.Bartolome	3	Cough, fever, flu, pasma	21	0.62
Subusub/Bengaw	<i>Blumea balsamifera</i> (L.) DC	2	Asthma, flu, colds, cough, fever	12	0.35
Andadasi	<i>Senna alata</i> (L.) Roxb.	2	Scabies, ringworm, athlete's foot, skin disease	12	0.35
Kalamansi	<i>Citrus × microcarpa</i> Bunge	3	Cough, colds, flu, postpartum care	12	0.35
Lattok	<i>Arcangelisia flava</i> (L.) Merr	3	Stomachache, vomiting, lamig, toothache, diarrhea	11	0.32
Ummanak	<i>Fibraurea tinctoria</i> Lour.	3	Stomachache, vomiting, lamig, toothache, diarrhea	11	0.32
Erbaka	<i>Artemisia vulgaris</i> L.	1	Dysmenorrhea, menstrual problems	10	0.29
Oregano	<i>Coleus amboinicus</i> Lour.	2	Gas pain, cough, colds	9	0.26
Dalaw Bakir	<i>Homalomena philippinensis</i> Engl.	3	Cough, eltor, diarrhea, stomachache	9	0.26
Tagireng	<i>Homonoia riparia</i> Lour.	2	Relapse, paralysis	9	0.26
Tuggaraw / Duggaraw	<i>Buddleja asiatica</i> Lour.	4	Relapse, lamig, cough, stimulate menstruation, postpartum cleansing	9	0.26

Table 3. Informant Consensus Factor (ICF) of the diseases cured by the medicinal plants

Disease category	Nur	Nt	ICF	Most cited species (use reports)
1. Certain infectious or parasitic diseases	48	24	0.51	<i>Senna alata</i> (9); <i>Vitex arvensis</i> (4); <i>Blumea balsamifera</i> (3); <i>Citrus × microcarpa</i> (3)
5. Endocrine, nutritional, or metabolic diseases	2	1	1.00	<i>Cymbopogon citratus</i> (2)
12. Diseases of the respiratory system	43	11	0.76	<i>Vitex arvensis</i> (11); <i>Blumea balsamifera</i> (7); <i>Homalomena philippinensis</i> (6); <i>Citrus × microcarpa</i> (6)
13. Diseases of the digestive system	42	14	0.68	<i>Myristica</i> sp. (10); <i>Sapindus saponaria</i> (7); <i>Arcangelisia flava</i> (6); <i>Fibraurea tinctoria</i> (6)
14. Diseases of the skin	5	3	0.50	<i>Senna alata</i> (3); <i>Gliricidia sepium</i> (1); <i>Sapindus saponaria</i> (1)
15. Diseases of the musculoskeletal system	33	17	0.50	<i>Zingiber officinale</i> (5); <i>Bischofia javanica</i> (3); <i>Mallotus</i> sp. (3)
16. Diseases of the genitourinary system	32	11	0.68	<i>Artemisia vulgaris</i> (10); <i>Cinnamomum verum</i> (5); <i>Cymbopogon citratus</i> (4)
18. Pregnancy, childbirth, or the puerperium	60	18	0.71	<i>Myristica</i> sp. (13); <i>Homonoia riparia</i> (8); <i>Buddleja asiatica</i> (5)
21. Symptoms, signs, or clinical findings not elsewhere classified	52	25	0.53	<i>Myristica</i> sp. (7); <i>Coleus amboinicus</i> (5); <i>Vitex arvensis</i> (4)
22. Injury, poisoning, or other consequences of external causes	25	13	0.50	<i>Calamus microcarpus</i> (3); <i>Imperata cylindrica</i> (3); <i>Hedychium coronarium</i> (3)
26. Traditional or cultural practices	11	7	0.40	<i>Hyptis capitata</i> (2); <i>Vitex arvensis</i> (2); <i>Psidium guajava</i> (2); <i>Citrus maxima</i> (2)

Note. Nur: Number of use reports per disease category, Nt: Number of plant taxa

These findings indicate that community medicinal practices are strongly convergent for certain high-prevalence or culturally significant ailments, leading to concentrated use of a few dominant species. In contrast, for conditions with lower consensus, traditional healing relies on a broader and more variable set of taxa.

Fidelity Level (FL)

Fidelity Level (FL) analysis was undertaken to identify medicinal plants with the highest potential for pharmacological validation by examining cultural importance, therapeutic specificity, and the degree of consensus among Agta informants (Table 4). Several species exhibited maximum fidelity (FL = 100 percent), indicating complete agreement among all informants who cited the species for a single, specific use. These included *Moringa oleifera* Lam. for cough, *A. vulgaris* for dysmenorrhea and menstrual problems, *Sphaeropteris glauca* (Blume) R.M.Tryon for oral thrush, *Cinnamomum verum* J.Presl for stimulating menstruation, and *H. capitata* for its culturally significant role in warding off spirits. Their highly focused therapeutic or cultural applications underscore their prominence within the Agta ethnopharmacological repertoire. Additional species with maximum consensus but supported by only one to two use reports also emerged, covering a wide range of conditions: *Allium cepa* L. (measles); *Centella asiatica* (L.) Urb., *Ageratum conyzoides* L., *Elephantopus mollis* Kunth, *Phyllanthus reticulatus* Poir. (wound); *Catharanthus roseus* (L.) G.Don, *Oryza sativa* L., *Lantana camara* L. (stomachache); *Acorus calamus* L., *Chrysanthemum indicum* L., *Melastoma malabathricum* L. (bloating); *Caryota cumingii* Lodd. ex Mart. (diarrhea); *Crassocephalum crepidioides* (Benth.) S.Moore, *Heliotropium indicum* L., *Dinchoria* sp. (cough); *Solidago virgaurea* L. (toothache); *Macaranga sinensis* (Baill.) Müll.Arg. (dysmenorrhea); *Macaranga tanarius* (L.) Müll.Arg. (oral thrush); *Mimosa pudica* L., *Quassia indica* (Gaertn.) Noot. (abortifacient); *Bambusa bambos* (L.) Voss (stimulation of menstruation); *Lagerstroemia speciosa* (L.) Martyn, *Eleusine indica* (L.) Gaertn., *Zea mays* L. (UTI); *Hibiscus rosa-sinensis* L. (boil); *Donax canifformis* (G.Forst.) K.Schum (snakebite); *Ficus septica* Burm.f. (headache); *Musa x paradisiaca* L. (fever); *Vanda* sp. (arthritis); *Thysanolaena latifolia* (Roxb. ex Hornem.) Honda (abdominal cramps); and *Scoparia dulcis* L. (lamig). While their FL values reflect specific and consistent uses, the low number of informants indicates limited community-wide recognition, warranting cautious interpretation but still marking them as potential candidates for targeted ethnopharmacological assessment.

Species with high but non-maximal fidelity also demonstrated strong diagnostic value. *Senna alata* (FL = 75 percent) showed a marked and consistent association with dermatological conditions such as scabies and ringworm, while *H. riparia* (FL = 88 percent) was strongly linked to the culturally recognized condition of relapse, despite being cited by a relatively small number of informants. *Myristica* sp., although widely used across

multiple ailments, recorded moderate FL values for postpartum care (FL = 43 percent) and stomachache (FL = 33 percent), reflecting its multifunctional nature but also its prominence in culturally important health practices. *Cymbopogon citratus* exhibited FL values of 33 percent for beriberi and 67 percent for urinary tract infection, indicating low to moderate specificity but continued relevance for targeted FL evaluation.

Overall, the FL analysis identifies key species characterized by high cultural salience and strong agreement among informants. These plants represent priority candidates for pharmacological validation due to their clearly defined therapeutic roles. At the same time, species with limited yet highly specific use reports highlight emergent leads for further investigation, particularly for culturally embedded or condition-specific applications within the Agta community.

Discussion

The Agta community in Gonzaga, Cagayan, demonstrates extensive ethnomedicinal knowledge, with 81 plant species documented across 37 families and 74 genera through 34 key knowledge holders. Quantitative analyses identified culturally and pharmacologically important species, including *Myristica* sp., *S. alata*, and *A. vulgaris*, providing a foundation for targeted bioactivity studies. High Informant Consensus Factor (ICF) values indicate strong agreement on specific health conditions, while Fidelity Level (FL) analysis highlights species with narrowly defined therapeutic uses, suggesting priority candidates for pharmacological validation.

Table 4. Fidelity Level (FL) of selected medicinal plants cited by the Agta community

Species	Main use / disease category	Np	N	Estimated FL (%)
<i>Hyptis capitata</i> Jacq.	Ward off spirits (cultural use)	2	2	100
<i>Sphaeropteris glauca</i>	Oral thrush	3	3	100
<i>Cinnamomum verum</i>	Stimulate menstruation	5	5	100
<i>Moringa oleifera</i> Lam.	cough	3	3	100
<i>Artemisia vulgaris</i> L.	Dysmenorrhea / menstrual problems	10	10	100
<i>Homonoia riparia</i> Lour.	Relapse	7	8	88
<i>Senna alata</i> (L.) Roxb.	Skin disorders (scabies, ringworm)	9	12	75
<i>Myristica</i> sp.	Postpartum care	13	30	43

Note. Np: Number of informants reporting the specific use of the medicinal plant species, N: Total number of informants who mentioned the plant for any use, FL (%): Estimated Fidelity Level

Dominant families-Poaceae, Asteraceae, Euphorbiaceae, and Rutaceae-likely reflect ecological abundance and cultural familiarity (Meñiza et al. 2024). Apocynaceae, Zingiberaceae, and Fabaceae align with ethnomedicinal patterns across Southeast Asia, reflecting bioactive richness and therapeutic versatility (Tantengco et al. 2018). Globally, Zingiberaceae and Fabaceae are widely used in Africa and South America for febrile, gastrointestinal, and inflammatory conditions (Ballester et al. 2022; Khumalo et al. 2022; Maroyi 2023; Danvide et al. 2024; Szymczak et al. 2024; Paudel et al. 2025), illustrating convergent human-plant relationships in tropical regions. Conversely, 19 families were represented by a single species and six by two, reflecting ecological constraints or selective cultural adoption (Giday et al. 2009). Despite low representation, these taxa contribute unique phytochemicals and therapeutic properties, emphasizing the need to conserve both biodiversity and traditional knowledge (Cordero and Alejandro 2021; Balangiao and Walag 2022; Caleda et al. 2024).

Comparison with five ethnobotanical studies of Agta/Ayta communities in Luzon (Ragragio et al. 2013; Tantengco et al. 2018; Pablo 2019; Canceran et al. 2021; Antonio and Tuazon 2022) shows similar species numbers, with 16-28 consistently reported. Fabaceae and Asteraceae were most frequent, and *M. oleifera* was commonly used. The species count here exceeds Casiguran, Aurora (58 species), Morong (61), and Hermosa (74) in Bataan, but is lower than Porac (83) and Dinalupihan (118), reflecting geographical continuity and site-specific variation.

Herbaceous plants were most utilized, climbers least, consistent with other Philippine studies (Cordero and Alejandro 2021; Cordero et al. 2022, 2025; Andalan et al. 2024). Limited use of climbers may result from accessibility constraints and preference for more available plant types (Giday et al. 2009; Chekole 2017; Sajeeb et al. 2022). Nearly half of the species are maintained in home gardens, while others are collected from forest margins and riverbanks-habitats central to subsistence pharmacopeias but often absent from formal floristic inventories. Reports of scarce or uncollected species highlight risks of local extirpation amid deforestation and agricultural expansion (Brawn 2020), consistent with patterns observed in Amazonian and African communities, where community-based conservation supports both plant populations and cultural resilience (Bussmann and Sharon 2018; Albuquerque et al. 2024).

The most frequently treated ailments-fever, colds, cough, stomachache, asthma, urinary tract infection, diarrhea, and tuberculosis-reflect rural morbidity patterns and a pluralistic medical system integrating traditional and biomedical care (Balangcod and Balangcod 2015; Belgica et al. 2021; Caleda et al. 2024). Similar pluralism is reported globally (van Andel et al. 2015; Sundararajan et al. 2020), emphasizing ethnomedicine's continuing role as an adaptive health system.

Leaves (41%) and decoction (43%) were the most frequently used plant part and preparation method, reflecting availability, renewability, and efficient extraction of bioactive compounds (Maroyi 2023; Paudel et al. 2025). High Use Value (UV) species, including *Myristica* sp. (UV

= 0.88) and *V. arvensis* (UV = 0.62), were primarily prepared as leaf or bark decoctions, supporting multifunctional use for postpartum care, gastrointestinal, and respiratory ailments. High ICF values for endocrine, respiratory, digestive, and pregnancy-related conditions indicate convergence on a limited set of taxa, while FL analysis identified species with specific therapeutic applications-*M. oleifera* (cough), *A. vulgaris* (dysmenorrhea), *S. glauca* (oral thrush), *C. verum* (stimulating menstruation), and *H. capitata* (cultural use).

Culturally important species, including *V. arvensis*, *B. balsamifera*, *S. alata*, and *C. × microcarpa*, showed high UV and ICF, aligning with validated bioactivities (Montealegre and de Leon 2016; Husni et al. 2021; Ashfaq and Yousaf 2022; Islam et al. 2024). FL results highlight culturally specific applications and potential for bioprospecting (Agrawal and Mehta 2008; Fatmawati et al. 2020; Singh et al. 2021; Siwan et al. 2022; Trifan et al. 2022). High ICF values from limited reports, e.g., *C. citratus* (ICF = 1.00), reflect uniformity rather than broad prominence (Janačković et al. 2022). Species reported by few informants-including *A. cepa*, *C. asiatica*, *A. conyzoides*, *C. roseus*, *C. cumingii*, *C. crepidioides*, *S. virgaurea*, *Macaranga* spp., and *M. pudica*-demonstrated high fidelity for specific uses, indicating consistent efficacy and potential for targeted pharmacological study.

Quantitative indices were applied descriptively due to small sample sizes and low-frequency reports (Albuquerque et al. 2014) and are culturally representative rather than exhaustive. Limitations include recall bias, underreporting of rare species, and incomplete collection or identification, emphasizing the need for DNA barcoding or molecular tools. While UV, ICF, and FL indicate cultural importance, phytochemical and pharmacological validation remains necessary.

Agta ethnomedicine is characterized by high species diversity, broad therapeutic coverage, and strong consensus in culturally central health domains. Key implications include urgent conservation to ensure sustainable access to medicinal species, reinforcement of knowledge transmission through elder-to-youth transfer and community-led initiatives, and pharmacological research on culturally valued species such as *Myristica* sp., *V. arvensis*, *B. balsamifera*, *A. flava*, and *F. tinctoria*. These findings underscore the global significance of indigenous pharmacopeias as cultural heritage and sources of pharmacological innovation.

In conclusion, the study revealed that the Agta community in Gonzaga, Cagayan utilizes 81 medicinal plant species, representing 74 genera and 37 families, highlighting a rich and diverse ethnomedicinal knowledge system. This documentation fills a critical geographical and cultural gap in Philippine ethnobotany, providing a baseline record of Agta traditional plant knowledge and securing cultural heritage for future generations. By combining quantitative indices (UV, ICF, FL) with qualitative ethnobotanical data, the study validates culturally significant species, such as *Myristica* sp., *S. alata*, and *A. vulgaris*, demonstrating both their community-wide relevance and potential pharmacological promise. Beyond cultural preservation, these findings underscore the role of

traditional medicinal plants in supporting primary healthcare in resource-limited settings, providing baseline information that could inform future health strategies and conservation planning. Furthermore, the study establishes a foundation for future research, including phytochemical screening, pharmacological validation, and molecular identification of unidentified taxa, while highlighting the importance of conserving both ecological and ethnomedicinal knowledge in the face of modernization and environmental change. Despite limitations such as the modest sample size, seasonal collection constraints, and absence of laboratory validation, the findings provide a structured framework for bridging traditional knowledge with scientific inquiry, supporting the resilience of Agta cultural and healthcare systems.

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Table S1. List plants recorded to have medicinal significance to the Agta of Gonzaga, Cagayan, Philippines

Family	Scientific name	Local name	Accession number	Growth habit	Location	Disease	Plant part	Preparation and administration	Use Report	Use Value
Acanthaceae	<i>Andrographis paniculata</i> (Burm.f.) Wall. ex Nees	Serpentina	USTH019245	H	HG	stomachache	Leaf	Boil and drink the decoction	2	0.060
Acoraceae	<i>Acorus calamus</i> L.	Dalaw bubon	USTH019263	H	B	bloating in infants	Rhizome	Pound and combine the extract for oral intake for babies	1	0.030
Amaryllidaceae	<i>Allium cepa</i> L.	Lasuna	HS4708	H	HG	measles	Leaf	Boil for steam inhalation (<i>suob</i>)	1	0.030
	<i>Allium schoenoprasum</i> L.	Kutsay	USTH019242	H	HG	colds, cough	Leaf	Boil and drink the decoction; pound and drink the extract	2	0.060
Apiaceae	<i>Centella asiatica</i> (L.) Urb.	Malmalukong	USTH019253	H	B	wound	Leaf	Apply the pounded leaves to the affected area	1	0.030
Apocynaceae	<i>Alstonia scholaris</i> (L.) R.Br.	Dalipawen	HS4709	T	W	headache, stomachache, gas pain, flu, malaria	Bark	Boil and drink the decoction	5	0.15
	<i>Catharanthus roseus</i> (L.) G.Don	Sansan vicente	USTH019252	H	HG	stomachache	Root	Boil and drink the decoction	1	0.030
	<i>Tabernaemontana pandacaqui</i> Poir.	Busbusilak	HS4710	T	HG	wound, boils	Root	Apply the pounded leaf to the affected area; boil leaves and bark, and use them to wash the affected area	3	0.090
Araceae	<i>Homalomena philippinensis</i> Engl.	Dalaw bakir	HS4711	H	W	<i>eltor</i> , diarrhea, stomachache, cough	Root Leaf	Boil and drink the decoction Peel off the outer covering of the leaf's petiole and hang it around the neck	9	0.26
	<i>Raphidophora korthalsii</i> Schott	Dagmen	USTH019265	C	W	relapse; body cold or ' <i>lamig</i> ' hyperacidity	Leaf Leaf	Boil (with other <i>kuribang, tuggaraw, & lidda</i>) and drink the decoction Pound and drink the extract	5	0.15
Arecaceae	<i>Caryota cumingii</i> Lodd. ex Mart.	Anibong	HS4712	T	W	diarrhea	Shoot	Eat the soft apical shoot	1	0.030
	<i>Calamus microcarpus</i> Becc.	Limuden/ alimuran	HS4713	C	W	snakebite, centipede bite,	Shoot	Apply the pounded soft apical shoot	3	0.090

						scorpion bite		directly to the affected area		
	<i>Cocos nucifera</i> L.	Niyog	HS4714	T	HG	urinary tract infection (UTI)	Fruit	Drink the coconut juice	3	0.090
						muscle pain, relapse	Fruit	Process coconut meat into oil and use it for massage, often in combination with other medicinal plants.		
Asteraceae	<i>Ageratum conyzoides</i> L.	Garim/ gargarim	USTH019250	H	HG	wound	Leaf	Apply the pounded leaves to the affected area	2	0.060
	<i>Artemisia vulgaris</i> L.	Erbaka	HS4715	H	HG	dysmenorrhea, menstrual problems	Leaf	Heat the leaves, drink the extract, and apply the remaining residue to the temples.	10	0.29
	<i>Blumea balsamifera</i> (L.) DC.	Subusub/ bengaw	USTH019270	S	B	asthma, colds, cough, fever, flu	Leaf	Boil and drink the decoction	12	0.35
	<i>Chrysanthemum indicum</i> L.	Mansanilla	HS4716	H	HG	bloating, gas pain	Leaf	Pound and drink the extract	1	0.030
	<i>Crassocephalum crepidioides</i> (Benth.) S.Moore	Payukpok	USTH019251	H	HG	cough	Leaf	Pound and drink the extract	1	0.030
	<i>Elephantopus mollis</i> Kunth	Maratabako	USTH019259	H	HG	wound	Leaf	Apply the pounded leaves to the affected area	1	0.030
	<i>Solidago virgaurea</i> L.	Tantanduk	HS4717	H	W	toothache	Leaf	Apply the pounded leaves directly to the affected area	1	0.030
Boraginaceae	<i>Cordia dichotoma</i> G.Forst.	Anunang	HS4718	T	W	relapse, toothache	Bark	Boil and drink the decoction	2	0.060
	<i>Heliotropium indicum</i> L.	Arartitus	USTH019254	H	HG	cough	Leaf	Pound and drink the extract	1	0.030
Caricaceae	<i>Carica papaya</i> L.	Kapaya	HS4719	H	HG	malaria, dengue	Leaf	Boil young leaves and drink the decoction	3	0.090
						eye irritation from a particle	Latex	Squeeze out a drop of the leaf latex into the eye		
Cyatheaceae	<i>Sphaeropteris glauca</i> (Blume) R.M.Tryon	Talipangpang	HS4720	T	W	oral thrush	Latex	Squeeze out the latex from the roots into the affected area of the tongue	3	0.090
Cyperaceae	<i>Cyperus rotundus</i> L.	Bagnat (Ilocano)	HS4721	H	HG	postpartum	Root	Boil for use in a steam	2	0.060

						care, relapse		bath (<i>suob</i>), and decoction bath (<i>gulgol</i>), or for drinking as a decoction		
	<i>Cyperus brevifolius</i> (Rottb.) Hassk.	Bagnat	USTH019266	G	HG	postpartum care, relapse	Root	Boil for use in a steam bath (<i>suob</i>), and decoction bath (<i>gulgol</i>), or for drinking as a decoction	2	0.060
	<i>Scleria scrobiculata</i> Nees & Meyen	Gegellat	HS4722	H	B	relapse	Root	Boil for use in a decoction bath (<i>gulgol</i>)	5	0.15
Euphorbiaceae	<i>Euphorbia hirta</i> L.	Maragatas	USTH019255	H	HG	gas pain	Root	Grill roots and wrapped all over arms and legs		
	<i>Homonoia riparia</i> Lour.	Tagireng	USTH019271	T	W	oral thrush, eye irritation from a particle, wound relapse, paralysis	Latex	Squeeze out drop/s of leaf latex directly to the affected area	3	0.090
	<i>Jatropha curcas</i> L.	Tawwa tawwa	USTH019247	S	HG	"lamig"	Leaf, bark	Boil (with other plants: <i>kuribang</i> , <i>tuggaraw</i> , & <i>lidda</i>) and drink the decoction or bath decoction	9	0.26
	<i>Macaranga sinensis</i> (Baill.) Müll.Arg.	Bilante	HS4723	T	W	dysmenorrhea	All parts	Heat/warm leaves and put around the temple; Grill bark and put it in the affected area	6	0.18
	<i>Macaranga tanarius</i> (L.) Müell.Arg.	Samak	HS4724	T	W	oral thrush	Latex	Boil and drink the decoction	1	0.030
	<i>Mallotus</i> sp.	Kuribang	HS4725	T	W	UTI, "lamig"	Leaf	Apply a drop/drops of leaf latex directly to the affected area by squeezing	1	0.030
Fabaceae	<i>Gliricidia sepium</i> (Jacq.) Kunth	Kawkawati	USTH019261	T	HG	spit blood skin disease; mange	Leaf Leaf	Boil and drink the decoction	7	0.21
								Chew raw leaves		
								Pound/crush leaves and apply them directly to the affected area	2	0.060

	<i>Mimosa pudica</i> L.	Bain bain	USTH019257	H	HG	postpartum care, abortifacient	Leaf	Boil and drink the decoction	4	0.12
	<i>Senna alata</i> (L.) Roxb.	Andadasi	USTh019267	S	B	scabies, ringworm, athlete's foot, skin disease	Leaf	Pound leaves and apply them directly to the affected area; Boil leaves and use them to wash the affected area	12	0.35
Lamiaceae	<i>Coleus amboinicus</i> Lour.	Oregano	USTH019244	H	HG	gas pain, cough, colds	Leaf	Pound leaves and drink the liquid extract	9	0.26
	<i>Hyptis capitata</i> Jacq.	Ananib	USTH019269	H	HG	spirit warding	Leaf	Wear the leaves on the body as an amulet or hang it by the windows	2	0.030
	<i>Vitex arvensis</i> Gentallan, Sengun & M.B.Bartolome	Dangla	USTH019241	S	HG	cough	Leaf	Boil and drink the decoction	21	0.62
Lauraceae	<i>Cinnamomum verum</i> J. Presl	Kuliwan	HS4726	T	W	fever, flu, "pasma" stimulate menstruation	Bark	Boil for use in a stem inhalation Chew it directly or mix with betel and lime (<i>nganga</i>)	5	0.15
	<i>Persea americana</i> Mill.	Abokado	HS4727	T	HG	diarrhea, vomiting	Bark	Boil and drink the decoction	2	0.060
Lythraceae	<i>Lagerstroemia speciosa</i> (L.) Martyn	Banaba	USTH019248	T	B	UTI	Bark	Boil and drink the decoction	2	0.060
Malvaceae	<i>Hibiscus rosa-sinensis</i> L.	Gumamela	HS4728	S	HG	boils	Flower	Pound flower and apply it directly to the affected area	1	0.030
Marantaceae	<i>Donax canniformis</i> (G.Forst.) K.Schum	Darumaka	USTH019249	G	W	snake bite	Leaf, Stem	Apply the pounded plant to the bitten area	2	0.060
Melastomaceae	<i>Melastoma malabathricum</i> L.	Maratungaw	USTH019268	T	HG	gas pain	Bark	Wrap grilled bark around the abdominal area	1	0.030
Menispermaceae	<i>Arcangelisia flava</i> (L.) Merr	Lattok	HS4729	C	W	vomiting, "lamig"	Root	Boil and drink the decoction; infuse with liquor for consumption	11	0.32
						toothache	Latex	Squeeze out the latex from the roots and apply it directly to the affected area		
						stomachache, diarrhea	All parts	Boil and drink the decoction		
	<i>Fibraurea tinctoria</i>	Ummanak	HS4730	C	W	postpartum	Root	Boil and drink the	11	0.32

	Lour.					care		decoction; infuse with liquor for consumption		
						toothache	Latex	Squeeze out the latex from the roots and apply it directly to the affected area		
						stomachache, diarrhea	All parts	Boil and drink the decoction		
	<i>Tinomiscium petiolare</i> Miers ex Hook.f. &Thomson	Olang	HS4731	C	W	wound; scabies	Leaf	Pound leaves and apply directly to the affected area; wash the affected area with the plant decoction	3	0.090
Moraceae	<i>Artocarpus heterophyllus</i> Lam.	Nangka	USTH019262	T	HG	leech infiltration of the stomach	Leaf, Bark, fruit	Boil and drink the decoction	1	0.030
	<i>Ficus variegata</i> Blume	Labting	HS4732	T	B	snake bite, dog bite	Latex	Drink latex from the trunk, then apply some to the bitten area	2	0.060
	<i>Ficus septica</i> Burm.f.	Tagatta/ rayya	HS4733	T	B	headache	Leaf	Heat leaves with salt and wrap them around the temple	1	0.030
Moringaceae	<i>Moringa oleifera</i> Lam.	Marunggay	HS4734	T	HG	cough	Leaf	Pound leaves and drink the liquid extract, then wrap the remaining leaf residue around the abdominal area	3	0.090
Musaceae	<i>Musa x paradisiaca</i> L.	Dupa	HS4735	H	HG	fever	Bark	Wrap the dried part of the bark around the temple	2	0.060
Myristicaceae	<i>Myristica</i> sp.	Butaw	HS4736	T	W	postpartum care, headache	Leaf	Boil for use in a decoction bath (<i>gulgol</i>)	30	0.88
						relapse; bloating	Bark	Chew grilled fruit or mix the grilled fruit with water for drinking		
						stomachache	Fruit	Boil and drink the decoction		
Myrtaceae	<i>Psidium guajava</i> L.	Bayaba	USTH019240	T	HG	flu, postpartum care, "pasma"	Leaf	Boil for use in a decoction bath (<i>gulgol</i>)	6	0.18
	<i>Syzygium cumini</i> (L.)	Manek manek	HS4737	T	W	relapse,	Root	Boil and drink the	5	0.15

Skeels						"lamig"		decoction		
Orchidaceae	<i>Vanda</i> sp.	Kontada	HS4738	H	B	Joint pain, arthritis	Leaf	Boil for use in a decoction bath (<i>gulgol</i>) Mix the grilled leaves with a small amount of water, then apply or rub them on the affected area	1	0.030
Phyllanthaceae	<i>Phyllanthus reticulatus</i> Poir.	Tintinta	HS4739	S	W	wound	Latex	Squeeze out drop/s of leaf latex directly into the affected area	1	0.030
	<i>Bischofia javanica</i> Blume	Anggu	HS4740	T	W	UTI, "lamig"	Bark	Boil and drink the decoction	7	0.21
Pinaceae	<i>Pinus insularis</i> Endl.	Saleng	HS4741	T	W	spit blood relapse, postpartum care	Leaf Stem	Chew raw leaves Boil for use in steam inhalation (<i>suob</i>)	2	0.060
Plantaginaceae	<i>Scoparia dulcis</i> L.	Itsang kabayo	USTH019256	H	HG	"lamig"	Leaf	Boil and drink the decoction	2	0.060
Poaceae	<i>Bambusa bambos</i> (L.) Voss	Bayog	HS4742	G	W	to stimulate menstruation	Leaf	Boil and drink the decoction	1	0.030
	<i>Dinochloa</i> sp.	Bikal	HS4743	G	W	cough	Stem	Drink the extract	1	0.030
	<i>Cymbopogon citratus</i> (DC.) Stapf	Baraniw	USTH019243	H	HG	UTI, beri beri	Leaf, Root	Boil and drink the decoction	6	0.18
	<i>Eleusine indica</i> (L.) Gaertn.	Labba labba	USTH019258	H	HG	UTI	Leaf	Boil and drink the decoction	1	0.030
	<i>Imperata cylindrica</i> (L.) Raeusch.	Tikal	USTH019246	G	B	"lamig"	Root	Boil and drink the decoction	7	0.21
						relapse	Root	Boil with manek-manek for use in a decoction bath (<i>gulgol</i>)		
						snake bite, centipede bite, scorpion bite	Root	Boil for use in washing/rinsing the bitten area; pound and rub it directly on the bite area		
	<i>Oryza sativa</i> L.	Bagas	HS4744	G	HG	stomachache	Seed	Boil and drink the decoction made from toasted rice grains	2	0.060
	<i>Saccharum spontaneum</i> L.	Lidda	HS4745	G	B	relapse, "lamig"	Root	Boil and drink the decoction	2	0.060
	<i>Thysanolaena latifolia</i> (Roxb. ex Hornem.)	Buybuy	HS4746	G	W	gas pain	Leaf	Grill the leaf until it turns blackish, then	1	0.030

	Honda								mix the ash with coconut oil, and rub it around the abdominal area		
	<i>Zea mays</i> L.	Mais	HS4747	H	HG	UTI	Fruit		Boil and drink the decoction made from fruit/corn silk	1	0.030
Rutaceae	<i>Citrus x aurantiifolia</i> (Christm.) Swingle	Dalayap	HS4748	S	HG	headache, postpartum care " <i>pasma</i> "	Leaf		Boil leaves, mix with other citrus leaves for use in a decoction bath (<i>gulgol</i>)	4	0.12
	<i>Citrus maxima</i> (Burm.) Merr.	Suwa	HS4749	S	HG	flu, postpartum care, " <i>pasma</i> "	Leaf		Boil leaves, mix with other citrus leaves for use in a decoction bath (<i>gulgol</i>)	7	0.21
	<i>Citrus x microcarpa</i> Bunge	Kalamansi	HS4750	S	HG	flu, postpartum care	Leaf		Boil leaves, mix with other citrus leaves for a decoction bath (<i>gulgol</i>)	12	0.35
						colds, cough	Fruit		Drink juice mixed with water and other ingredients		
	<i>Citrus reticulata</i> Blanco	Mandarin	HS4751	S	HG	flu, postpartum care, " <i>pasma</i> "	Leaf		Boil leaves, mix with other citrus leaves for use in a decoction bath (<i>gulgol</i>)	5	0.15
Sapindaceae	<i>Sapindus saponaria</i> L.	Tuklab/ Tuklabo	HS4752	T	W	stomachache	All parts		Boil and drink the decoction	8	0.24
							Seed		Chew the seeds directly or pound it to make a decoction		
						foot blisters	Leaf		Grill the leaf and combine it with coconut oil, and apply it to the affected area of the foot		
Scrophulariaceae	<i>Buddleja asiatica</i> Lour.	Tugaraw	HS4753	S	W	relapse; " <i>lamig</i> "; stimulate menstruation; cough; postpartum cleansing	Root		Boil with <i>kuribang</i> and drink the decoction (Note: The decoction should not be taken if the person is suffering from diarrhea)	9	0.26
Simaroubaceae	<i>Quassia indica</i> (Gaertn.) Noot.	Manunggal	HS4754	T	W	abortifacient	All Parts		Boil and drink the decoction; consumed	1	0.030

Verbenaceae	<i>Lantana camara</i> L.	Bangsit	USTH019260	S	HG	stomachache	Root	raw Infuse with liquor for consumption	2	0.060
Zingiberaceae	<i>Hedychium coronarium</i> J.Koenig	Banay	HS4755	H	HG	wound	Stem	Boil and drink the decoction; combine the grilled roots with coconut oil and apply it directly to the abdominal area	4	0.12
	<i>Kaempferia galanga</i> Linn.	Disol	USTH019264	H	B	bloating/ gas pain	Rhizome	Pound to extract the juice and rub this into the affected area	1	0.030
	<i>Zingiber officinale</i> Roscoe	Laya	HS4756	H	HG	stomachache	Rhizome	Drink the extract from the pounded rhizome, or it can be mixed with water for children	7	0.21
						"lamig", paralysis, sprain, arthritis, weakness, and malaise	Rhizome	Boil and drink the decoction Pound and mix with coconut oil for rubbing or massage therapy		

Note: *Gulgol* is a process of rinsing or bathing with the use of boiled medicinal plants over the entire body starting from the head.; *lamig* is having a symptom that is trapped cold air in the body or "body cold"; *nganga* is chewing of betel nut, usually mixed with betel leaf, lime and other ingredients); *pasma* is a condition believed to be caused by sudden exposure to cold or wet conditions after being hot or tired, often resulting in trembling hands, fatigue, or muscle spasms); *suob* is a process whereby steam from the boiled medicinal plant is inhaled. A towel or blanket is wrapped around the body or used to cover the head to trap the steam.; *ubod* refers to the inner soft core or the heart of a palm. G: Grass; C: Climber; H: Herb; S: Shrub; T: Tree; HG: Home Grown; W: Wild; B: Both

Table S2. List of other medicinal plants mentioned by the Agta informants of Gonzaga, Cagayan, Philippines

Local name	Disease	Plant Part	Administration	Use Report	Use Value
Alimunos	Oral thrush	Bark	Apply the scraped bark to the affected area of the tongue	1	0.030
Bulig	Spirit warding	Leaf	It can be used (together with ananib) by wearing it on the body or by the windows.	1	0.030
Digeng	Stomachache; gastric pain/hyperacidity	Leaf	Drink decoction	2	0.060
Illelus	Stomachache	Leaf	Wrap the plant around the abdominal area	1	0.030
Pannig-an	Relapse (after childbirth)	Root	Drink the decoction; It can also be mixed with liquor for consumption	2	0.060
Tagappilay	Arthritis	Root Leaf	Drink decoction Heat/warm the leaves and apply directly to the affected area	2	0.060
Talingu	Beri-beri; cough; relapse	Root	Drink decoction	6	0.18
	<i>Lamig</i>	Root	Wrap the scraped roots around the foot-sole		
Tumuk	Relapse	Leaf	Boil dried leaves for suob	1	0.030