

Ethnomedicinal knowledge used by Mullukurumbas of Nilgiris, Western Ghats, India

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Abstract. Sanu C, Jeevith S, Sheeba TC. 2023. Ethnomedicinal knowledge used by Mullukurumbas of Nilgiris, Western Ghats, India. *Asian J Ethnobiol* 6: 115-126. Nilgiris is one of the biodiversity-rich areas in the Western Ghats, India, with six major groups of indigenous tribes, and Mullukurumba is one of the subtribes of Kurumbas. The present study aimed to document the ethnomedicinal knowledge among the Mullukurumba Tribe of Kallichal, Cherangode Village of Nilgiris, Western Ghats. Most of the tribes in Nilgiris follow a close cultural ritual and traditional knowledge, including food and medicine. The field data were collected through interviews, observation, and documentation. The tribal people utilized 152 plant species belonging to 60 families. The life forms of the collected plants revealed that herbs constitute 53 species, followed by shrubs 44 species, trees 35 species, and climbers 20 species. Family-wise, Fabaceae dominated with 13 species, followed by Asteraceae 10 species, and Solanaceae included 8 species. The use category made by the tribal community were medicinal plants (70%), edible fruits (19%), and miscellaneous uses (11%). The plant species treat various illnesses, including piles, rheumatism, gynecological issues, dermatitis, and antidiarrheal and anti-diabetic conditions. *Argyrea cuneata* (Willd.) Ker Gawl., *Cascabela thevetia* (L.) Lippold, *Coix lacryma-jobi* L., *Ixora coccinea* L., *Gloriosa superba* L., *Melastoma malabathricum* L., and *Plumeria alba* L. were the most common plants used for rituals. Also, this study presented an updated checklist of medicinal plants used by the Mullukurumba Tribe.

Keywords: Checklist, ethnobotany, medicinal plants, Nilgiris, Pandalur

INTRODUCTION

India is one of the floristically richest regions on the planet. Since ancient times, India has been a source of medicinal plants and their products, accounting for more than 40% of the world's floristic diversity (Arinathan 2003; Vijeesh and Velumani 2011). People that depend totally or partially on wood for their livelihood reside there, and the forest is an essential component of tribal community social structures (Rajan et al. 2002; Narayanan et al. 2011). For a very long time, local populations have been quite knowledgeable about the flora and other natural resources that may be found in their immediate and adjacent environs. The herbal drugs obtained from plants are much safer, with fewer or no side effects in treating various ailments (Ayyanar and Ignacimuthu 2005; Ayyanar 2013). The tribal segment of India's population presents an interesting profile country's ethnic diversity; most of India's population comprises 427 tribal communities (Dutta and Dutta 2005). Tribes are an ecosystem of people that coexist peacefully with the environment and preserve a strong connection between the two. With more than 2,500 plant species, India has seen a rise in the study of medicinal plants and traditional knowledge in recent decades (Jain 1991). In addition, the importance of traditional treatments is extensively recognized, and ethnomedicine is considered the source of all modern medicines.

The Nilgiris District of Tamil Nadu is located at 11°10'-11°43'N and 76°14'-77°00'E, with an area of 2,565 km² and an elevation of 900-2,636 masl, of Western Ghats, as one of the eight hot spots of the world known for its rich biodiversity. There are 2,100 species of flowering plants endemic to Peninsular India. Among these, 818 were found in the Nilgiris and adjoining areas. The district consists of six major taluks, including Gudalur (507 km²) and Pandalur (218 km²) (Jeevith and Manjunath 2023). In Nilgiris, there are six major tribes, i.e., Kotas, Todas, Irulas, Kurumbas, Paniyas, and Kattunayakans (Hosagowder and Henry 1996; Rajan et al. 2003). The origin of Kurumba Tribes of the Nilgiris District is from the Wayanad District of Kerala and Gundalpet District of Karnataka, in and around Nilgiri Biosphere Reserve (Silja et al. 2008). Kurumbas are one of the very old primitive tribes of the Nilgiris (Ramachandran and Udhayavani 2013), and they are widely distributed in major taluks of the district, i.e., Coonoor, Kothagiri, Kundha, Gudalur, and Pandalur. In Kurumba Tribes, there are five sub-groups, namely Alukurumbas, Jenukurumbas, Uralukurumbas, Bettakurumbas, and Mullukurumbas (Sathyanarayanan and Nirmal 2013a).

Kallichal is a primitive village in Munanad, Pandalur Taluk, Nilgiris District of Tamil Nadu, India. The village comprises 10 colonies around the region and one of the Scheduled Tribe Mullukurumbas. The tribe is well known for their traditional hunting, owning small tracts of land, and

practicing indigenous agriculture crops, constituting (23.25%) 2,000 of the district's total population (Census 2011). They follow their traditional culture, worship their sacred grooves, and are medicinal practitioners, with fewer similarities and interests of each group (Rajan et al. 2001). The production of permanent plantation crops and spices is distinctive to these areas. Homestead farming is significant in this area, and a range of crops, including annuals and perennials, are cultivated in these modest holdings. Coconut, areca nuts, pepper, vegetables, tubers, and fruit crops, including mango and jackfruit, are among the crops. The community people have very less known of cultivation and participating cereals other than paddy, unlike Irulas, who are more experienced in agriculture and maintaining germplasm of the cereals, e.g., *Eleusine coracana* (L.) Gaertn., *Pennisetum glaucum* (L.) R.Br., *Sorghum bicolor* (L.) Moench, and *Panicum sumatrense* Roth (Arinathan et al. 2003; Saradha et al. 2017).

Several studies have contributed to recent findings of medicinal plants in the Nilgiris area during the past three decades (Rajan et al. 2003; Udayan et al. 2007; Ramachandran and Udhayavani 2013). However, the ethnobotanical and medicinal plants of Nilgiris, and Western Ghats, are yet to be revalidated. The present work is an effort to document the traditional knowledge of medicinal herbs utilized by the MulluKurumba Tribes.

MATERIALS AND METHODS

Study area

The present study area, Kallichal, is located in Cherangode Village, Munnadan Post, Pandalur Taluk of Nilgiris District, Western Ghats, India (Figure 1), Tamil Nadu, India, with a total geographical area of 2,463 hectares. The area is surrounded by tropical moist deciduous forests and patches of tropical semi-evergreen forests (Champion and Seth 1968), comprising *Vateria indica* L., *Lagerstroemia macrocarpa* Wall. ex Kurz, *Terminalia paniculate* Roth, and *Tectona grandis* L.f.. The usage of ethnobotanical and medicinal plants was obtained from experienced and traditional healers of the MulluKurumba Tribe.

Data collection

Intensive botanical exploration trips were made from April 2021 to December 2022 in the Kallichal Area of Cherangode Village. The data was collected from a questionnaire survey and personal interviews with knowledgeable inhabitants of the hamlets. We also collected published literature about the ethnic community, and recent modern techniques of the tribe were also reviewed. The plants observed from the study area were identified with the help of the regional floras and field guides. Only observation and field notes were taken in this study due to the authors' lack of access to the herbarium or preservation facilities; therefore, no specimens were collected. Plant species of

vegetative, flowering, and fruiting phases were photographed for identification and future reference.

Data analysis

The plant species were analyzed with the ethnomedical value reported by the tribal practitioner and people in the village and pertinent literature. The analysis of habit was followed by Gamble and Fischer (1915-1936) and Fyson (1915). The plant species followed POWO (2023) for nomenclature updates. The photographs taken in situ are provided as figures in plates.

RESULTS AND DISCUSSION

In the present investigation, the plants used by the MulluKurumbas from the wild for their day-to-day life were gathered. A total of 152 species from 106 genera belonging to 61 families of flowering plants were studied (Table 1). Of 152 plants, 140 species are widely distributed, and 12 are cultivated. An analysis was made in the life forms of the collected plants revealed that herbs constitute 53 species (35%), followed by 44 species of shrubs (29%), 35 species of trees (23%), and 20 species of climbers (13%) (figure 2). Similarly, the dominant families are so being worked out; the families such as Fabaceae dominated with 13 species, followed by Asteraceae with 10 species, Solanaceae with 8 species, Lamiaceae and Rutaceae with 6 species each, Acanthaceae, Cucurbitaceae, Malvaceae, Moraceae, Myrtaceae Piperaceae, and Poaceae with 5 species each, Phyllanthaceae with 4 species. Amarathaceae, Apiaceae, Apocynaceae, Euphorbiaceae, Meliaceae, Oxalidaceae, and Zingiberaceae were represented by 3 species each. In contrast, Araceae, Arecaceae, Convolvulaceae, Plantaginaceae, Rhamnaceae, and Rubiaceae with 2 species each, and the rest of the families represented only one species. The complete list of species with family and uses is given in Table 1. The selected images of medicinal plants and fruits are displayed in Figures 4 and 5.

Tribal people use specific plant parts and dosages to treat specific ailments. Plant products are consumed raw or taken as decoction or infusion (oral treatment) and paste (external application). Fresh leaves, roots, and stems were more frequently used compared to other parts of the plant. In the present investigation was found that various parts used by these indigenous communities were classified and inferred that leaves (45 species; 25%), fruits (39 species; 22%), whole plants (36 species; 20%), flowers (18 species; 10%), root (14 species; 8%), seeds (11 species; 6.2%), rhizome (8 species; 4.5%), stem (4 species; 2.2%), bark (2 species; 1%), and tuber (1 species; 0.6%) (Figure 3).

The plants studied concerning the kind of use made by the tribal community were medicinal plants (70%), edible fruits (19%), and miscellaneous uses (11%). Traditional healers use these medicinal plants to cure diseases: common cold, seasonal allergies, stomach ache, diarrhea, skin problems, toothache, wounds, respiratory syndromes, urinary tract infections, hemorrhoids, and venomous bites.

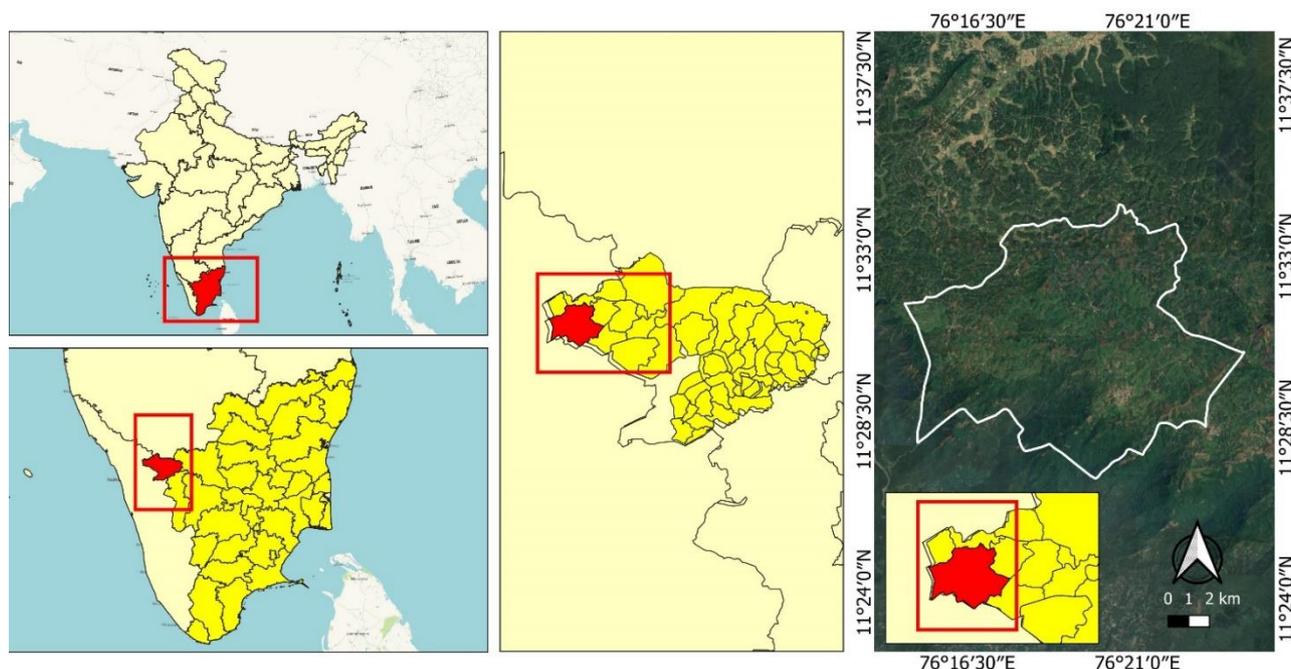


Figure 1. Map showing the Cherangode Village, Nilgiris District, Western Ghats, India

Wild and ornamental fruits are consumed raw and used as vegetables in their diet, cooked in traditional methods for daily consumption and communal ceremonies. The fruits of common plant species are widely available and reported in the flora of Nilgiris by Fyson (1915) and Sharma et al. (1977). In addition, *Diplocyclos palmatus* (L.) C.Jeffrey, *Passiflora subpeltata* Ortega, *Persicaria chinensis* (L.) H.Gross, *Physalis peruviana* L., *Solanum torvum* Sw., *S. viarum* Dunal, *S. villosum* Mill., and *S. nigrum* L. were utilized for multiple purposes.

In this study, fruits of 20 tree species were consumed raw. Therefore leaves, fruits, and barks of *Ficus benghalensis* L., *F. racemosa* L., *Artocarpus heterophyllus* Lam., *A. hirsutus* Lam., *Morus alba* L., *Psidium guajava* L., *Syzygium cumini* (L.) Skeels, *S. jambos* (L.) Alston, *Eugenia uniflora* L., *S. aqueum* (Burm.f.) Alston, *Phyllanthus emblica* L., *Scolopia crenata* (Wight & Arn.) Clos, *Ziziphus oenopolia* (L.) Mill., *Z. rugosa* Lam., *Rhaphiolepis bibas* (Lour.) Galasso & Banfi, *Naringi crenulate* (Roxb.) Nicolson, *Morinda citrifolia* L., and *Citrus maxima* (Burm.) Merr. were utilized in many forms for their day-to-day consumption. Recently, Jeevith and Manjunath (2023) listed 171 tree species; 107 were used in traditional medicine, and 51 were used as fruit crops, in urban landscapes. Fruits of *Asparagus racemosus* Willd., *Azadirachta indica* A.Juss., *F. racemosa*, *S. cumini*, *S. jambos*, *Murraya paniculate* (L.) Jack, and *Momordica charantia* L. are well-known medicinal plants that have long been used as anti-diabetic agent (Manikandan et al. 2006).

According to Sasidharan (2004), *Artemisia nilagirica* (C.B.Clarke) Pamp. and *Globba sessiliflora* Sims are endemic to Peninsular India, followed by *Ochlandra beddemei* Gamble, and *S. aromaticum* (L.) Merr. & L.M.Perry are endemic to the southern Western Ghats. In addition, *Argyreia cuneata* (Willd.) Ker Gawl. is endemic to

South India, and *Neonotonia wightii* is endemic to Western Ghats.

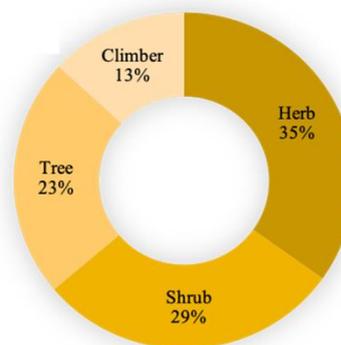


Figure 2. The analysis of habit-wise composition

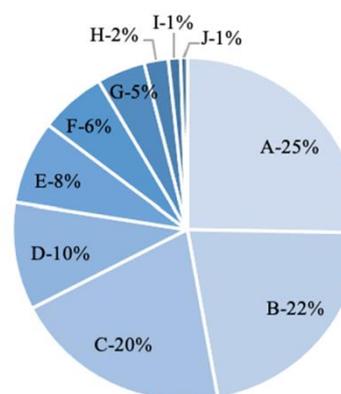


Figure 3. The utilization of plant species in the study. Note: A: Leaf, B: Fruit, C: Whole Plant, D: Flower, E: Root, F: Seed, G: Rhizome, H: Stem, I: Bark, J: Tuber

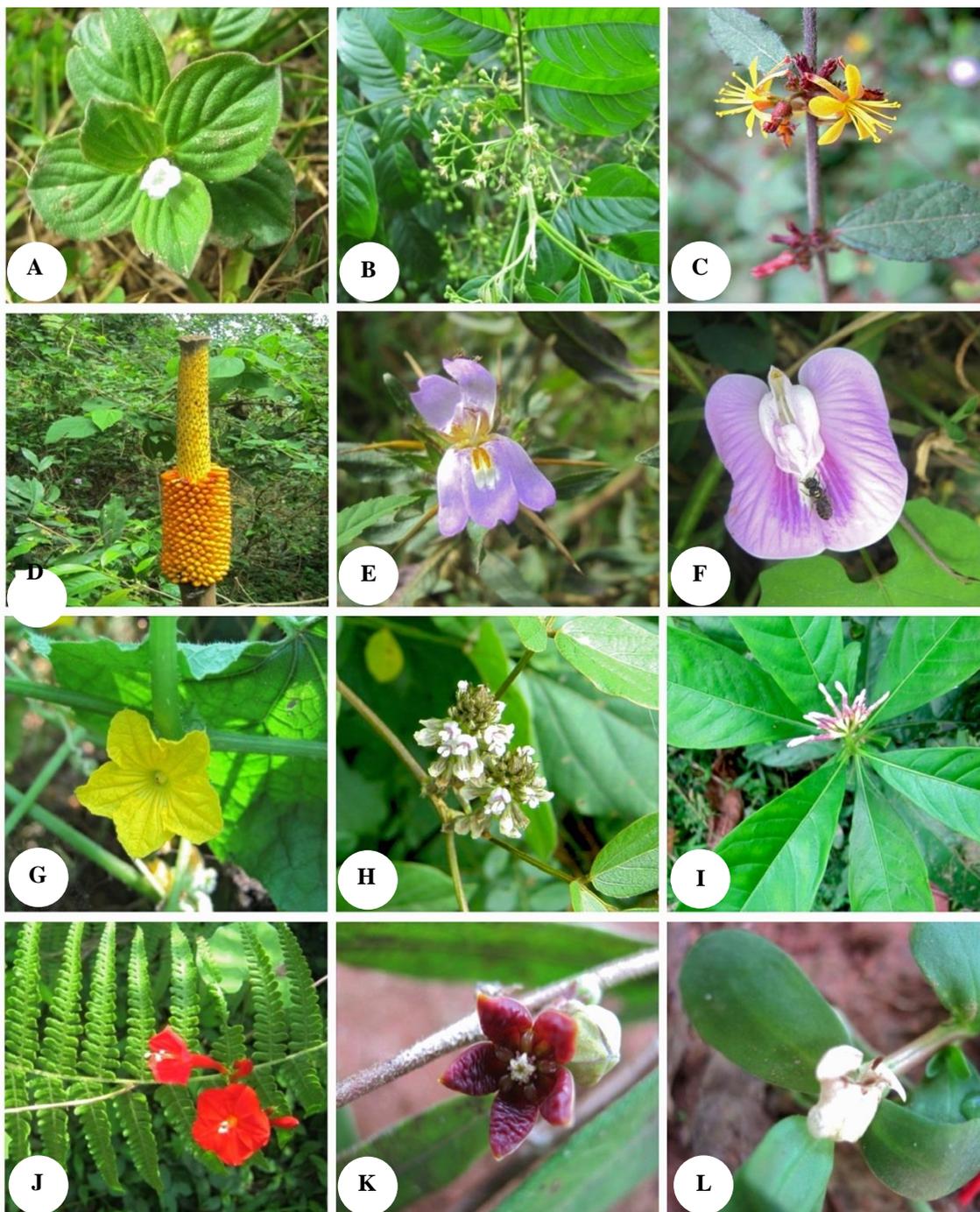


Figure 4. Selected medicinal herbs from the study area. A. *Spermacoe latifolia* Aubl., B. *Cipadessa baccifera* (Roth) Miq., C. *Triumfetta rhomboidea* Jacq., D. *Amorphophallus paeoniifolius* (Dennst.) Nicols, E. *Hygrophila schulli* (Buch-Ham.) M.R & S.M., F. *Centrosema pubescens* Benth., G. *Citrullus colocynthis* (L.) Schrad., H. *Neonotonia wightii* (Wight & Arn.) J.A.Lackey, I. *Rauwolfia serpentina* (Linn.) Benth. Ex Kurz, J. *Ipomoea hederifolia* L., K. *Hemidesmus indicus* (L.), L. *Bacopa monnieri* (L.) Wettst

In Wayanad, Kerala, Silja et al. (2008) reported that 136 plant species for traditional medicine purposes are used by the Mullu kurumas (=Mullukurumba) tribe. Similarly, medicinal plants are used for different ailments and purposes; mainly, plants are used for curing asthmatic bronchial diseases, skin diseases, urinary complaints and kidney stones, anemia, treating inflammation, dandruff control, jaundice, epilepsy, leucorrhoea, leprosy, burns and wounds, piles and constipation, abortifacient, malaria,

migraine, and tuberculosis.

Similarly, Ramachandran and Udhayavani (2013) reported 123 wild edible plant species used by the ethnic community of Paniyas and Kurumbas in Pandalur and Gudalur taluk. The plant species of less known or unknown medicinal uses were reported for 36 species from these regions. Some of the species were not shown much interest by the community in Kallichal area, species such as *Acronychia pedunculata* (L.) Miq., *Amaranthus graecizans*

L., *Aporosa cardiosperma* (Gaertn.) Merr., *Bidens Pilosa* L., *Boussingaultia baselloides* Kunth., *Brassica juncea* (L.) Czern., *Bridelia retusa* (L.) A.Juss., *Caesalpinia mimosoides* Lam., *Caryota urens* L., *Cinnamomum iners* (Reinw. ex Nees & T.Nees) Blume, *Colocasia esculenta* (L.)

Schott, *Diplazium esculentum* (Retz.) Sw., *Elaeagnus kologa* Schlttdl., *Eryngium foetidum* L., *Hibiscus hispidissimus* Griff., *Osbeckia wynaadensis* C.B.Clarke, and *Vaccinium neilgherrense* Wight.

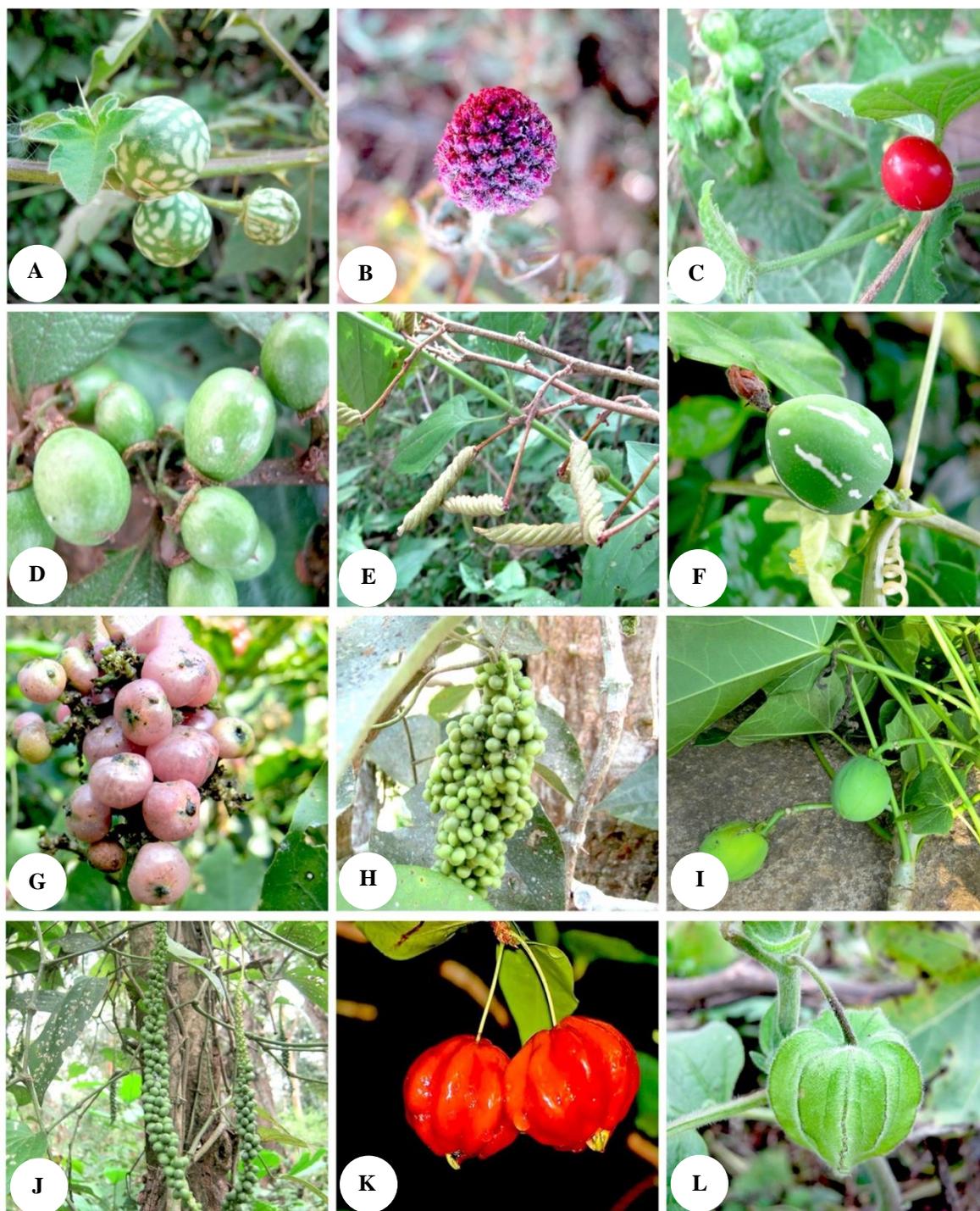


Figure 5. Some medicinal fruits from the study area. A. *Solanum viarum* Dunal, B. *Sphaeranthus indicus* L., C. *Cucumis maderaspatanus* L., D. *Ziziphus oenopolia* (L.) Mill., E. *Helicteres isora* L., F. *Diplocyclos palmatus* (L.) C.Jeffrey, G. *Glycosmis pentaphylla* (Retz.) DC., H. *Cyclea peltata* (Burm.f.) Hook.f. & Thomson, I. *Jatropha curcas* L., J. *Piper argyrophyllum* Miq., K. *Eugenia uniflora* L., L. *Physalis peruviana* L.

Table 1. List of ethnomedicinal plants used by Mullukurumbas, Nilgiris, Western Ghats, India

Family / Scientific Name	Habit	Vernacular / (Partly Used)	Mode of Preparation and Uses
Acanthaceae			
<i>Asystasia gangetica</i> (L.) T.Anderson	S	Upputhaliyan (whole plant)	Juice of the plant is administered to children suffering from swellings and intestinal worms.
<i>Hygrophila auriculata</i> (Schumach.) Heine	S	Vayalchulli (leaf, root)	Decoction of the root and leaf paste is used to stimulate sexual activity.
<i>Justicia glauca</i> Rottler	S	Vadamkolli (leaf)	Leaves are boiled in water and used for bathing to relieve rheumatism.
<i>Rungia pectinata</i> (L.) Nees	H	Kattucheera (leaf)	Leaves are used as vegetables during pregnancy period.
<i>Thunbergia alata</i> Bojer ex Sims	C	Kattumulla (whole plant)	A paste of the whole plant is applied for skin dryness and itching.
Agavaceae			
<i>Agave sisalana</i> Perrine	S	Kallichedi (leaf)	The leaf is used for making house roofs.
Amaranthaceae			
<i>Amaranthus spinosus</i> L.	S	Mullucheera (leaf)	The leaf paste is applied to cure burns and wounds; whole leaves are used as a vegetable.
<i>Cyathula prostrata</i> (L.) Blume	H	Kadaladi (whole plant)	The whole plant is boiled with water for bathing to relieve rheumatic pains.
<i>Ouret lanata</i> (L.) Kuntze	H	Cherupoola (leaf, root)	The leaf extract expels kidney stones; the roots are grounded and taken orally to treat jaundice.
<i>Alternanthera sessilis</i> (L.) DC.	H	Ponnankanni cheera (leaf, stem)	The leaves and shoots are used as a vegetable.
Anacardiaceae			
<i>Mangifera indica</i> L.	T	Mangai (whole plant)	Fruits are eaten raw and made pickled. Leaves are used in rituals.
Annonaceae			
<i>Annona reticulata</i> L.	T	Seetha (whole plant)	Fruits eaten raw, leaf decoction consumed for dysentery.
Apiaceae			
<i>Centella asiatica</i> (L.) Urb.	H	Muthil (leaf)	Leaves are eaten raw to improve memory power.
<i>Pimpinella heyneana</i> (DC.) Benth. & Hook.f.	H	Kattuaymodakam (seed)	The seed extract is used to cure stomach pain
<i>Centella asiatica</i> (L.) Urb.	H	Vallara cheera (leaf)	Fresh leaves are consumed for wound healing and to boost neuro health.
Apocynaceae			
<i>Cascabela thevetia</i> (L.) Lippold	S	Arali chedi (flower)	Flowers are used for rituals.
<i>Plumeria alba</i> L.	T	Kadangala poovu (flower)	Flowers are used for rituals.
<i>Asclepias curassavica</i> L.	S	Sonipoovu (whole plant)	The whole plant is used in mesmerizing activity.
<i>Hemidesmus indicus</i> (L.) R.Br.	C	Nannari (root)	Fresh root extracts treat dysentery and act antidote for snake bites.
<i>Rauvolfia serpentina</i> (L.) Benth. ex Kurz	H	Sarpaganthum (root)	Fresh root extracts treat dysentery and act antidote for snake bites.
Araceae			
<i>Amorphophallus paeoniifolius</i> (Dennst.) Nicolson	S	Kattuchena (rhizome)	Corms are boiled without adding salt and eaten to cure bleeding piles.
<i>Alocasia macrorrhizos</i> (L.) G.Don	H	Yannacheppa (rhizome)	Rhizomes edible, used as vegetable.
<i>Caryota urens</i> L.	T	Kattupana (leaf)	Leaves are used to build huts.
<i>Areca catechu</i> L.	T	Arikka (seed)	Areca nut is chewed with beetle leaf for dyspepsia; dry leaves and wood are used to make handicrafts.
Asparagaceae			
<i>Asparagus racemosus</i> Willd.	C	Umicheekal (root)	Leaf paste is applied to heal foot cracks.
Asteraceae			
<i>Acemella calva</i> (DC.) R.K.Jansen	H	Palluedana chedi (flower)	The flowers are eaten raw to cure toothache.
<i>Ageratum houstonianum</i> Mill.	H	Appala (leaf)	Leaf pastes are used for wound healing.
<i>Artemisia nilagirica</i> (C.B.Clarke) Pamp.	S	Malechi (leaf)	Leaf pastes are used to cure malaria.
<i>Baccharoides anthelmintica</i> (L.) Moench	H	Kattujeerakam (seed)	Seeds are ground with milk or water and drank to cure stomach aids.

<i>Chromolaena odorata</i> (L.) R.M.King & H.Rob.	S	Kammunist pacha (leaf)	Grounded leaves are applied for wound healing.
<i>Cyanthillium cinereum</i> (L.) H.Rob.	H	Poovamkurunna (whole plant)	The plant extract is drunk orally for blood purification and fever and acts as an antidote for scorpion bites.
<i>Eclipta prostrata</i> (L.) L.	H	Kaiyonni (leaf, stem)	Dried leaves and stems are added into oil and used for premature grey hair.
<i>Elephantopus scaber</i> L.	H	Anachavitti (whole plant)	The juice of the whole plant is used to control asthmatic cough.
<i>Sphaeranthus indicus</i> L.	H	Adakkamani (flower)	Flower paste is used to remove skin parasites from cattle and pets.
<i>Tithonia diversifolia</i> (Hemsl.) A.Gray	S	Suryakanthi (flower)	Flower paste is used to remove skin parasites from cattle and pets.
Basellaceae			
<i>Basella alba</i> L.	H	Pasella (leaf)	Leaves are edible, used to control hemorrhoids and improve constipation.
Bignoniaceae			
<i>Oroxylum indicum</i> (L.) Kurz	T	Vellapathiri (whole plant)	One of the herbs in dasamoola is used for arthritis, diabetes, and respiratory diseases.
Boraginaceae			
<i>Cynoglossum zeylanicum</i> (Sw. ex Lehm.) Thunb. ex Brand	H	Mudichilooram (root)	Fresh root extracts are mixed in hot water and taken orally for 2-3 days against diarrhea.
Cannaceae			
<i>Canna indica</i> L.	S	Menthoni (rhizome)	Rhizome powder is consumed with hot water or soup as an energy booster.
Caricaceae			
<i>Carica papaya</i> L.	T	Pappali (leaf, fruit)	Consumption of fruit helps to control leukemia and improves eyesight; leaf decoction is used to control malarial fever.
Caryophyllaceae			
<i>Drymaria cordata</i> (L.) Willd. ex Schult.	H	Puliyarila (whole plant)	Juice of the whole plant is drunk to regulate digestion.
Clusiaceae			
<i>Garcinia gummi-gutta</i> (L.) Roxb	T	Kodampuli (fruit)	Dried fruit is used as a flavoring agent and helps with gastrointestinal ailments.
Combretaceae			
<i>Terminalia bellirica</i> (Gaertn.) Roxb.	T	Thannika (fruit)	Fruit powder is used for the common cold and toothache.
Commelinaceae			
<i>Cyanotis cristata</i> (L.) D.Don	H	Kannjai (whole plant)	Whole plant paste is applied to the forehead to cure headaches.
Convolvulaceae			
<i>Argyrea cuneata</i> (Willd.) Ker Gawl.	S	Kattukuzhalan (flower)	poovu Flowers are used in rituals and ceremonies.
<i>Ipomoea hederifolia</i> L.	C	Devathali (whole plant)	The whole plant extract is taken orally to overcome infertility.
Cucurbitaceae			
<i>Citrullus colocynthis</i> (L.) Schrad.	C	Attanga (fruit)	Whole fruit is cut and kept in the infected nail or finger to cure inflammations.
<i>Cucumis maderaspatanus</i> L.	C	Velisemattha (stem)	Young shoots are eaten raw to improve appetite.
<i>Cucumis melo</i> L.	C	Kattupeecheera (fruit)	Fruits are edible; used as a vegetable.
<i>Diplocyclos palmatus</i> (L.) C.Jeffrey	C	Kuriyankay (fruit)	Shade-dried fruits are roasted and consumed without seeds as a supplement.
<i>Momordica charantia</i> L.	C	Kaippa (whole plant)	Juice of the whole plant is used to control diabetes, respiratory diseases, and anemia.
Cyperaceae			
<i>Cyperus dubius</i> var. <i>dubius</i>	H	Muthanga (whole plant)	The whole plant is boiled in water with garlic, and the concoction is drunk to control dysentery.
Dioscoreaceae			
<i>Dioscorea pentaphylla</i> L.	C	Cheethukizhangu (rhizome)	Rhizomes are used as a vegetable; helps with rheumatism and arthritis problem.
Euphorbiaceae			
<i>Jatropha curcas</i> L.	S	Kattavanak (seed)	The oil is extracted from the seeds and mixed with coconut oil to promote hair growth.
<i>Ricinus communis</i> L.	S	Avanaku (root, seed)	The root powder is used in leprosy control; seed oil is used to treat liver disease.
<i>Manihot esculenta</i> Crantz	S	Kappakizhangu (tuber)	Tubers are cooked and eaten as the main food to enrich carbohydrates and fiber.

Fabaceae

<i>Cassia fistula</i> L.	T	Kattukonna (whole plant)	Leaf paste and bark decoction are used to cure skin diseases.
<i>Centrosema pubescens</i> Benth.	C	Poombattapayar (whole plant)	Whole plant paste is used as an antidote for insect bites.
<i>Crotalaria pallida</i> Aiton	H	Kilukilukki (stem, seed)	Stem fiber is used for threading material. Ripen seeds are roasted and used as substituted for coffee.
<i>Crotalaria prostrata</i> Rottler ex Willd.	H	Kulukunchi (whole plant)	The whole plant paste is applied to control body itching.
<i>Flemingia strobilifera</i> (L.) W.T.Aiton	T	Sankuruni (root)	Root decoction is taken orally to reduce fatigue and chest pain.
<i>Mimosa pudica</i> L.	H	Thottavadi (root)	Root decoction is used to treat urinary disorders.
<i>Moullava spicata</i> (Dalzell ex Wight) Nicolson	S	Kumulmullu (flower)	Flowers are eaten raw, and paste is used as an antidote for snakebite.
<i>Neonotonia wightii</i> (Wight & Arn.) J.A.Lackey	C	Kattu uzhunnu (seed)	Seeds are ground with water and eaten for general health benefits.
<i>Pseudarthria viscida</i> (L.) Wight & Arn.	C	Kannadi (seed)	Seeds are crushed, and paste is applied to prevent pimples.
<i>Senna tora</i> (L.) Roxb.	H	Thakara (leaf)	Leaves are consumed as a vegetable.
<i>Sesbania bispinosa</i> (Jacq.) W.Wight	S	Agathi (flower, seed)	Flower extracts are used to cure leucorrhoea, and the seed paste is used to treat liver disorders.
<i>Tadehagi triquetrum</i> (L.) H.Ohashi	H	Kattusangupushpam (leaf)	Tender leaves are used as vegetables to regulate menstrual problem
<i>Pterocarpus marsupium</i> Roxb.	T	Venggamara (whole plant)	Leaf paste and latex are used for skin diseases.

Flacourtiaceae

<i>Scolopia crenata</i> (Wight & Arn.) Clos	T	Challurpazham (fruit)	Ripened fruits are eaten raw.
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Hypoxidaceae

<i>Curculigo orchiooides</i> Gaertn.	H	Nilapana (rhizome)	Rhizome paste is taken orally with milk to treat diabetes and tonsillitis.
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Juglandaceae

<i>Juglans regia</i> L.	T	Vallunatkotta (fruit, seed)	Fruit and seed extract is used for toothache and intestine disorders.
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Lamiaceae

<i>Clerodendrum infortunatum</i> L.	S	Vattaparuvellam (leaf)	Leaf extract is used for asthma, cough, diarrhea, and rheumatism.
<i>Lantana camara</i> L.	S	Chulli (fruit)	Ripened fruits are eaten raw.
<i>Leucas aspera</i> (Willd.) Link	H	Thumba (flower)	Flower extract is used to treat jaundice.
<i>Leucas biflora</i> (Vahl) Sm.	H	Kattuthumba (whole plant)	Oil is extracted from the whole plant and used to control itching.
<i>Mesosphaerum suaveolens</i> (L.) Kuntze	H	Kattuchulli (leaf, flower)	The leaves and flowers are ground and applied to the forehead to cure headaches.
<i>Ocimum gratissimum</i> L.	S	Kattuthulasi (whole plant)	Leaf extract is consumed to cure headaches, coughs, colds, and fever.

Lauraceae

<i>Cinnamomum camphora</i> (L.) J.Presl	T	Lavanga (leaf, bark)	Used as a whole spice.
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Lilliaceae

<i>Gloriosa superba</i> L.	C	Onapoovu (flower)	Flowers are used in rituals and ceremonies.
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Lobeliaceae

<i>Lobelia nicotianifolia</i> Roth	S	Kattupukayila (leaf)	The leaf paste is used as an antiseptic agent, and the extract is used for bronchial problems.
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Lythraceae

<i>Lawsonia inermis</i> L.	S	Milanchi (leaf)	Dried leaf powder mixed with coconut oil and applied for premature and grey hair.
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Malvaceae

<i>Azanza lampas</i> (Cav.) Alef.	S	Kattuveda (root, fruit)	Root extract and fruit juice are used to cure mouth ulcers.
<i>Hibiscus rosa-sinensis</i> L.	S	Chemparuthi (leaf, flower)	Leaf extract is used for hair shampoo, skin disorders, and burning sensation, mainly for children.
<i>Sida acuta</i> Burm.f.	H	Anakurunthotti (whole plant)	Crushed leaves are used to promote the healing of bone fractures. Dried plants are used as broomsticks.
<i>Sida rhombifolia</i> subsp. <i>alnifolia</i> (L.) Ugbor.	H	Vattakurunthoti (root)	Root extracts are taken orally to cure uterine disorders.
<i>Urena lobata</i> L.	S	Oorakam (flower)	Flower extract is used for controlling cough and healing sore throat.

Melastomataceae

<i>Melastoma malabathricum</i> L.	S	Thotukarapoo (leaf, flower)	Leaf and flowers are used in rituals and sacred grooves.
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Meliaceae			
<i>Cipadessa baccifera</i> (Roxb. ex Roth) Miq.	S	Kaippanarachi (leaf)	Leaf paste is used to arrest bleeding in cuts and wounds.
<i>Azadirachta indica</i> A.Juss.	T	Veppuella (whole plant)	Leaves and fruits are used for several ailments.
<i>Melia azedarach</i> L.	T	Kattuveppu (leaf)	Leaf decoction is used to cure malarial fever.
Menispermaceae			
<i>Cyclea peltata</i> (Burm.f.) Hook.f. & Thomson	C	Padakizhangu (root)	The consumption of root extract helps in purifying blood.
Mimosaceae			
<i>Senegalia rugata</i> (Lam.) Britton & Rose	T	Cheenikka (seed)	Seed powder is used to take baths for skin diseases.
Moraceae			
<i>Ficus benghalensis</i> L.	T	Peral (fruit)	Ripened fruits are eaten raw.
<i>Ficus racemosa</i> L.	T	Athipazham (fruit)	Ripened fruits are eaten raw.
<i>Artocarpus heterophyllus</i> Lam.	T	Chakka (fruit)	Ripened fruits are eaten raw.
<i>Artocarpus hirsutus</i> Lam.	T	Aynichaka (fruit)	Ripened fruits are eaten raw.
<i>Morus alba</i> L.	S	Kamblipoochedi (leaf, fruit)	Leaves are used for skin rashes, and fruits are eaten for anemia.
Moringaceae			
<i>Moringa oleifera</i> Lam.	T	Muringa (whole plant)	The whole plant is used as a vegetable.
Myrtaceae			
<i>Psidium guajava</i> L.	T	Mambazham (fruit)	Ripened fruits are eaten raw.
<i>Syzygium cumini</i> (L.) Skeels	T	Njaval (fruit)	Ripened fruits are eaten raw.
<i>Syzygium jambos</i> (L.) Alston	T	Maduranelli (fruit)	Ripened fruits are eaten raw.
<i>Eugenia uniflora</i> L.	T	Aranelli (fruit)	Ripened fruits are eaten raw.
<i>Syzygium aqueum</i> (Burm.f.) Alston	T	Chambaika (fruit)	Ripened fruits are eaten raw.
<i>Syzygium aromaticum</i> (L.) Merr. & L.M.Perry	T	Kirambuchedi (flower, bark)	Dried fruit is used as a whole spice.
Onagraceae			
<i>Ludwigia perennis</i> L.	S	Sidi (leaf)	The dried leaves are mixed with coconut oil and applied for smallpox.
<i>Biophytum sensitivum</i> (L.) DC.	H	Mukkuthi (whole plant)	The plant is grounded and consumed to relieve the menstrual pain; and used as an antidote for snakebite.
Oxalidaceae			
<i>Oxalis corniculata</i> L.	H	Pulichakeera (leaf, flower)	Leaves and fruits are edible.
<i>Oxalis latifolia</i> Kunth	H	Nilapulikeera (leaf, flower)	Leaves and fruits are edible.
Passifloraceae			
<i>Passiflora subpeltata</i> Ortega	C	Thattbotpal (fruit)	Fruits are edible and eaten raw.
Phyllanthaceae			
<i>Phyllanthus emblica</i> L.	T	Nelli (fruit)	Fruits are eaten raw and also pickled.
<i>Phyllanthus reticulatus</i> Poir.	S	Amari (leaf, stem)	Leaf paste is applied to cure the burning sensation; tender stems are used to make baskets.
<i>Phyllanthus urinaria</i> L.	H	Keezharnelli (whole plant)	The leaf paste is applied to the throat to cure tonsils.
<i>Breynia androgyna</i> (L.) Chakrab. & N.P.Balacr.	H	Peruneruri (leaf)	Used as a leafy vegetable.
Piperaceae			
<i>Peperomia pellucida</i> (L.) Kunth	H	Kodithutha (whole plant)	Paste of the whole plant is used to cure itching and leprosy.
<i>Piper argyrophyllum</i> Miq.	C	Kattukurumulaku (root)	Crushed roots are chewed and kept aside to cure toothache.
<i>Piper umbellatum</i> L.	S	Kattuveraku (leaf)	In the morning, leaves are ground and taken on an empty stomach to cure piles.
<i>Piper betle</i> L.	C	Veetilla (leaf)	Leaves chewed with areca nut as a stimulant.
<i>Piper nigrum</i> L.	C	Kurumulaku (fruit)	Dry fruits are used as whole spices.
Plantaginaceae			
<i>Bacopa monnieri</i> (L.) Wettst.	H	Brahmi (whole plant)	Whole plant extract is consumed with honey to reduce obesity and improves memory power.
<i>Scoparia dulcis</i> L.	H	Kalluruki (whole plant)	The whole plant is ground as a paste and consumed for expelling kidney stones.

Poaceae			
<i>Bambusa bambos</i> (L.) Voss	H	Mula (leaf)	Tender leaf extracts are used to cure irregular menstrual problems and used to treat spasmodic muscle contraction.
<i>Cenchrus purpureus</i> (Schumach.) Morrone	H	Tharippapullu (whole plant)	The whole plant is used for making house roofs.
<i>Cynodon dactylon</i> (L.) Pers.	H	Karkampullu (whole plant)	Whole plants are used in rituals and ceremony.
<i>Ochlandra beddomei</i> Gamble	H	Ooda (leaf, fruit)	Stem is used to make handcraft products and to build huts as thatching material.
<i>Coix lacryma-jobi</i> L.	H	Kattukotamani (whole plant)	Plants are used in rituals and ceremonies.
Polygonaceae			
<i>Persicaria chinensis</i> (L.) H.Gross	S	Chorathandan (fruit)	Ripened fruits and tender shoots are eaten raw.
Rhamnaceae			
<i>Ziziphus oenopolia</i> (L.) Mill.	T	Karingotta (fruit)	Ripened fruits are eaten raw.
<i>Ziziphus rugosa</i> Lam.	T	Vellakotta (fruit)	Ripened fruits are eaten raw.
Rosaceae			
<i>Rhaphiolepis bibas</i> (Lour.) Galasso & Banfi	T	Loqukaai (fruit)	Fruits are edible and used for refreshment.
<i>Ixora coccinea</i> L.	S	Thechi (flower)	Flowers are used for rituals and ceremonies.
Rubiaceae			
<i>Spermaceoce latifolia</i> Aubl.	H	Tharthaval (whole plant)	Whole plant paste is used to cure heat boils.
<i>Glycosmis pentaphylla</i> (Retz.) DC.	S	Panal (root, fruit)	Root paste is mixed with goat milk and applied to the forehead to cure sinusitis; fruits are edible.
Rutaceae			
<i>Naringi crenulata</i> (Roxb.) Nicolson	T	Narinarakam (fruit)	Ripened fruits are eaten raw.
<i>Ruta graveolens</i> L.	H	Arudha (leaf)	The leaf is grounded and given to children to cure fever.
<i>Morinda citrifolia</i> L.	T	Nunakaai (leaf, fruit)	Leaf and fruit juice are used for body nourishment.
<i>Murraya paniculata</i> (L.) Jack	S	Kattukaruvapu (leaf)	Leaves paste is used for a hair pack.
<i>Citrus maxima</i> (Burm.) Merr.	S	Naringa (leaf, fruit)	Leaves are used as a dry spice, and fruits are used to make pickles.
Sapindaceae			
<i>Cardiospermum halicacabum</i> L.	C	Uzinja (whole plant)	The extract of the whole plant is used to control asthma.
Solanaceae			
<i>Capsicum frutescens</i> L.	S	Mulaku (leaf, fruit)	The leaf is used as a vegetable; fruit is used as a carminative.
<i>Datura innoxia</i> Mill.	S	Ummamkay (whole plant)	Plant extract cures cardiac disease, intestine problems, and rabies.
<i>Physalis peruviana</i> L.	H	Muttupazhum (fruit)	Ripened fruits are eaten raw.
<i>Solanum lycopersicum</i> L.	H	Kattuthakali (whole plant)	Leaf extract controls asthma and cures eye diseases; ripened fruits are eaten.
<i>Solanum torvum</i> Sw.	S	Putharichunda (fruit)	Fruit powder is used to treat intestinal ulcers.
<i>Solanum viarum</i> Dunal	S	Kandakarichunda (fruit)	Fruit powder is used to treat asthma.
<i>Solanum villosum</i> Mill.	S	Ganikkachappu (leaf, fruit)	Whole plants are used as leafy vegetables, and ripened fruits are eaten raw.
<i>Solanum nigrum</i> L.	H	Ganikkachu (leaf, fruit)	Whole plants are used as leafy vegetables, and ripened fruits are eaten raw.
Sterculiaceae			
<i>Helicteres isora</i> L.	S	Valampiri idampiri (fruit)	Dried fruits are added to the coconut oil and later applied to promote hair growth.
Tiliaceae			
<i>Triumfetta rhomboidea</i> Jacq.	S	Oorapam (whole plant)	The whole plant is used as a broomstick.
Zingiberaceae			
<i>Globba sessiliflora</i> Sims	H	Malainji (rhizome)	Rhizome extract is used for gastric chest pain.
<i>Zingiber wightianum</i> Thwaites	H	Katuinji (rhizome)	The rhizome is used to make pickles.
<i>Globba marantina</i> L.	H	Kattumanja (leaf, rhizome)	Rhizome extract is used for indigestion problems.

Notes: H: Herb, S: Shrub, C: Climber, T: Tree

Therefore, medicinal plants of different ethnic communities, such as Kota, Toda, Irula, Paniya, and Kattunayak and have been reported in Nilgiris by several authors (Cyril et al. 1993; Mandal and Basu 1996; Rajan et al. 2003; Manikandan 2005; Udayan et al. 2007). Sathyanarayanan and Chandra (2013a,b) reported the occupational transformation that happened among the Alukurumbas of Nilgiris with the modern urbanization of the landscape, followed by Sejin (2019), who reported the socio-economic life of Kurumbas in Nilgiris, including culture and rituals, which they focus for many decades.

Deepak and Gopal (2014) listed 25 plant species mainly used for dermatology diseases practiced by Kurumba Tribes in Coonoor, Kotagiri, and Kundah taluks of Nilgiris. The medicinal plants locally available in and around the village are mostly used for skin rashes, burns, warts, pimples, cuts, and wounds. Saradha et al. (2017) reported 56 medicinal plants used by Kurumbas in the Chemmankarai village of Nilgiris, and the mode of medicinal plant utilization was taken generally by oral application with 58%, and external application with 41% and nasal or inhaler and steaming by 1% only.

The knowledge of wild edible plants and their potential value strongly relates to the community people for daily consumption. Most people living in rural parts of the Western Ghats have highlighted the advantages of the medicinal plants found on and around local people's homeland biodiversity. However, most popular medicinal plants are extensively dispersed and accessible in metropolitan settings, where they may be used and vigorously promoted for long-term health advantages. The present study indicates that exploring medicinal plants and their ornamental potential value in large landscapes should be designed for pharmacognosy and nanotechnology conservation in the country.

In conclusion, an updated list of the medicinal plants used among the Mullukurumba Tribe is presented in this study. In the 21st century, ethnobotany has been recognized as a separate field of natural science, and there is growing interest in investigating how people and plants interact in the natural world. Ethno-botanists can be useful in preventing the disappearing knowledge and returning it to local communities. This interrelationship has evolved over generations of experience and practices. Presently ethnobotany has become an important discipline of research and development in resource management, biodiversity conservation, and the region's socio-economic development. Therefore, best practices on propagation and preservation techniques of medicinal plants can be developed among the self-help groups with the support of the forest department and district stakeholders. In this context, it is recommended that the previous and current literature on indigenous knowledge can be patented, and further investigations on medicinal plant diversity need to be upgraded with mapping techniques for the possibility of extinction of rare or endemic species in the future.

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REFERENCES

- Arinathan V, Mohan VR, John de Britto A, Chelladurai V. 2003. Studies on food and medicinal plants of Western Ghats. *J Econ Taxon Bot* 27: 750-753.
- Ayyanar M, Ignacimuthu S. 2005. Medicinal plants used by the tribals of Tirunelveli hills, Tamil Nadu to treat poisonous bites and skin diseases. *Indian J Tradit Knowl* 4 (3): 229-236. DOI: 10.4172/2167-1206.1000140.
- Ayyanar M. 2013. Traditional herbal medicines for primary healthcare among indigenous people in Tamil Nadu, India. *J Homeop Ayurv Med* 2 (5): 1-7.
- Census 2011. Census of India. Government of India, New Delhi.
- Champion HG, Seth SK. 1968. A Revised Survey of the Forest Types of India. Manager of Publications, New Delhi, India.
- Cyril MN, Pushparaj MS, Rajan S. 1993. Less known edible fruit - Yielding plants of Nilgiris. *Anci Sci Life* 12 (3&4): 363-376.
- Deepak P, Gopal CV. 2014. Ethnomedicinal practices of Kurumba Tribes, Nilgiris District, Tamil Nadu, India, in treating skin disease. *Glob J Res Med Plants India Med* 3 (1): 8-16.
- Dutta BK, Dutta PK. 2005. Potential of ethnobotanical studies in North East India: An overview. *Indian J Tradit Knowl* 4 (1): 7-14.
- Fyson PF. 1915. The Flora of Nilgiri and Pulney Hill Tops. Superintendent, Government Press, Madras.
- Gamble JS, Fischer CEC. 1915-1936. Flora of Presidency of Madras. 3 Vols. Adlard and Sons Ltd., London. DOI: 10.5962/bhl.title.21628.
- Hosagowder VB, Henry AN. 1996. Ethnobotany of the tribes Irular, Kurumbar, and Paniyas of the Nilgiris in Tamil Nadu Southern India. *J Econ Taxon Bot* 12: 272-283.
- Jain SK. 1991. Dictionary of Indian Folk Medicine and Ethnobotany. Deep Publications, New Delhi.
- Jeevith S, Manjunath J. 2023. Urban trees of Nilgiris District, Tamil Nadu, India. *Biod Res Conserv* 69: 1-12.
- Mandal SK, Basu SK. 1996. Ethnobotanical studies among some tribals of Nilgiris District, Tamil Nadu. *J Econ Taxon Bot* 12: 268-271.
- Manikandan APN. 2005. Folk herbal medicine: A survey on the Paniya Tribes of Mundakunnu Village of the Nilgiris Hills, Southern India. *Anci Sci Life* 25 (1): 21-27.
- Manikandan, APN, Jayendran, M, Rajasekaran CS. 2006. Study of plants used as anti-diabetic agents by the Nilgiris aborigines. *Anci Sci Life* 25 (3&4): 101-103.
- Narayanan RMK, Mithunlal S, Sujanalal P, Anil Kumar AN, Sivadasan M, Alfarhan AH, Alatar AA. 2011. Ethnobotanically important trees and their uses by Kattunaikka tribe in Wayanad Wildlife Sanctuary, Kerala, India. *J Med Plants Res* 5 (4): 604-612.
- POWO 2023. Plants of the World Online. Facilitated by the Royal Botanic Gardens, Kew. Published on the Internet; <http://www.plantsoftheworldonline.org>.
- Rajan S, Baburaj DS, Sethuraman M. 2001. Indigenous folk practices among Paniyas of Nilgiris District, Tamil Nadu, India. *J Med Arom Plant Sci* 23: 602-606.
- Rajan S, Jayendran M, Sethuraman M. 2003. Medico-ethnobotany: A study on the Kattunayaka Tribe of Nilgiri Hills, Tamil Nadu. *Nat Reme* 3 (1): 68-72.
- Rajan S, Sethuraman M, Mukherjee PK. 2002. Ethnobiology of the Nilgiri Hills, India. *Phyto Res* 16 (2): 98-116. DOI: 10.1002/ptr.1098.
- Ramachandran VS, Udhayavani C. 2013. Knowledge and uses of wild edible plants by Paniyas and Kurumbas of Western Nilgiris, Tamil Nadu. *Indian J Nat Prod Res* 4 (4): 412-418.

- Saradha M, Bharathi GD, Paulsamy S. 2017. Ethnobotanical study of knowledge and medicinal plants use by the Kurumba Tribes in Chemmankarai, Nilgiris District, Tamil Nadu. *Kongunadu Res J* 4 (2): 136-146. DOI: 10.26524/krj214.
- Saradha M, Samyudurai P, Jeevith S, Panneerselvam K. 2016. Traditional knowledge of cultivated cereals for their food security in rular tribe of Palamalai Hills, a part of Westen Ghats of Coimbatore, Tamil Nadu, India. *Intl J Bioresour Sci* 3 (1): 65-68. DOI: 10.5958/2454-9541.2016.00007.4
- Sasidharan N. 2004. Biodiversity Documentation for Kerala Part 6: Flowering Plants. Kerala Forest Research Institute, Kerala.
- Sathanarayanan CR, Nirmal C. 2013a. Traditional life, livelihood and plantations: A study among the Mullu Kurumba. *J Anthropol Surv India* 61 (1): 595-615.
- Sathanarayanan CR, Nirmal C. 2013b. The lost landscape and livelihood: A case study of the Alu Kurumba of Nilgiris, Tamil Nadu. *J Anthropol Surv India* 62 (2): 821-850.
- Sejin V. 2019. Socio-economic life of the Kurumbas in Nilgiris. *Pramana Res J* 9 (3): 61-64.
- Sharma BD, Shetty BV, Vajravelu E, Kumari GR, Vivekanathan K, Chandrabose M, Swaminathan MS, Chandrasekaran R, Subbarao GV, Ellis JL, Rathakrishnan NC, Karthikeyan S, Chandrasekaran V, Srinivasan SR. 1977. *Studies on the Flora of Nilgiris, Tamil Nadu. Biological Memoirs Vol.2 No. 1 & 2.* International Publishers, Lucknow.
- Silja VP, Varma SK, Mohanan KV. 2008. Ethnomedicinal plant knowledge of the Mullukuruma Tribe of Wayanad District, Kerala. *Indian J Tradit Knowl* 7 (4): 604-612.
- Udayan PS, Tushar KV, George S, Balachandran I. 2007. Ethnomedicinal information from Kattunayakas Tribes of Mudumalai Wildlife Sanctuary, Nilgiris District, Tamil Nadu. *Indian J Tradit Knowl* 6 (4): 574-578.
- Vijeesh P, Velumani K. 2011. Use of ethnomedicinal plants among Mullukuruma Tribe of Wayanad District, Western Ghats, Kerala, India. *Plant Arc* 2 (1): 193-200.