



RESEARCH ARTICLE

A study on quantitative indices of ethno wild edible plants in the Jawadhu hills, Tirupattur district, Tamil Nadu

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Abstract

The study area is Jawadhu hills situated in the Tirupattur district of Tamil Nadu, Eastern Ghats, which is home to about 80,000 indigenous Malayali tribal people living in 36 villages across three forest ranges: Singarapettai, Tirupattur and Alangayam. An ethnobotanical wild edible plants survey was conducted and enumerated 142 species, among these 79 wild edible plant species belonging to 67 genera, 42 families were used as medicine. Ethnobotanical information was gathered from 275 local informants, including 138 women and 137 men, about how wild edible plants are used to treat various ailments and results expressed in quantitative indices method. The Rutaceae family has a high use value of 0.043 and the most significant species was *Naringi crenulata* (Roxb.) D.H. Nicolson, with a use value of 0.074. The informant consensus factor (ICF) for jaundice and psoriasis was 0.875. The high-fidelity level (FL) is recorded in *Ocimum tenuiflorum* L. was 99%. According to plant parts value data fruit has highest value 0.426. The *Ocimum tenuiflorum* L. has a relative frequency citation value of 0.986 among wild edible medicinal plants. The study provides sustainable using wild edible plants in the study area, helping to preserve traditional knowledge and improve community health practices. Thus, it is essential to focus on conserving the traditional wild edible medicinal plants and their indigenous knowledge in Jawadhu hills to use for future generations.

Keywords: Eastern Ghats; Ethnobotany; Jawadhu hills; Malayali; Quantitative indices; Wild edibles.

1. Introduction

India has immense biological diversity over 17,500 wild plant species, possessing 4,000 medicinal properties (Tariq et al., 2018). In developing countries, 60% of the residents depend on traditional medicines, as reported by World Health Organization (WHO). About, 80% of communities depend on conventional medicinal practices for primary healthcare (Gondokesumo et al., 2023). The ethnic groups have historically had a strong connection with nature for their sustenance. Several tribal communities use wild edible plants as dietary supplements, medicine and other sources (Das et al., 2013). Wild edible plants are rich sources of all nutrient benefits and play a huge role in food security worldwide (Anwar et al., 2024). Due to their changing lifestyles, their traditional knowledge is slowly being degraded (Das et al., 2013). It is essential to convert the traditional knowledge of wild edible plants that are found to have medicinal value into scientific knowledge to conserve, revalue and utilize it (Anwar et al., 2024). The main objective is to enumerate wild edible plants that are used for ethnomedicinal purposes with quantitative analysis to evaluate wild edible medicinal plants.

2. Material and method

2.1. Study area

The Jawadhu hills are spread into three districts Tirupattur, Tiruvannamalai and Vellore. The study was conducted on Jawadhu hills in Tirupattur district, Eastern Ghats of Tamil Nadu (Figure 1). The study area was home to 36 tribal villages in Tirupattur district, across the three forest ranges Singarapettai, Tirupattur and Alangayam. The study area is located between 11°59'00.0" & 13°02'00.0" North latitude, and between 78°39'00.0" & 80°20'00.0" East longitude. These hills have elevation ranging from 3,600 to 3,800 feet (1,100 to 1,150 m). The temperature in the

hills ranges from 12 to 33°C per day. The mean annual rainfall is 1,100 mm of which about 480 mm is received in the South West monsoon period (June - September) and 429 mm in the North East monsoon period (October - December). The Jawadhu hills are home to different types of soils, including Red Laterite Soil, Shallow Stony Soils, Clayey and Loamy Soils, and Forest Soil. The forest consists of Dry mixed deciduous forest, Dry deciduous scrub forest, Tropical dry riverine forests, Tropical thorny forest, Thorny scrub forest, Tropical dry evergreen forest and Tropical dry semi-evergreen scrub forest.

Thurston (1909) stated that Malayali tribes who were lived in the hills had migrated to Jawadhu hills. While others describe them as Malayalis or Kanchipuram Gounders, the Malayalis call themselves Vellalar Gounders. The locals from different areas refer these tribes as Shevaroy Malai Makkal, Jawadhi Malai Makkal and Kolli Malai Makkal. Malayali contributes about 47.6% of Tamil Nadu's tribal population and they widely follow Hinduism (<https://www.tntribalwelfare.tn.gov.in>).

2.2. Method

Field surveys were conducted in the Jawadhu hills and ethnobotanical information was gathered from Malayali tribal about the wild edible medicinal plants. Data was collected using standard methods, through personal interviews, questionnaire methods and surveys were conducted. The questionnaire sheets were designed to collect ethnomedicinal information on each wild edible, which includes the informant's demographics such as age, sex, education and parental details. Informants often needed more than one session to provide complete information, the surveys were rarely finished on a first visit. The data included the local common name, uses of the plant part, mode of preparation, mode of administration, dosage and treated diseases. The wild edible ethnobotanical data was analysed using various quantitative

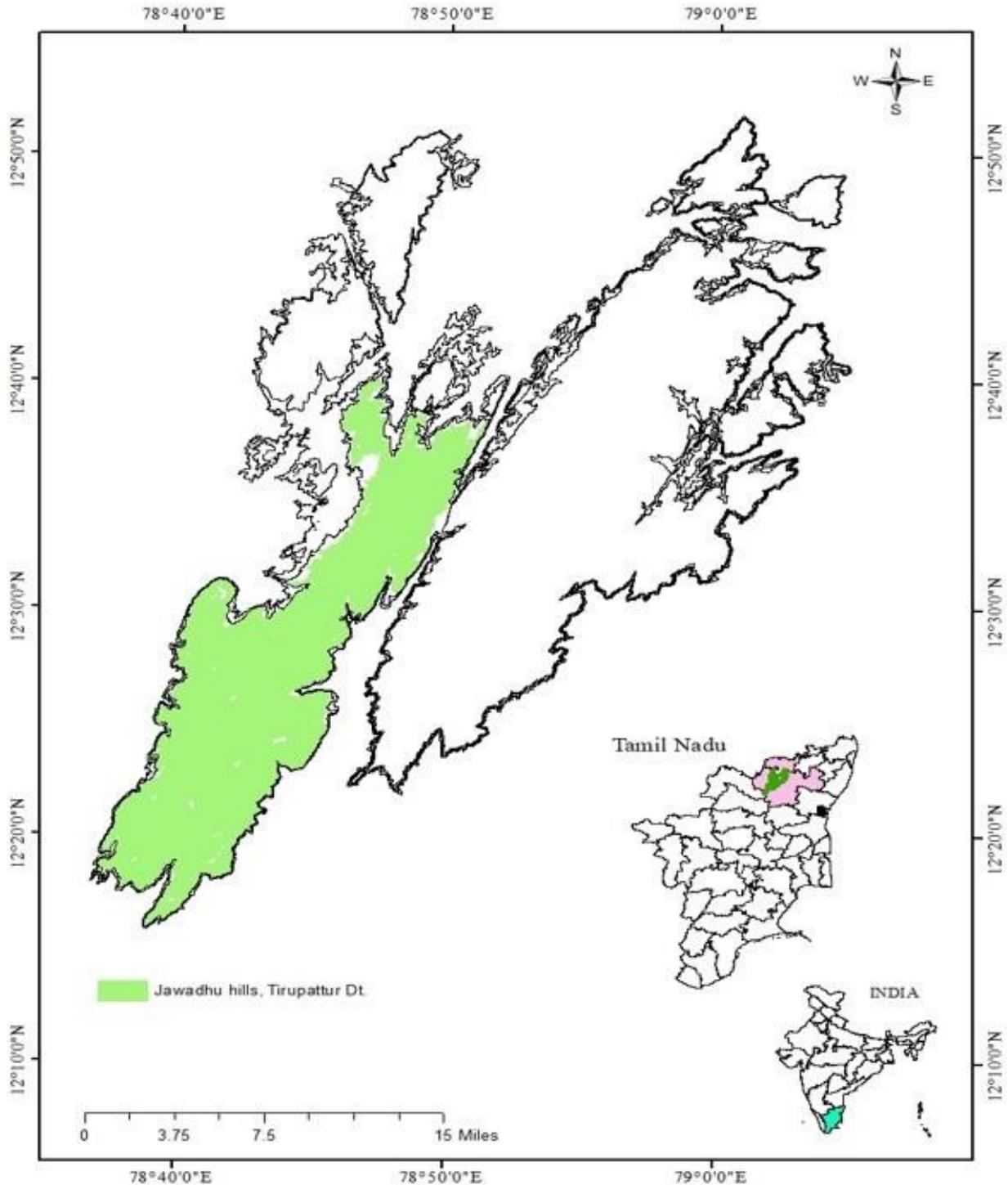


Figure 1. Study area of Jawadhu hills.

indices, including the Informant Consensus Factor (ICF), Relative Frequency Citation (RFC), Fidelity Level (FL), Use Value (UV), Family Use Value (FUV) and Plant Part Value (PPV). Results were expressed as proportions and percentages.

2.3. Quantitative indices data analysis

2.3.1. Use Value (UV)

The use value of species (UV), a quantitative method that indicates the relative importance of locally recognized species, was also computed using the following formula.

$UV = \frac{\sum U_i}{N}$, Where U_i is the number of use reports mentioned by each informant and N is the total number of informants interviewed for a given plant species.

2.3.2. Fidelity Level (FL)

The fidelity level (FL) is employed to identify the most effective species for treating a particular ailment. It is calculated using the following formula,

$FL = \frac{I_p}{I_u} \times 100$, Where I_p is the number of informants who independently indicated the use of a species for the same major

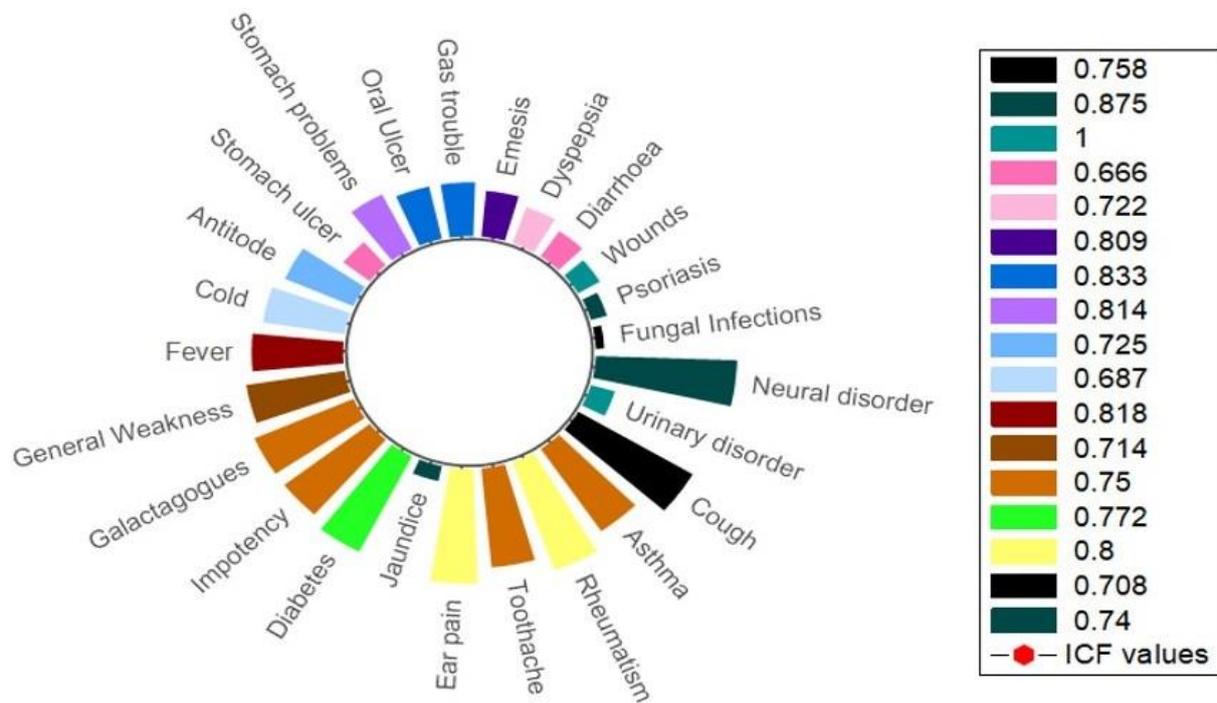


Figure 2. Informant Consensus Factor (ICF) values of wild edible plants.

ailment and *Iu* are the total number of informants who mentioned the plant for any major ailment.

2.3.3. Relative Frequency Citation (RFC)

The relative frequency of citation (RFC) indicates the local importance of each species and is calculated using the following formula.

$RFC = FC / N$ ($0 < RFC < 1$); this index is obtained by dividing the number of informants mentioning a useful species frequency of citation by the total number of informants in the survey (*N*).

2.3.4. Informant Consensus Factor (ICF)

The informant consensus factor measures the level of agreement among informants regarding the use of plants for specific categories. It is calculated using the following formula.

$ICF = \frac{Nur - Nt}{Nur - 1}$, Where *Nur* is the number of mentions in each category and *Nt* is the number of taxa used in each category.

2.3.5. Family Use Value (FUV)

The FUV assesses the significance of plant families as an index of cultural importance in ethnobotany, providing a value for biological plant taxa. The FUV is calculated using the following formula.

$FUV = \frac{UVs}{NS}$, Where *UVs* / *UV* is the number of informants mentioning the family and *Ns* is the total number of species within each family. Number of Informants mentioning the family (*UVs*) and total number of species within each family (*Ns*).

2.3.6. Plant Part Value (PPV)

Plant part value (PPV) measures the relative significance of different plant parts in traditional medicines. It reflects how the use of various components, such as roots, seeds, leaves, flowers, and fruits, varies depending on cultural context and community needs.

$PPV = \frac{RU \text{ Plant part}}{RU}$ Where *RU* is the number of uses reported of all parts of the plant and *RU plant part* is the sum of uses reported per part of the plant. The part with the highest PPV is the most used by the respondents.

3. Result

A wild edible survey was conducted and enumerated 142 species in the study area. Among this total of 79 wild edible species, belonging to 67 genera from 42 families were identified as medicine. The dominant genera are *Citrus* and *Senna* with 3 species respectively. The dominant family is Rutaceae with 11 species. Wild edible plants include trees 29 species, herbs 31 species, shrubs 10 species and climbers 9 species were used to treat various ailments. Table 1 provides detailed information on wild edibles, including its scientific name, family, local name, medicinal uses, and UV, FL and RFC data.

The Malayali tribals in the Jawadhu hills from three study forest ranges has a high level of knowledge about traditional medicine. The ten villages of Singarapettai forest range are Malaiyandipatti, Nellivaasal Nadu, Nellippattu, Valasai, Malaitirupattur, Puliur, Kizhur, Kombai, Mel pattu, Sembarai. The twenty-two village of Tirupattur forest range are Melur, Sithur, Arumaal pattu, Vazhuthalapattu, Nadu kuppam, Vizhankuppam, Pudhur Nadu, Muzhalai, Kizhanur, Thagara kuppam, Perumpalli, Serkkanoor, Chennattanoor, Rangasamuthiram, Nadur, Kambukudi, Pelur, Pungampattu Nadu, Kovilur, Arasamaraththu kollai, Kotthanur, Kallavur and the four village of Aalangayam forest range are Kavalur, Pazhiya palayam, Poongulam and Vasanthapuram. Tribal local informants ranges from 24 to 67 years old, reported from 36 villages from 3 forest ranges. Information was gathered from 275 people (137 males, 138 females) including herbalists (38), farmers (110), shepherds (89) and others (38). Informant ages are divided into the following categories 21-30 (14 persons), 31-40 (105 persons), 41-50 (83 persons), 51-60 (60 persons) and above 60 (13 persons). Educational levels of informants ranged from illiterate respondents (50%), Primary school respondents (11%), Secondary school respondents (21%), Higher secondary school (11%) and degree and above (7%). The wild edible plants are available in and surrounding places of village and forest areas. The Malayali tribal consume these wild edible plant parts either raw or cooked, roasted, or fried. Most of these wild edible plants are multipurpose species and valued in traditional medicine. A quantitative indices method was used to determine wild edible

Table 1. List of wild edible medicinal plants use value, fidelity level and relative frequency citation values in Jawadhu Hills.

SN	Family	Binomial name	Vernacular name	Medicinal uses	UV	FL	RFC
1.	Acanthaceae	<i>Barleria gibsonii</i> Dalzell	Kaami sakkara	Antitode	0.034	35	0.198
2.	Aizoaceae	<i>Trianthema portulacastrum</i> L.	Pasalikeera	Stomach ulcer	0.027	59	0.256
3.	Alangiaceae	<i>Alangium salvifolium</i> (L.f.) Wangerin	Alinji	Antitode	0.013	86	0.809
4.	Amaranthaceae	<i>Achyranthes aspera</i> L.	Nayuruvi	Stomach ulcer	0.036	73	0.283
5.		<i>Amaranthus spinosus</i> L.	Mullu keerai	Stomach ulcer	0.048	55	0.143
6.		<i>Amaranthus viridis</i> L.	Thoppul keerai	Stomach ulcer	0.019	81	0.532
7.		<i>Celosia argentea</i> L.	Pannai keerai	Stomach ulcer	0.042	75	0.164
8.	Anacardiaceae	<i>Mangifera indica</i> L.	Ma maram	Emesis	0.024	91	0.85
9.	Annonaceae	<i>Annona reticulata</i> L.	Rama seetha	Dyspesia	0.019	67	0.358
10.		<i>Annona squamosa</i> L.	Seetha maram	Dyspesia	0.012	84	0.556
11.		<i>Uvaria narum</i> (Dunal) Blume	Kaakkana kai	Diabetes	0.042	19	0.164
12.	Apiaceae	<i>Centella asiatica</i> (L.) Urb.	Vallarai	Stomach ulcer	0.021	80	0.652
13.	Apocynaceae	<i>Ceropegia juncea</i> Roxb.	Aatlangodi	General weakness	0.015	80	0.451
14.		<i>Stephanotis volubilis</i> (L.f.) S.Reuss, Liede & Meve	Vattakakka kodi	Antitode	0.012	84	0.556
15.	Asparagaceae	<i>Asparagus racemosus</i> Willd.	Thannirvittan kizhangu	Antidiuresis	0.011	92	0.638
16.		<i>Dracaena roxburghiana</i> (Schult. & Schult.f.) Byng & Christenh.	Jaang / Manji	Ear pain	0.023	80	0.447
17.	Asteraceae	<i>Sphagneticola calendulacea</i> (L.) Pruski	Manjal karilamkanni	Jaundice	0.013	92	0.775
18.	Boraginaceae	<i>Cordia dichotoma</i> G.Forst.	Jolka maram	Dyspesia	0.031	84	0.437
19.		<i>Ehretia microphylla</i> Lam.	Kurangu veththalai	Diarrhoea	0.024	60	0.283
20.	Brassicaceae	<i>Mutarda nigra</i> (L.) Bernh.	Kadugu	Stomach problems	0.016	83	0.628
21.	Cactaceae	<i>Opuntia vulgaris</i> Mill.	Sappathikalli	Neural disorder	0.01	81	0.703
22.	Capparaceae	<i>Capparis zeylanica</i> L.	Aathandai / Nagathali mullu	Antitode	0.022	80	0.471
23.		<i>Maerua oblongifolia</i> (Forssk.) A. Rich.	Poomi sakkara	Antitode	0.014	84	0.495
24.	Cleomaceae	<i>Cleome gynandra</i> L.	Nal velai	Dyspesia	0.014	85	0.713
25.		<i>Cleome viscosa</i> L.	Naai velai	Diarrhoea	0.016	80	0.655
26.	Combretaceae	<i>Terminalia chebula</i> Retz.	Kadukkai	Antitode, Neural disorder, Stomach problems, Diabetes and Paralysis	0.029	95	0.942
27.	Crassulaceae	<i>Kalanchoe pinnata</i> (Lam.) Pers.	Ranakalli	Ear pain	0.023	77	0.437
28.	Cucurbitaceae	<i>Coccinia grandis</i> (L.) Voigt	Kovaikkai	Dyspesia	0.015	96	0.908
29.	Euphorbiaceae	<i>Acalypha fruticosa</i> Forssk.	Jittu chedi	Stomach problems and General weakness	0.027	70	0.249
30.		<i>Euphorbia heterophylla</i> L.	Paal perukki Chedi	Impotency and galactagogues	0.012	82	0.573
31.		<i>Euphorbia hirta</i> L.	Amman pachcharisi	Impotency and galactagogues	0.013	84	0.761
32.	Fabaceae	<i>Bauhinia purpurea</i> L.	Nilattiruvatti	Diarrhoea	0.017	74	0.594
33.		<i>Bauhinia racemosa</i> Lam.	Aacha maram	Diarrhoea	0.015	80	0.451
34.		<i>Gliricidia sepium</i> (Jacq.) Kunth	Konjaam maram	Stomach ulcer and Cold	0.047	69	0.147
35.		<i>Pithecellobium dulce</i> (Roxb.) Benth.	Kodukkapuli	Dyspesia and Stomach ulcer	0.015	98	0.935
36.		<i>Senna auriculata</i> (L.) Roxb.	Aavaram	Stomach ulcer	0.022	78	0.468

Table 1. List of wild edible medicinal plants use value, fidelity level and relative frequency citation values in Jawadhu Hills.

SN	Family	Binomial Name	Vernacular Name	Medicinal uses	UV	FL	RFC
37		<i>Senna occidentalis</i> (L.) Link	Paayavarai	Stomach ulcer	0.021	78	0.488
38		<i>Senna tora</i> (L.) Roxb.	Thagara	Stomach ulcer	0.021	87	0.666
39	Hypoxidaceae	<i>Curculigo orchioides</i> Gaertn.	Nilappanai	Neural disorder and General Weakness	0.015	92	0.894
40	Lamiaceae	<i>Ocimum basilicum</i> var. <i>basilicum</i>	Thiruneetrapachilai	Cold and Cough	0.011	93	0.911
41		<i>Ocimum tenuiflorum</i> L.	Thulasi	Cold, Cough and Asthma	0.01	99	0.986
42	Loganiaceae	<i>Strychnos potatorum</i> L.f.	Thethan maram	Neural disorder	0.018	85	0.56
43	Meliaceae	<i>Azadirachta indica</i> A. Juss.	Vembu	Antitode Stomach problems, Fungal Infections, Psoriasis and Jaundice	0.022	94	0.928
44		<i>Melia dubia</i> Cav.	Malai vembu / Karna maram	Anti-dot to fungal infections and Psoriasis	0.02	83	0.519
45	Moraceae	<i>Artocarpus heterophyllus</i> Lam.	Pala maram	Antitode	0.013	86	0.819
46	Myrtaceae	<i>Psidium guajava</i> L.	Goyya	Oral Ulcer	0.009	87	0.761
47		<i>Syzygium cumini</i> (L.) Skeels.	Naaval maram	Diabetes	0.026	82	0.399
48	Nyctaginaceae	<i>Mirabilis jalapa</i> L.	Anthimantharai	Antitode	0.047	57	0.147
49	Orchidaceae	<i>Habenaria plantaginea</i> Lindl.	Iddly kilangu	Neural disorder	0.031	73	0.437
50	Oxalidaceae	<i>Oxalis corniculata</i> L.	Puliyarai / puliyam pul	Toothache	0.034	63	0.201
51	Phyllanthaceae	<i>Flueggea virosa</i> (Roxb. ex Willd.) Royle	Poola chedi	Stomach ulcer	0.059	40	0.116
52		<i>Phyllanthus emblica</i> L.	Kattu nelli	Cough and Gas trouble	0.016	90	0.874
53	Piperaceae	<i>Piper betle</i> L.	Vettilai	Cold and Cough	0.011	97	0.973
54		<i>Piper nigrum</i> L.	Milagu	Cold and Cough	0.012	84	0.823
55	Plumbaginaceae	<i>Plumbago zeylanica</i> L.	Chithirai moolam	Antitode	0.021	88	0.498
56	Poaceae	<i>Cymbopogon citratus</i> (DC.) Stapf	Manja pil	Cold and Cough	0.022	82	0.457
57	Portulacaceae	<i>Portulaca quadrifida</i> L.	Pasalai keerai	Stomach ulcer	0.019	68	0.549
59	Rubiaceae	<i>Catunaregam spinosa</i> (Thunb.) Tirveng.	Kaara mul	Asthma and Cough	0.048	65	0.143
60		<i>Gynochthodes umbellata</i> (L.) Razafim. & B. Bremer	Thumbu kodi	Diabetes and Neural disorder	0.029	85	0.235
61		<i>Morinda pubescens</i> Sm.	Manjanatthi / Nuna	Diabetes and Neural disorder	0.017	81	0.594
62	Rutaceae	<i>Aegle marmelos</i> (L.) Correa.	Vilvam maram	Neural disorder and Impotency	0.013	90	0.802
63		<i>Atalantia monophylla</i> DC.	Kaattu elumichai	Fungal Infections	0.016	88	0.427
64		<i>Citrus limon</i> (L.) Burm. f.	Elumichai	Emesis and Fungal infections	0.024	88	0.86
65		<i>Citrus maxima</i> (Burm.) Merr.	Jakotharai kai	Emesis, Fungal infections.	0.038	59	0.266
66		<i>Citrus medica</i> L.	Naarthangai	Emesis and Fungal infections	0.02	88	0.696
67		<i>Clausena dentata</i> (Willd.) Roem.	Aana maram	Fungal infections	0.017	74	0.403
68		<i>Glycosmis pentaphylla</i> (Retz) DC.	Siru kolinji / kula pannai	Emesis and Toothache	0.016	90	0.628
69		<i>Limonia acidissima</i> L.	Vizham maram	Stomach ulcer	0.018	63	0.57
70		<i>Berbera koenigii</i> L.	Karuveppilai	Fungal infections	0.017	92	0.788

Table 1. List of wild edible medicinal plants use value, fidelity level and relative frequency citation values in Jawadhu Hills.

SN	Family	Binomial Name	Vernacular Name	Medicinal uses	UV	FL	RFC
71		<i>Naringi crenulata</i> (Roxb.) Nicolson	Naai vizha / Maha vilvam	Diabetes, Impotency and Fever	0.074	66	0.232
72		<i>Zanthoxylum asiaticum</i> (L.) Appelhans, Groppo & J.Wen	Milagaranai	Antitode and Fever	0.018	85	0.765
73	Sapindaceae	<i>Cardiospermum helicacabum</i> L.	Mudakkathan	Rheumatism and Fever	0.012	90	0.829
74	Sapotaceae	<i>Madhuca longifolia</i> (L.) J.F.Macbr.	Iluppai	Stomach ache	0.022	84	0.464
75		<i>Mimusops elengi</i> L.	Moluva maram / Magizhamaram	Stomach ache	0.024	84	0.563
76	Solanaceae	<i>Solanum nigrum</i> L.	Manathakkali	Oral Ulcer and Stomach problems	0.018	97	0.942
77		<i>Solanum torvum</i> Sw.	Sundai	Stomach problems	0.031	83	0.437
78	Vitaceae	<i>Cissus quadrangularis</i> L.	Pirandai	Rheumatism	0.012	94	0.877
79	Zingiberaceae	<i>Zingiber zerumbet</i> (L.) Roscoe ex Sm.	Kattukolinch	Wounds and Cough	0.023	81	0.587

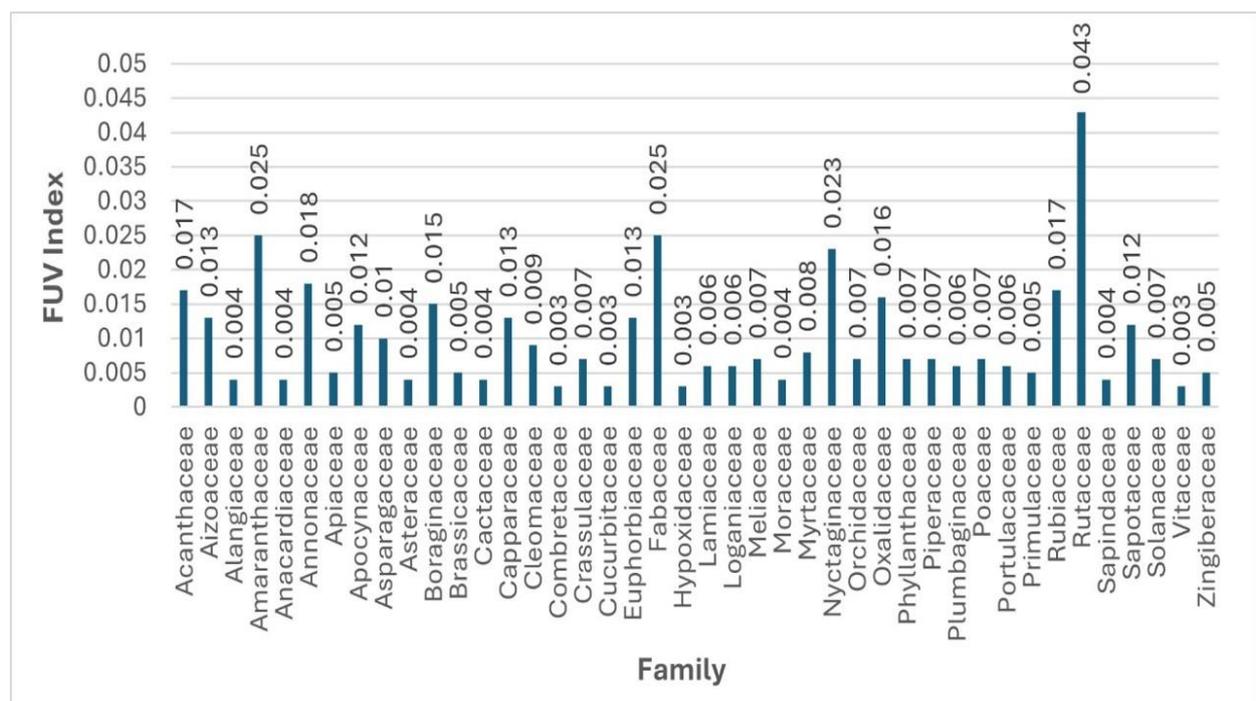


Figure 3. Family use value (FUV) of wild edible plants

medicinal plants usage and the criteria are Informant Consensus Factor (ICF), Relative Frequency Citation (RFC), Fidelity Level (FL), Use Value (UV), Family Use Value (FUV) and Plant Part Value (PPV). Enumerated wild edible plants play a role in medicinal properties and quantify ethnobotanical information to estimate and explain the application of knowledge in statistical and mathematical analysis.

3.1. Use Value (UV)

The findings indicate that the wild edible Use Value (UV) ranged from 0.009 to 0.074 (Table 1). The highest use value was reported

in *Naringi crenulata* (Roxb.) Nicolson (0.074), followed by the *Flueggea virosa* (Roxb. ex Willd.) Royle (UV = 0.059), *Catunaregam spinosa* (Thunb.) Tirveng. and *Amaranthus spinosus* L. (UV = 0.048). The lowest UV was reported in 3 species they are *Psidium guajava* L. (UV = 0.009), *Ocimum tenuiflorum* L. and *Opuntia vulgaris* Mill. (UV = 0.010).

3.2 Fidelity Level (FL)

The fidelity level (FL) is a valuable metric for evaluating the efficacy of specific wild edibles in treating particular ailments. In the present investigation, FL values ranged from 19 to 99% (Table 1).

The study identified 79 wild edible plant species with a fidelity level (FL), most of which were used to treat a single ailment by multiple informants (Table 1). The highest FL value was reported by *Ocimum tenuiflorum* L. 99%, *Pithecellobium dulce* (Roxb.) Benth. 98%, *Piper betle* L., and *Solanum nigrum* L. 97%. The lowest FL value was recorded in *Uvaria narum* (Dunal) Blume 19%, *Barleria gibsonii* Dalzell. 35%, *Flueggea virosa* (Roxb. ex Willd.) Royle 40% and *Amaranthus spinosus* L. 55%.

3.3. Relative Frequency Citation (RFC)

The RFC value, which reflects the relative importance of wild edibles, is known by the number of informants who use that species (Anwar et al., 2023). The results indicate that the relative frequency of citation (RFC) index for wild edibles used to treat various diseases ranges from 0.116 to 0.986 (Table 1). The maximum value of RFC reported in *Ocimum tenuiflorum* L. 0.986, *Piper betle* L. 0.973, *Solanum nigrum* L., and *Terminalia chebula* Retz. 0.942. The lowest RFC value recorded in *Flueggea virosa* (Roxb. ex Willd.) Royle 0.116, *Amaranthus spinosus* L. and *Catunaregam spinosa* (Thunb.) Tirveng. 0.143, followed by the *Gliricidia sepium* (Jacq.) Kunth and *Mirabilis jalapa* L. 0.147.

3.4. Informant Consensus Factor (ICF) values

The consistency of the information provided by different informants on the species utilized to treat 7 disease categories. ICF values varies between 0 and 1, According to the high-level ICF mentioned several informants provided and shared the traditional knowledge, the lowest level of ICF mentioned that a minimum number of informants provided the information. Significantly, the highest ICF value is 1 was observed for the treatment of Urinary disorders and Wounds, followed by Jaundice and Psoriasis ICF value is 0.875 respectively. These high ICF values suggest the strong reliability among informants regarding the use of medicinal wild edible species. The low ICF values was observed in the treatment of Diarrhoea and Stomach ulcers were 0.666, followed by Cold 0.687 and Cough 0.708 respectively (Figure 2).

3.5. Family Use Value (FUV)

The results indicate that there are 42 wild edible families recorded in the study area. The most frequently cited family was Rutaceae with 11 species, followed by Fabaceae with 7 species, while Amaranthaceae cited 4 species, Annonaceae, Rubiaceae and Euphorbiaceae each with 3 species respectively, whereas other families were represented by either 2 or a single species. Based on the high FUV index, the top five most cited families were Rutaceae 0.043, Amaranthaceae and Fabaceae 0.025, Nyctaginaceae 0.023, Annonaceae 0.018, Acanthaceae and Rubiaceae 0.017 (Figure 3). The families of Combretaceae, Cucurbitaceae, Hypoxidaceae and Vitaceae exhibiting a use value below 0.003 were regarded as having less knowledge of folklore significance.

3.6. Plant Parts Value (PPV)

The wild edibles are a common and popular ingredient in medical preparation; the study focused on wild edible ethnobotanical diversity. The results indicate that the high PPV index is attributed to fruits. Wild edible plant parts enumeration revealed 39 species of leaves, 36 species of fruits, 7 species of underground parts, 2 species of stems, 2 species of flowers and 2 species of seeds. The results indicated that underground parts, flowers and fruits (0.50) were the most predominantly used plant parts, followed by stems 0.44 leaves and seeds 0.40 respectively (Figure 4).

4. Discussion

The use value index, calculated for each wild edible medicinal plant species, gives the association between the relative importance of the plant species to the Malayali tribal community and the uses attributed to them. High use values reflect the significant importance attributed to the wild edibles based on their perceived therapeutic benefits (Ikraoun et al., 2023).

The factors contributing to a high use value are multifaceted, including local customs, traditions, historical practices and efficacy of the wild edibles, frequent mention by a substantial number of informants, the species exhibited the highest usage value index. As usage value is directly correlated with the number of reported uses,

these plants warrant further investigation for their phytochemical and pharmaceutical properties. Species with high usage values should be conserved and prioritized for their continued availability in the future because of their widespread use and the risk of overharvesting.

The presence of a low use value (UV) in a wild edible does not diminish its significance; rather, it may indicate that traditional healers have utilized it less frequently. A plant with the high UV means that a higher volume of documented reports exists regarding its use while a plant with the low UV means that the existence of such reports is less among respondents. The highest UV value for a wild edible shows that a plant is well known in the community and may be used to cure diseases. Wild edible medicinal plant species with low usage values should not be overlooked, as failure to document them can lead to the gradual loss of traditional knowledge.

The fidelity level (FL) varied among wild edibles indicated by the responses provided by Malayali tribal of Jawadhu hills. The fidelity level (FL) calculation provides insights into the most recommended wild edibles for treating various types of diseases (Najem et al., 2020). The high-fidelity level (FL) values are attributed to the extensive traditional knowledge and experience of the Malayali tribal regarding the specific therapeutic properties of wild edibles. Malayali tribal often develop a profound understanding of the medicinal applications of plants through trial and error, observations and intergenerational transmission of knowledge. The consistent observation of the effectiveness of wild edibles in treating specific ailments over time contributes to their high FL values. Low fidelity levels may also contribute to the scarcity of certain plant species in this region. It indicates a limited awareness of the medicinal uses of wild edible plant among the Malayali tribal community. Despite their low fidelity levels, these plant species should not be ignored in preserving the traditional knowledge of the community regarding the treatment of certain diseases.

The wild edibles with high values of Relative Frequency Citation are mostly well-known, traditionally valued and are used for the treatment of diseases. These species might exhibit higher RFC values because they are widely recognized, hold traditional significance and effectively treat various local ailments. The lowest value of relative frequency citation of wild edible plants occurs when a particular species of the wild plant has few mentions or citations as against all other species.

Informant Consensus Factor values may be attributed combination of factors, limited communication among practitioners of traditional medicine and the abundance of potential medicinal plants for this condition. The informant values suggest a strong network among the Malayali tribal community in sharing their knowledge of medicinal practices, which is typical of traditional healers addressing the most encountered diseases in the study area. Consequently, species with high ICF should be prioritized for further pharmacological and phytochemical research.

The high Family Use Value of Rutaceae, Fabaceae and Amaranthaceae in the study was explained by the fact that these families contain a variety of wild edibles with important traditional applications in the local area. The high value of these families is attributed to their frequent use of traditional medicine. Furthermore, wild edible medicinal plant families encompass significant species used to treat various diseases. The lower FUV is due to factors such as limited uses or a smaller number of species with significant traditional importance in the study region. The lower FUV indicates that wild edibles from these families are less frequently utilized in the study area. The ethnobotanical results confirm that the significance of plant families is not determined by the number of species they contain, but rather by the importance and use value of the individual species within these families in treating various diseases.

The specific part of the wild edibles used is determined by the traditional way of treating various diseases; over time, practitioners of medicinal information have gained insights into the properties of each part, enabling them to identify the most effective one based on its active ingredient content (Najem et al., 2020). Leaves are available in all seasons, but fruits are not

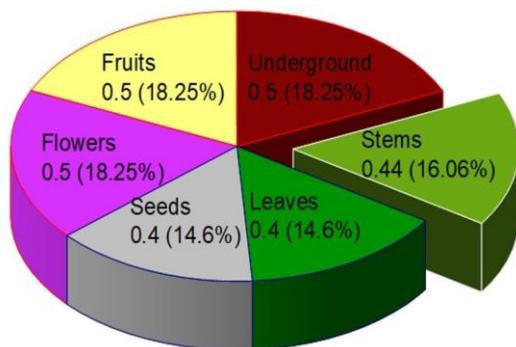


Figure 4. Plant part value (PPV) of wild edible plants.

available in all seasons. So, the fruits are collected and used when available, ensuring sustainability in herbal preparations.

A comparative analysis with other studies revealed a consistent trend: leaves emerged as the most frequently utilized plant in herbal remedies, comprising 45% of total usage. The local preference could be attributed to the leaves in which they are collected as well as their availability. Many studies mention leafy vegetables and fruits used in traditional recipes, highlighting their bioactive compounds responsible for any possible health benefits attributed to the herbal medicine preparation. The leaves appearance in several studies serves to signify their role in herbal medicine. The collection of fruits and leaves does not have any effect on the plant nevertheless the collection of stems, roots, or the whole plant can pose a serious threat to the survival of a plant (Gondokesumo et al., 2023).

5. Conclusion

The study is the first quantitative indices method of investigation using wild edible plants in traditional medicine to cure a variety of ailments in the Jawadhu hills. The Malayali people still use wild edibles, proving the importance of traditional knowledge. The study revealed quantitative indices values of the wild edible species will reveal future pharmaceutical and phytochemical research. It is crucial to focus on conserving traditional wild edible medicinal plants and their indigenous knowledge in Jawadhu hills to ensure survival for future generations. The present study forms a basis for the sustainable use of wild edible plants in the region, which helps preserve traditional knowledge and improves community health practices.

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Author's contribution

Saravanan J. and Ajin S. Raj conducted the ethnobotanical investigation and data collection, applying statistical, mathematical, computational and other formal techniques to analyze and synthesize the study data. The corresponding author Dr. R. Prabakaran, framed the methodology and corrected the manuscript through writing, reviewing, editing and results.

Conflict of Interest

The authors declare that there is no conflict of interest.

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