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# Floristic and ethno-botanical survey of flora population in Thirumoorthy hills of Western Ghats, Tamil Nadu, India

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**Abstract**
Several scientific studies are in progress using modern scientific tools based on the lead from the folkloric and herbal uses for formulating new western medicine. The present study involves the identification, enumeration and utilization of medicinal flora in the study area. The present study is mainly carried to study the flora of hill and it results with the collection in the Thirumoorthy hills. An ethnomedical survey was carried out among the Pulaya ethnic groups of Thirumoorthy Hills, Western Ghats, Tirupur region of Tamil Nadu, India. The natural forest in the study area consisted of numerous trees, lianas, shrubs and herbs - the treasure troves of medicines. Due to the degradation of medicinal flora habitats in the recent past, there is a gradual decline in their Distribution and abundance. As a consequence of the increase in access to western medicine, the utilization of medicinal plants has reduced and hence the knowledge of its use stands to be lost. In this study, about 52 plants which belong to 33 families were documented and their medicinal uses also reported. The reported potential ethnomedicinal plants could be conserved and further validation need for better utilization and provisions of the documented knowledge.

**Keywords:** Thirumoorthy Hills, ethnobotany, random sampling, medicinal plants, Tamil Nadu

## Introduction

Biodiversity is essential for the processes that support all life on Earth, including us. Without a wide range of animals, plants and microorganisms, we cannot have the healthy ecosystems that we rely on to provide us with the air we breathe and the food we eat. Some aspects of biodiversity are instinctively widely valued by people but the more we study biodiversity the more we see that all of it is important (Pimm *et al*., 1995) [29]. Life on earth consists of many distinct biological species including the flora and fauna but they are not consistent across the earth and varies depending on the local micro climates, topography, altitude of the area, sunlight availability which their presence are rich in tropics when compared with the polar regions where conditions not suitable for the biomass. It shows a complex relationship existence among the different diversity levels where the temperature rise of earth due to several factors like global warming and greenhouse emissions and mainly deforestation results in loss of vegetation in the those area (Cardinale *et al*., 2012) [7]. The effects of climate change ultimately led to the fluctuation in rainfall pattern, reduces the level of ground water availability in the soil and these environmental changes affects the floral diversity (Chase *et al*., 2020). The information of these floras in an area need to be obtained for understanding and making a protective, sustainable population that can be analysed through survey practices.

Surveys form the backbone for generating all the baseline information on biodiversity of a region. Surveys have not only added to the knowledge but have provided valuable information for highlighting the importance of ‘‘megadiverse countries’’ in sustenance of biodiversity and well-being of mankind (Gokhale *et al*., 2011) [12]. The need for documenting current status of biodiversity has been much emphasized and at the same time, importance of background information and the sources from where the information collected have also highlighted. Surveys usually involve surveying the distribution and abundance of either individual species or a few similar species, where direct and precise quantitative measurements are required. The species of primary interest are often endangered or ecologically valuable. This type of survey information is vital to the management of these species in biodiversity.

A biodiversity survey documents the biodiversity of a specified area. The information collected provides people with the ability to assess conservation values of areas, understand the implications of changes in land use, document natural heritage, and assist in natural resource management. Biodiversity information owes a lot to field surveys and floristic studies (Honeycutt *et al*., 2010) [13]. This is the basis of monitoring and assessment exercises. Floristic surveys are concerned with an assessment of species composition of vegetation, rather than

the structure. These are favoured for large-scale or small area studies of a detailed botanical nature. The information can be integrated for larger area studies, e.g. vegetation classification and mapping. The identification of species is essential for floristic mapping (Roberts *et al*., 1989) [37]. The major purpose of survey activities is for documenting biological diversity, determining the conservation value of particular areas or species, preparing management guidelines for natural resources, describing the distribution of species and the environmental factors that influence them and developing hypotheses about habitats. This would provide a basic knowledge about the importance of the floras with economical and ethnobotanical benefits.

Flora around us is under tremendous observations nowadays because of the presence of various kinds of bioactive compounds which are studied to introduce them in the field of pharmacology. Due to the wide spread diseases which people suffering across the globe, plant medicine which has less known side effects are the reason for the interest. Due to the presence of many nutritional and pharmacological values, plants are protected and cultivated for its value-added compounds obtained from it. This plant medicine practice is carried either direct use of plant parts or through the use of drugs obtained from the plant sources (Bassam Abdul, 2012) [5]. The efficacy of drugs are studied both in *in vitro* and *in vivo* conditions for several years to get introduced into the pharmacology field (Bandaranayake, 2006) [4]. The modern advancement in the field of plant pharmacology is improving day by day but the importance and the use of these plant's medicinal qualities were studied and used by traditional people were the antecedent who paved the way for the present pharmacological studies (Minakshi *et al.*, 2016) [19].

In India, Some of the recognized traditional medicinal practices followed in India are Ayurveda, Yoga and Naturopathy, Siddha, Unani, Homeopathy (AYUSH). The widely followed traditional system of medicine Ayurveda and Siddha which are followed by ancient people for several centuries still it continues to circulate among people belong to tribal community. India is known for its traditional religious knowledge over plant medicine which came from several generations of practices carried out by local communities who directly depend on the forest products for their essential needs of survival.

Every medicinal property of plants which are known to treat diseases is due to the plant's composition of phytochemical compounds. A wide variety of chemical compounds are present in plants in the form of metabolites and enzymes. Many pharmaceutical products are also developed with the composition of these phytochemical compounds. Many plant species of different families have been identified and screening of their phytochemical compounds of many plant species resulted in identifying many bioactive compounds that proved to have antioxidant, antiviral, antimicrobial, anti-inflammatory, etc., potential which is widely considered for such ethnobotanical importance (Qasim *et al*., 2014) [30]. The primary source of these plants are the well sustained ecosystem in which Western Ghats is been one of them with rich diversity of flora and fauna.

In Western Ghats, Anamalai Tiger Reserve is one of the main conservation areas with rich flora diversity. Anaimalai Tiger Reserve, earlier known as Indira Gandhi Wildlife Sanctuary and National Park and as Anaimalai Wildlife Sanctuary, is a protected area in the Anaimalai Hills of Pollachi and Valparai taluks of Coimbatore District and Udumalaipettai taluk in Tiruppur District, Tamil Nadu, India (Radha *et al*., 2020) [31]. Thimoorthy hills is a part of Anamalai tiger reserve which is considered as religious place present in a foothills that has a water stream forming the primary source of the rich diversity in the flora population. With all these considerations the primary objectives of this study are,

- To explore the diversity of flora in the region of Thirumoorthy hills.
- To examine different habitats of plant species which are explored.
- To outline the Family and Genera of the plants examined.
- To obtain information of the medicinal plants which are known and used by the neighbouring tribal community.
- To review the ethnobotanical studies of the medicinal plants and their bioactivity and impact in the field of pharmacology.

## Materials and Methods

### Study Area

Thirumoorthy Hill at Udumalaipet is located at 10°27'46.2"N 77°09'18.2"E or 10.462829, 77.155051. It is situated 50 kms from Pollachi and 20 kms from Udumalaipet on the highway from Palani to Coimbatore. Like other hills in Anamalai range and it is a part of Western Ghats. This hill is also a part of the Indira Gandhi national park and has a huge number of plants and animals present in it. The beautiful hills of Thirumoorthy are located near the Thirumoorthy Dam (Fig-1). These hills are known to have a huge rock which is worshipped as Thirumoorthy, along with a sculpture of a Jain priest. The Thirumoorthy Hills are also home to many floras which are to be examined and documented in this study.

### Methods of Data Collection

### Random Sampling Method

Random sampling (Fig-2) is one of the simplest forms of collecting data from the total population. Here, the vegetation of plants with different habits were surveyed randomly (West, 2016) [50] and their ethnobotanical uses were known through obtaining traditional knowledge and through reviewing literature related to this survey. Under random sampling, each member of the subset carries an equal opportunity of being chosen as a part of the sampling process.

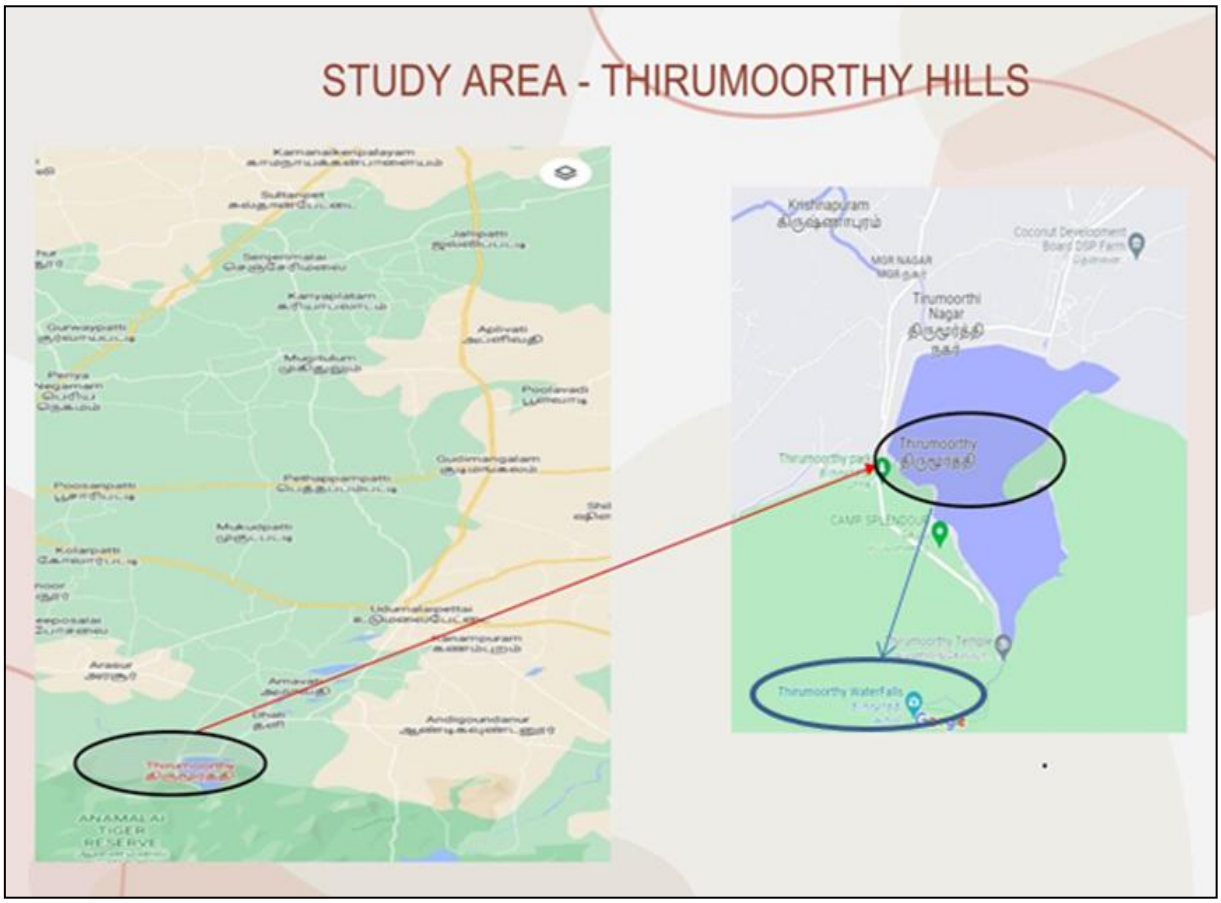


**Fig 1:** Map of study Area

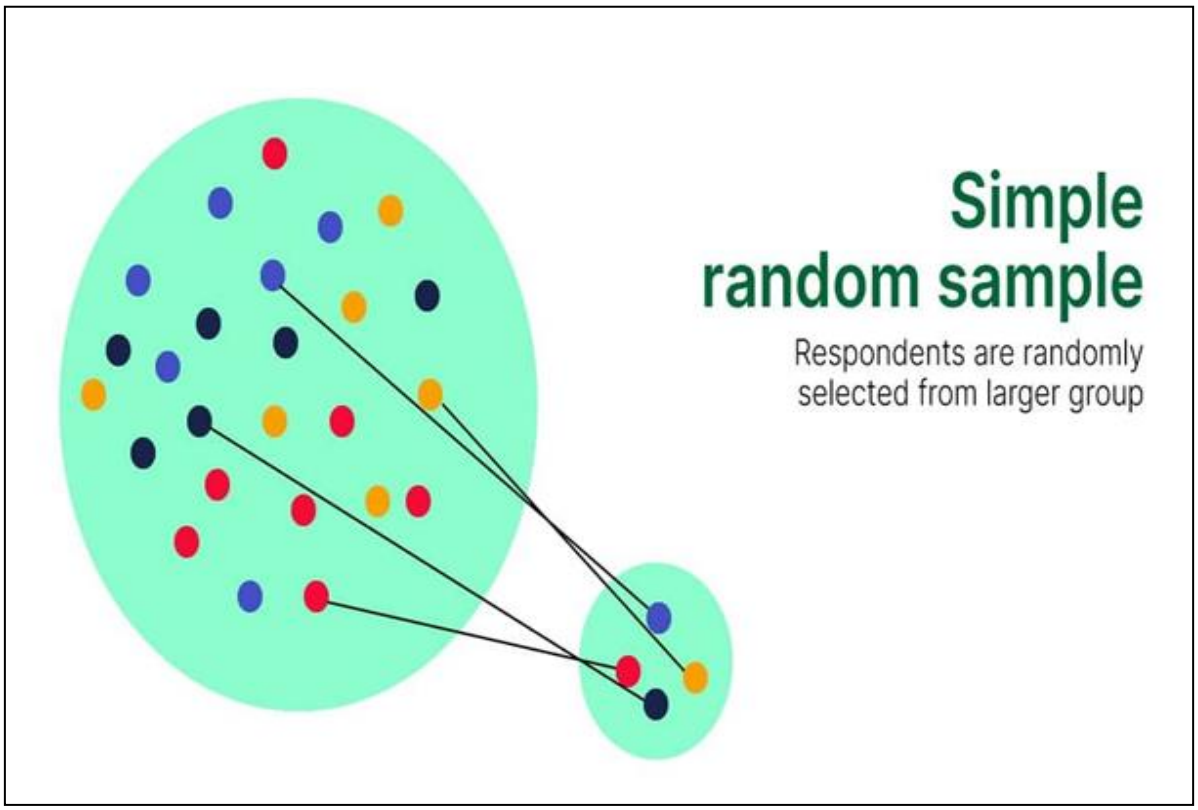


**Fig 2:** Random sampling method

The present investigation was undertaken to survey the vegetation in Thirumoorthy hills in Tiruppur district. Before starting with field work, preliminary information about the geographical area of the study was collected. During this course of survey, several field trips were conducted during the month of March – May, 2022.

**Species Identification**

The plant species were identified using the field guides: The Flora of the Tamilnadu Carnatic Vol I-III K.M. Matthew, Flora of Tamil Nadu, India. Ser. 1: Analysis. vol. 3 (Mathew 1993). Botanical Survey of India, Forest Plants of the Nilgris Eastern and Northern Nilgiri Biosphere Reserve published by Keystone Foundation NGO (Keystone Foundation, 2008; Keystone Foundation, 2010). Photographs from the field guide were shown to the informants and were recorded.

**Results and Discussion**

Nature is a place for many plants with different medicinal properties. Humans have used plants for the safer medication of diseases from ancient years (Rajan *et al*., 1997) [32]. People now changed their life styles to use herbal medicines instead of using synthetic medicines because of its least or no side effects (Khan *et al*., 2019) [17].

Medicinal plants have been used as an alternative source of therapeutic drug by using its different parts (Parveen *et al*., 2020) [27]. Many countries especially in India use herbal medicines as indigenous system of medicine (Sen *et al*., 2019) [39]. Naturally occurring antimicrobial compounds have enormous therapeutic potentials and advantages then similar such synthetic compounds (Nisar *et al*., 2018) [25].

Hence with this thought our survey of plants showed importance of them in ethnobotany with wide applicability in the field of pharmacology (Dahanukar *et al*., 2000) [9]. The study area showed a diverse distribution of plant species of different habits and their distribution is widely influenced by the presence the water stream and the falls present in that region. The diversity is very dense and evergreen in and around the falls region whereas vegetation is seen to be adapted to the semi-arid climatic condition outside land area away from the falls region. Hence many xerophytically adapted plant species are seen in this area. Through this survey, we observed medicinally important plants which include around 23 species of trees, 20 species of herbs and shrubs, 3 species of Climbers and 6 grass species listed in Table- 1 With this other plant species such 2 species in xerophytes, 2 species in pteridophytes and 1 species of moss in bryophytes with 4 predominant Crustose lichens are also observed through this survey shown in Figure -3.

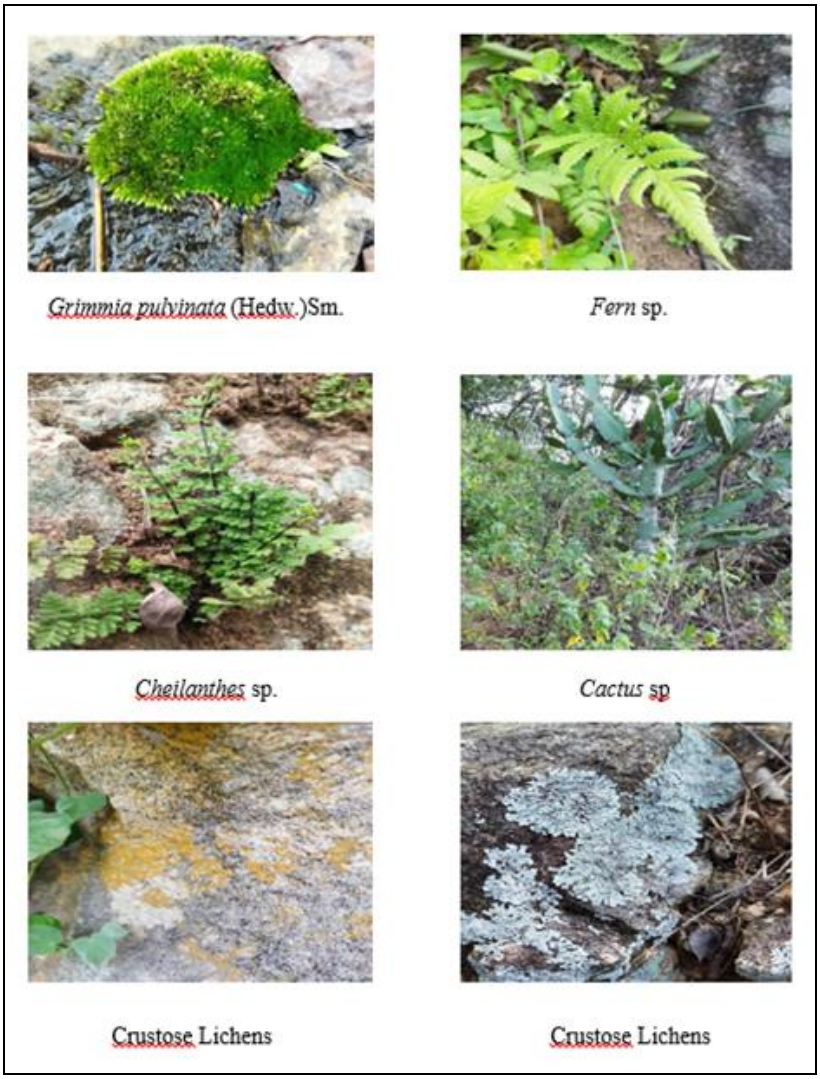


**Fig 3:** Some different life forms from the study are

**Table 1:** Ethno-botanical Survey of Thirumoorthy Hills

| Botanical name | Family | Local name in Tamil / (Common name) | Part used | Ailments treated |
|---|---|---|---|---|
| **List of Tree Species** | | | | |
| *Acacia nilotica* (L.) Delile | Leguminosae | Karuvelam | Leaves and bark | Used against tuberculosis and indurations of liver and spleen. Aphrodisiac, dressing of ulcers, anti-inflammatory (L.J. Rather *et al*., 2015). |
| *Aegle marmelos (*L.) Corrêa | Rutaceae | Vilvam | Leaves and fruits | Used for intermittent fever, intestinal ailments, fertility control and treatment after childbirth and fish poison intermittent fever (C. P. Kala, 2006). |
| *Albizia lebbeck* (L.) Benth. | Leguminosae | Vaagai | Leaves, flowers and fruits | Used as anti-asthmatic, anti-inflammatory, anti-fertility. The flowers are used as an antiseptic and to treat abdominal cramps and spasms. It is also taken to relieve headaches and colds. Fruits possess antioxidant property (S.C. Verma *et al*., 2013). |
| *Artocarpus heterophyllus* Lam. | Moraceae | Pila, Pilapalam, Pilavu | Leaves, roots and fruits | Ashes of the leaves are used for treating ulcers, diarrhoea, boils, stomach-ache and boils. Seeds are aphrodisiac. Root decoction can reduce fever and can treat diarrhoea, skin diseases and asthma (M.S. Baliga *et al*., 2011). |
| *Azadirachta indica* A.Juss. | Meliaceae | Vembu, Veppamaram. | Leaves, flowers and bark | Used to treat dental and gastrointestinal disorders, malaria fevers, skin diseases, and as insects repellent, while the Balinese used Neem leaves as a diuretic and for diabetes, headache, heartburn, and stimulating the appetite (J.M. Van der Nat *et al*., 1991). |
| *Bauhinia racemosa* Lam. | Leguminosae | Aathi | Leaves and bark | The bark and leaves are sweetish and acrid, used as a refrigerant, astringent, in the treatment of headache, fever, skin diseases, blood diseases, dysentery, and diarrhoea. A decoction of the bark is recommended as a useful wash for ulcers (V. Soni *et al*., 2015). |
| *Bursera simaruba* (L.) Sarg. | Burseraceae | (Turpentine tree) | Leaves | Used as treatment for dropsy, dysentery and yellow fever. Gum tree leaves are tea substitute. |
| *Ficus benghalensis* L. | Moraceae | Ala maram | Leaves, aerial roots | It is astringent to bowels; useful in treatment of biliousness (K. Murti *et al*., 2011) |
| *Ficus benjamina* L. | Moraceae | Nitamaravakai, Vellal. | Leaves, fruit and latex | Its latex and some fruit extracts are used by indigenous communities to treat skin disorders, inflammation, piles, vomiting, leprosy, malaria, nose-diseases and cancer besides the use as a general tonic. The plant is also used as antimicrobial, antinociceptive, antipyretic, hypotensive and anti- dysentery remedy. (S. Novelli *et al*., 2014) |
| *Ficus religiosa* L. | Moraceae | Arasa maram. | Leaves and bark | The bark is reported to possess antiulcer and wound healing. It is used in diabetes, diarrhoea, leucorrhoea, anxiety, for vaginal and other urinogenital disorders and to improve the complexion (D. Singh *et al*., 2011). |
| *Ficus tinctoria* G.Forst. | Moraceae | - (Ficus clarkel) | Leaves and fruits | A decoction of the plant juices and leaves is mentioned as an internal remedy for weakness after childbirth. The plant juices and leaves are used as a dressing for broken bones (R.M. Kunwar *et al*., 2006). |

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|---|---|---|---|---|
| *Gyrocarpus americanus* Jacq. | Hernandiaceae | Kaathadimaram, Vellaithanukku, Kosuthamugu. | Wood | The boles are traditionally used for dug-out canoes. The wood is used for roof laths, wall covering, insulation, toys, model making and carvings. |
| *Lannea coromandelica* (Houtt.) Merr. | Anacardiaceae | Othiya maram | Leaves | Used as folk medicine to treat fever, dyspepsia, general debility, gout, dysentery, sore eyes, leprosy, sprains, ulcers, inflammations. (R. Sathish *et al*., 2010) |
| *Manilkara zapota* (L.) P.Royen | Sapotaceae | Sapota | Leaves and fruit | Used for the treatment of fever, haemorrhage, wounds, ulcers, neuralgia, diarrhoea, indigestion, gallstones, and thrush in babies (B.I.D.V. Moura *et al*., 2019). |
| *Mimusops elengi* L. | Sapotaceae | Magilan | Bark, flowers and roots | The roots are used as diuretic, astringent, cardiotonic and stomachic. Flowers are used as an expectorant and in liver complaints and asthma. Bark showed antiulcer activity and also used to prepare lotion for wounds and ulcers (B. Gami *et al*., 2012). |
| *Muntingia calabura* L. | Muntingiaceae | Sarkarai Pala | Leaves and fruits | The flowers are used as an antiseptic and to treat abdominal cramps and spasms, headaches and colds. Fruits possess antioxidant property (N.D. Mahmood *et al*., 2014). |
| *Pithecellobium dulce* (Roxb.) Benth. | Leguminosae | (Manila tamarind) | Bark and pulp | Used in treating various sorts of ailments due to its restorative properties. The bark and pulp being astringent and haemostatic are used to treat gum ailments, toothache and bleeding (S. Murugesan *et al*., 2019). |
| *Pongamia pinnata* (L.) Pierre | Leguminosae | Pungai | Leaves and fruits | Used as crude drug for the treatment of tumors, piles, skin diseases. Root is effective for treating gonorrhoea, cleaning gums, teeth, and ulcers (Al Muqarrabun *et al*., 2013). |
| *Prosopis juliflora* (Sw.) DC. | Leguminosae | Cheemai karuvel | Leaves and pods | Paste, gum, and smoke from leaves and pods are applied for anticancer, anti-diabetic, anti-inflammatory, and antimicrobial purposes (Naper *et al*., 2012). |
| *Pterolobium hexapetalum* (Roth) Santapau & Wagh | Leguminosae | (Traveler terror) | Leaves and bark | The leaves and bark of this plant are widely used to treat many ailments like cough in children, delivery pains, tooth ache, chest pain, diarrhoea, constipation and piles, bone fracture, jaundice and ulcer (S. Sharmila *et al*., 2020). |
| *Senna siam ea* (Lam.) H.S.Irwin & Barneby | Leguminosae | Nila-vaa-rai | Leaves | Used for the treatment of typhoid fever, jaundice, abdominal pain, menstrual pain and is also to reduce sugar level in the blood. Used as laxative, blood cleaning agent, cure for digestive system (N.K. Mund., 2016). |
| *Tamarindus indica* L. | Leguminosae | Puliya maram | Leaves and fruits | Used in wound healing, abdominal pain, diarrhoea, dysentery, parasitic infestation, fever, malaria and respiratory problems (De Caluwé *et al*., 2010). |
| *Terminalia arjuna* (Roxb. ex DC.) Wight & Arn. | Combretaceae | Marutu | Leaves and seeds | Used to balance the three “humors”: kapha, pitta, and vata. It has also been used for asthma, bile duct disorders, scorpion stings, and poisonings. (R. Rekha *et al*., 2014) |
| List of Herbs and Shrubs | | | | |
| *Abutilon indicum* (L.) | Malvaceae | Thuthi keerai | Leaves and roots | It is useful in gout, tuberculosis, ulcers, bleeding disorders, and worms. |

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| Sweet | | | | Decoction used in toothache and tender gums (S. Rajeshwari *et al*., 2019). |
| *Andrographis lineata* Nees | Acanthaceae | Periya nangai | Leaves and roots | Used to treat diabetes, high blood pressure, ulcer, leprosy, bronchitis, skin diseases, flatulence, colic, influenza, dysentery, dyspepsia and malaria (D. Tewari *et al*., 2017). |
| *Catharanthus roseus* (L.) G.Don | Apocynaceae | Nithiya kalyani | Roots | Source of the drugs vincristine and vinblastine, used to treat cancer (G.A. Gordell, 1980). |
| *Chamaecostus cuspidatus* (Nees & Mart.) C.D.Specht & D.W.Stev. | Costaceae | (Fiery costus) | Leaves | Leaves used for treatment of diabetes, skin diseases, asthma, bronchitis, fever, and intestinal worm disease (M. Kaur *et al*., 2021). |
| *Crotalaria verrucosa* L. | Leguminosae | Amparanemi, Amparanemicceti, Avaratimatu | Leaves and roots | Used as medicine for treating impetigo, scabies, salivation, jaundice, cough, biliousness, dyspepsia, fever, cardiac abnormalities and oral diseases (T.M. Hussain *et al*., 2017). |
| *Crossandra infundibuliformis (L.) Nees* | Acanthaceae | Kanakambaram | Flowers | Flower extract is used in various conditions like fever, headache, aperitif, pain and wound healing (G. Madhumitha *et al*., 2011). |
| *Euphorbia hirta* L. | Euphorbiaceae | Amman pacharisi | Entire plant | Used traditionally for female disorders, respiratory ailments, worm infestations in children, dysentery, jaundice, pimples, gonorrhoea, digestive problems, and tumours (P. Ghosh *et al*., 2019). |
| *Gomphrena decumbens* Jacq. | Amaranthaceae | Airy Bachelor Buttons | Leaves | Effective against diarrhoea, hay fever, pains, carminative, bronchial asthma, diabetes, and dermatitis (Y. A. Tarnam *et al*., 2014). |
| *Hybanthus enneaspermus* (L.) F.Muell. | Violaceae | Oridhazh thamarai | Leaves and flowers | Reported to cure conditions of "Kapha" and "Pitta", urinary calculi, strangury, painful dysentery, vomiting, burning sensation, wandering of the mind, urethral discharge, blood trouble, asthma, epilepsy and cough (D.K. Patel *et al*., 2013). |
| *Jatropa curcas* L. | Euphorbiaceae | Kattamanakku | Leaves | Used for treatment of a wide spectrum of ailments related to skin, cancer, digestive, respiratory and infectious diseases (N. Carels, 2009). |
| *Ocimum basilicum* L. | Lamiaceae | Thiruneetru pachai | Leaves and seeds | Used for treatment of headaches, coughs, diarrhoea, constipation, warts, worms, and kidney malfunctions (A. Bilal *et al*., 2012). |
| *Ocimum gratissimum* L. | Lamiaceae | Elumichathulasi | Leaves | Leaves have been used as a general tonic and anti-diarrhoea agent and for the treatment of conjunctivitis by instilling directly into the eyes; the leaf oil when mixed with alcohol is applied as a lotion for skin infections, and taken internally for bronchitis (K. S. Prabhu *et al*., 2009). |
| *Ocimum sanctum* L. | Lamiaceae | Thulasi | Leaves and roots | Used for the treatment of bronchitis, malaria, diarrhoea, dysentery, skin disease, arthritis, eye diseases, insect bites (L. Mohan *et al*., 2011). |
| *Parthenium hysterophorus* L. | Asteraceae | (Santa-Maria) | Leaves | Confers many health benefits and remedies for skin inflammation, rheumatic pain, diarrhoea, urinary tract infections, dysentery and malaria (L. Kaur *et al*., 2021). |
| *Phyllanthus amarus* | Phyllanthaceae | Nelli | Leaves | It is an important plant of Indian Ayurvedic system of medicine which is |

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| Schumach. & Thonn. | | | | used in the problems of stomach, genitourinary system, liver, kidney and spleen. It is bitter, astringent, stomachic, diuretic, febrifuge and antiseptic. It is useful in gastropathy, diarrhoea, dysentery, intermittent fevers, ophthalmopathy, scabies, ulcers and wounds (J. R. Patel., 2011). |
| *Phyllanthus niruri* L. | Phyllanthaceae | Kizhanelli | Leaves and seeds | Used for jaundice, gonorrhoea, frequent menstruation, and diabetes and for skin ulcers, sores, swelling, and itchiness (K. Narendra *et al*., 2012). |
| *Spermacoce alata* Aubl. | Rubiaceae | Tharthavai | Leaves | Uses include the treatment of malaria, diarrheal and other digestive problems, skin diseases, fever, hemorrhage, urinary and respiratory infections, headache, inflammation of eye, and gums (L.M. Conserva *et al*., 2012). |
| *Tredescantia* sp. | Commelinaceae | - | Leaves | The plant have demonstrated significant pharmacological activities such as anticancer, antioxidant, antibacterial, antitrypanosomal, antiarrythmic and larvicidal activity against *Anopheles benarrochi* (J.B.L. Tan *et al*., 2020). |
| *Tridax procumbens* (L.) L. | Compositae | Vettukayap poondu | Leaves | Used for its wound healing property and as an anticoagulant, antifungal and insect repellent. The juice extracted from the leaves is directly applied on wounds. Its leaf extracts were used for infectious skin diseases in folk medicines (S. Beck *et al*., 2018). |
| *Ziziphus jujuba* Mill. | Rhamnaceae | Elandhai | Leaves and fruits | Used to increase strength and weight, for preventing liver diseases and stress ulcers, and as a sedative (S. Tripathi, 2014). |
| List of Climber Species | | | | |
| *Cissus quadrangularis* L. | Vitaceae | Pirandai | Leaves | Used for diabetes, obesity, high cholesterol, bone fractures, allergies, cancer, stomach upset, painful menstrual periods, asthma, malaria, wound healing, peptic ulcer disease, weak bones, weak bones (osteoporosis) and as body building supplements as an alternative to anabolic steroids (A. Siddiqua *et al*., 2017). |
| *Cocculus hirsutus* (L.) W.Theob. | Menispermaceae | Kattukkodi | Leaves | Used for treatment against fever, skin diseases, stomach disorders, urinary diseases (R. Logesh *et al*., 2020). |
| *Tinospora sinensis* (Lour.) Merr | Menispermaceae | Potchindil | Leaves | Used for diabetes, high cholesterol, allergic rhinitis (hay fever), upset stomach, gout, lymphoma and other cancers, rheumatoid arthritis (RA), hepatitis, peptic ulcer disease (PUD), fever, gonorrhoea, syphilis, and to boost the immune system (S. Hedge *et al*., 2016). |
| List of Grass Species | | | | |
| *Carex* sp, | Cyperaceae | - | Leaves | The root is diaphoretic and diuretic. An infusion has been used in the treatment of bronchitis and catarrhs, abdominal and stomach disorders, liver complaints, arthritis and rheumatism (M. Challam *et al*., 2012). |
| *Chloris barbata* Sw. | Poaceae | Chevvarakupul, Kodai pullu, Kotai-p-pul, Kuruthu pillu. | Leaves and roots | Used to treat rheumatism, while juice from the plant is used as an antibacterial and antimicrobial to treat skin disorders. The species is also said to possess anti-diabetic properties (P. Natarajan *et al*., 2012). |

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|---|---|---|---|---|
| *Cyperus rotundus* L. | Cyperaceae | Korai pullu, Korai kizhangu. | Leaves and roots | Used to treat various clinical conditions at home such as diarrhea, diabetes, pyresis, inflammation, malaria, and stomach and bowel disorders (S.R. Sivapalan., 2013). |
| *Cymbopogon citratus* (DC.) Stapf | Poaceae | Karppurappul, | Leaves and roots | Used as a fragrance and flavoring agent and in folk medicine as an antispasmodic, hypotensive, anticonvulsant, analgesic, antiemetic, antitussive, antirheumatic, antiseptic and treatment for nervous and gastrointestinal disorders and fevers (O.S. Oladeji *et al*., 2019). |
| *Dactyloctenium aegyptium* (L.) Willd. | Poaceae | (Crowfoot) | Leaves, seeds and roots | Seeds used for treatment of typhoid fever. Decoction of seeds used to relieve pains in the region of the kidney; stems and leaves applied externally for treatment of ulcers. Seeds used for making chapattis or haluwa and eaten as a cooling agent. Juice of fresh plants is prescribed in fevers (M.D. Choudury *et al*., 2010). |
| *Pogonatherum crinitum* (Thunb.) Kunth | Poaceae | (Bamboo grass) | Leaves and roots | Used in treatment for Pyreticosis and dipsesis, hematemesis, non-traumatic hemorrhage, coughing up blood, hematuria, profuse uterine bleeding, jaundice, edema, whitish and turbid urine, leukorrhea, dysentery, infantile malnutrition with fever, anthracia and furunculosis (G. J. Wang *et al*., 2008). |

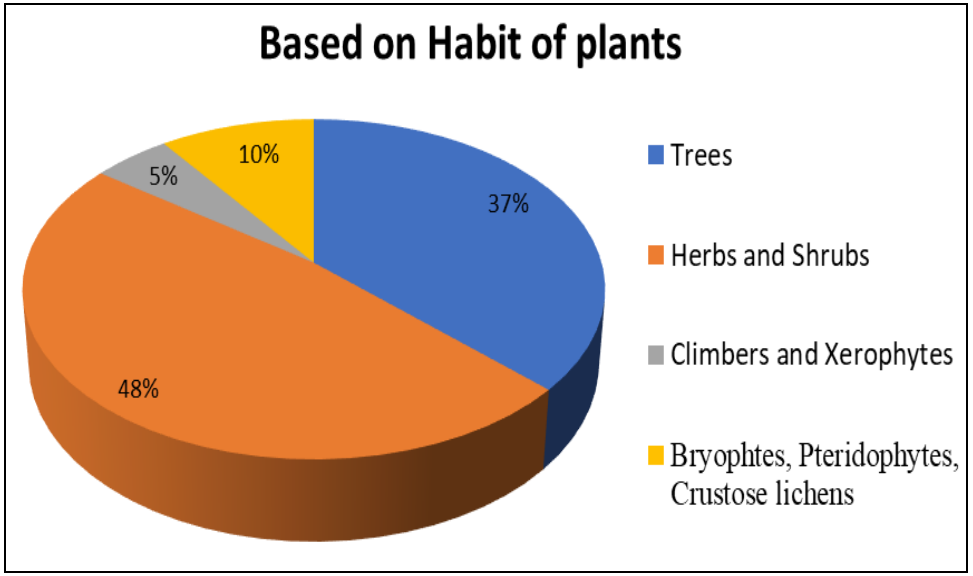


**Fig 4:** Habit of Plants

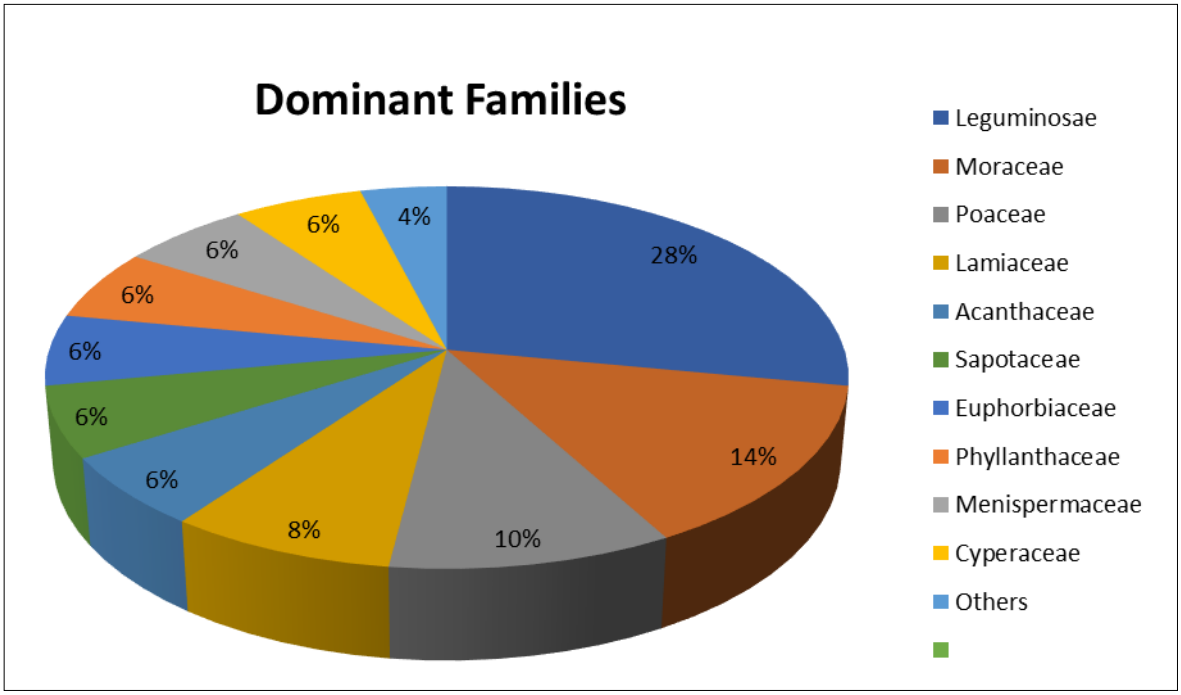


**Fig 5:** Dominant Families

**Regions in and around water stream and falls**

The studied area of Thirumoorthi hills showed dense vegetation in and around the falls region which are mostly dominated by tree species such as *Ficus religiosa*, *Ficus benghalensis*, *Tamarindus indicus*, *Pongamia pinnata*, *Albizia lebback* and *Azardirachta indica*. Bryophytes such as *Grimmia pulvinata*, Pteridophytes such as *Cheilanthes* species and a variety of *Fern* species are also dominantly observed in and around the falls region. Grass species observed in this study area are dominated by *Dactyloctenium aegyptium*, *Cympopogan citratus* and *Carex* sp. Some of the herbs and shrubs seen in this area were *Spermacoce alata* Aubl., *Phyllanthus niruri* L., *Euphorbia hirta* L., *Tinospora sinensis* (Lour.) Merr.

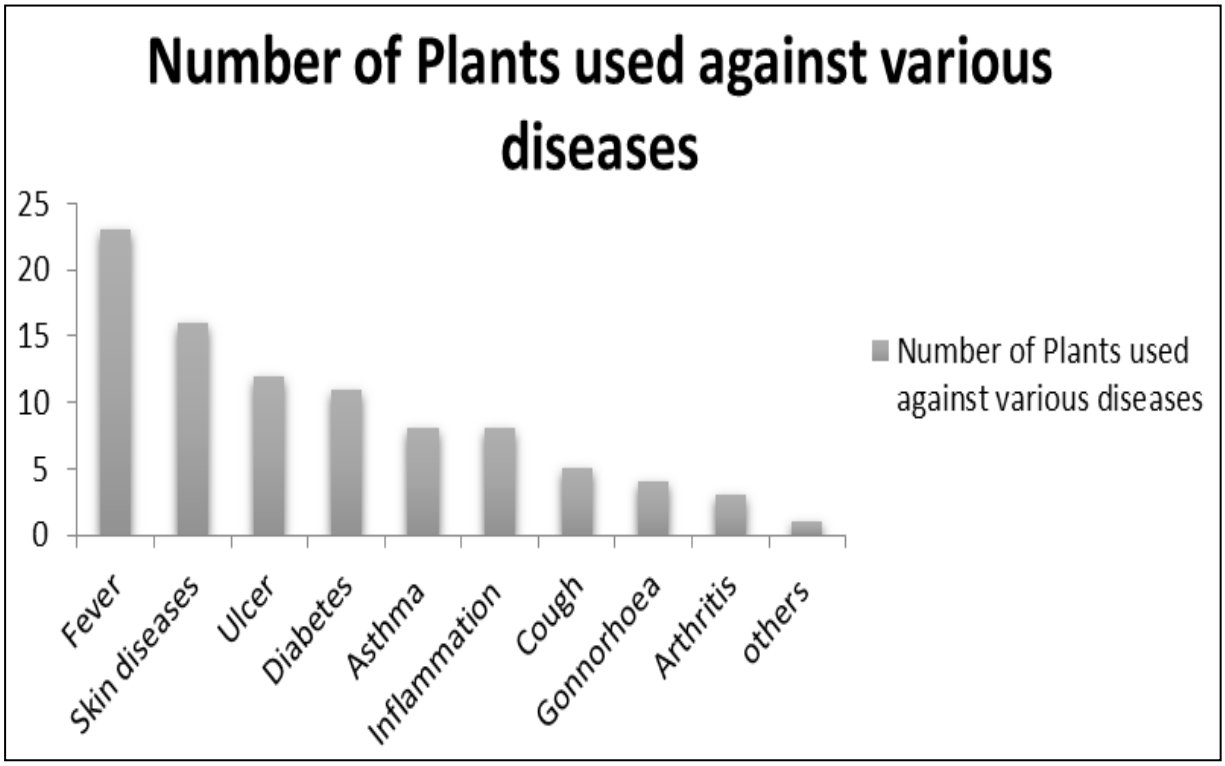


**Fig 6:** Number of Plants used against various

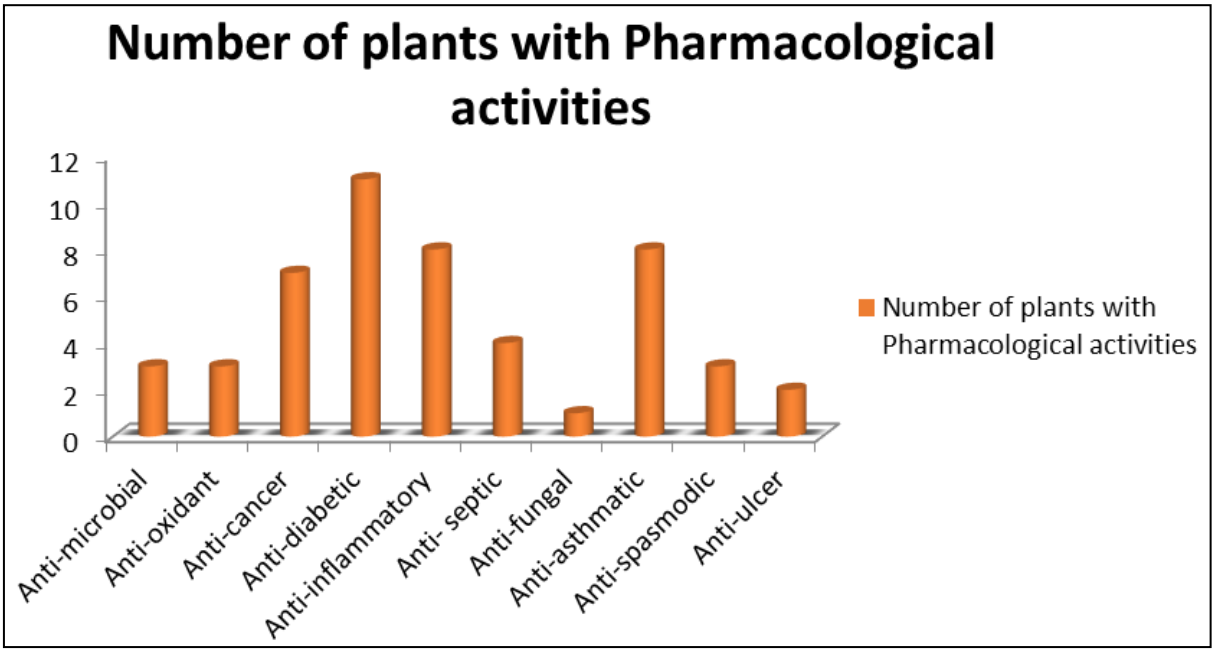


**Fig 7:** Number of Plants with Pharmacological activities

**Regions away from water stream and falls**

Away from the falls region the area was observed to be in a semi-arid condition, where the dominant species found are herbs and shrubs such as *Hybanthus ennaespermus*, *Abutilon indicum*, *Ocimum sanctum*, *Andrographis lineata*, *Euphorbia hirta* and *Catharanthus roseus*. Grass species which are predominant in this region are *Chloris barbata*, *Pognanthera crinitum* and *Cyperus rotundus*. Xerophytic species which are seen in this region are *Opuntia* and another variety of *Cactus* sp. Many trees species which are adapted to xerophytic conditions which are dominantly present includes *Acacia nilotica*, *Prosobis juliflora*, *Pterolobium hexapetalum*, *Gyrocarpus americanus* and other tree species present commonly are *Pongamia pinnata*, *Aegle mermalos*, *Terminalia Arjuna*, *Muntingia calabura*, *Azadirachta indica*, etc.

Based on the habit of the plants surveyed with reference to Figure 4, the vegetation was dominated by herbs and shrubs which accounted 48% among total vegetation which are followed by trees species which accounted around 37%, climbers accounted 5% and other habit of plants such as bryophytes, pteridophytes and xerophytes collectively accounted 10% of total vegetation.

Within the surveyed plants, about 52 plants which belong to 33 families were obtained. The dominant family which are widely spread around the study area was shown in the Figure 5, those were Leguminosae (Fabaceae) which 10 plants *Pongamia pinnata*, *Tamarindus indica*, *Prosopis juliflora*, *Acacia nilotica*, *Albizia lebbeck*, *Senna siamea*, *Pterolobium hexapetalum*, *Pithecellobium dulce*, *Bauhinia racemosa* were found belong to this family. 5 plants *Ficus benghalensis*, *Artocarpus heterophyllus*, *Ficus tinctoria*, *Ficus religiosa*, *Ficus benjamina* were found to be belonged to the family Moraceae. Family Lamiaceae is third dominant with 3 plants such as *Ocimum sanctum*, *Ocimum basilicum*, *Ocimum gratissimum.* Following these dominant families, families such as Acanthaceae - *Andrographis lineata*, *Crossandra infundibuliformis*, Euphorbiaceae - *Euphorbia hirta*, *Jatropa curcas*, Phyllanthaceae - *Phyllanthus niruri*, *Phyllanthus amarus*, Menispermaceae - *Cocculus hirsutus*, *Tinospora sinensis*, Sapotaceae - *Manilkara zapota*, *Mimusops elengi* and Cyperaceae - *Carex* sp, *Cyperus rotundus* consisted 2 plants in each family respectively.

Considering the medicinal and the ethnobotanical value of the plants which were consumed and used as a folk medicine traditionally which were surveyed in this study, the most widely dominated plant species were *Azadirachta indica* of Meliaceae (Islas *et al*., 2020), *Aegle marmelos* of Rutaceae (Venthodika *et al*., 2021) [47], *Ficus benghalensis*, *Ficus tinctoria*, *Ficus religiosa* of Moraceae (Murugesu *et al*., 2021), *Ocimum sanctum*, *Ocimum basilicum* of Lamiaceae (Miraj *et al*., 2016), *Euphorbia hirta* of Euphorbiaceae (Kumar *et al*., 2010), *Abutilon indicum* of Malvaceae (Parel *et al*., 2013), *Catharanthus roseus* of Apocynaceae (Ratna *et al*., 2013), *Phyllanthus amarus* of Phyllanthaceae (Patel *et al*., 2011) [28], *Cissus quadrangularis* of Vitaceae (Bafna *et al*., 2021) and *Chamaecostus cuspidatus* of Costaceae (Kaur *et al*., 2021) [16]. With the consideration of number of plants which are ethnobotanically valuable in a family it was found that the family Moraceae was comparatively highly medicinal valued in traditional knowledge (Shi *et al*., 2018). Lamiaceae was also considered to possess high ethnobotanical value (Rattray *et al*., 2021) [35].

Among the plants surveyed, the medicinal importance of plants for specific common diseases was shown in the Figure 6, it was found that about 23 plants across different families were therapeutically used for treatment to cure fever. About 16 plants were used to cure skin diseases, 12 plants were used to treat ulcers, 11 plants were applied to treat diabetics, 8 plants were considered to treat asthma, 8 plants were used to reduce inflammation, 5 plants were used to reduce cough, 4 plants were used to treat gonorrhoea.

With consideration of the plant's pharmacological potential many plants exhibited many pharmacological activities which was shown in the Figure 7, it was found that *Prosopis juliflora* (Leguminosae) known to possess anti-microbial, anti-cancer, anti-diabetic, anti-inflammatory activities (Ukande *et al*., 2019) [45]. *Albizia lebbeck* (Leguminosae) was known to exhibit anti-asthmatic, anti-inflammatory, anti-fertility, anti-septic, anti-oxidant potential (Shirisha *et al*., 2013). *Ficus benjamina* (Moraceae) was known to possess anti-microbial, anti-nociceptive, anti-pyretic, anti-dysentery (Mahomoodally *et al*., 2019). *Tredescantia* sp. (Commelinaceae) known to exhibit anti-cancer, anti-oxidant, anti-bacterial, anti-trypanosomal, anti-arrythmic and larvicidal activity (Tan *et al*., 2020). *Cymbopogon citratus* (Poaceae) known to possess anti-spasmodic, hypotensive, anti-convulsant, analgesic, antiemetic, anti-tussive, anti-rheumatic, anti-septic properties (Manvitha *et al*., 2014). *Tridax procumbens* (Asteraceae) known to possess anti-coagulant, anti-fungal properties (Beck *et al*., 2018).

**Summary and Conclusion**

The present study was to randomly survey the vegetation and to know the ethnobotanical value of the plant communities present in the study area and that was carried in the Thirumoorthy hills located in the Western Ghats in Tiruppur district.

The survey was carried out during the month of March – May (2022) which resulted in obtaining about 54 plants across different habits which belonged to 33 families. With the vegetation spread in the study area, there showed significant difference in the vegetation in and around the waterfalls and the stream, and area away from the waterfalls. The vegetation was dense around the waterfall region which was evergreen in habitat. Mostly evergreen trees were dominated the area. Whereas the vegetation was appeared as a semi-arid vegetation which depicted the presence of xerophytic condition around the region. Herbs and shrubs were dominant in this area with including trees of xerophytic adaptation.

With considering the dominance of the family, Leguminosae (Fabaceae) is dominant in the study area followed by Moraceae and Lamiaceae. Family Moraceae is considered to possess highly ethnobotanical value with the number of plants present and also was known through the traditional knowledge. Lamiaceae, Meliaceae, Phyllanthaceae were also considered with high medicinal value among the plants surveyed.

Many plants showed therapeutic application in treatment for fever, skin diseases, ulcers, diabetics, gonorrhoea which are the primary cause of using these plants. With consideration to the pharmacological activity reviewed through literature, many plants showed its potential in acting as anti-diabetic, anti-inflammatory, anti-cancer, anti-microbial, anti-asthmatic, anti-ulcer, anti-oxidant, anti-septic, anti-fertility activities. It showed that area was optimum for the growth of plants with high ethnobotanical and pharmacological values. Hence future studies would be continued from assessing the ethnobotanical and pharmacological application of these plants and applying it for the welfare of the living community through discovering the potential drugs and phytocompounds in these plants.

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