

## Folkloric medicinal plants commonly used by kani tribes to heal skeleto-muscular system disorders - An ethnobotanical study of Kanyakumari district, Tamil Nadu, India

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### Abstract

In an attempt to record the ethnomedicinal plants utilized by the Kani tribal settlement of the Pechiparai forest range (southern Western Ghats) in Kanyakumari district of Tamil Nadu, India, an ethnobotanical survey was carried out. The required data was put together after a direct interview of the local Kani traditional practitioners. It was deduced from the current examination that wild resources served as the major source plants in the traditional systems. A total of 59 species of medicinal plants belonging to 38 families were documented that are utilized for the treatment of skeleto-muscular system ailments such as rheumatism, headache, fatigue, bone dislocations, body heat, joints aches with inflammations and nervous conditions. The Kani tribal people's practical first-hand knowledge about the local plants and its utility is a significant practice taking into consideration the deteriorating conventional systems and traditions. Similar efforts ought to be taken to verify and assess the viability of these medicinal herbs utilized by the tribal groups.

**Keywords:** ethnobotanical, kani tribal, rheumatism, skeleto-muscular

### Introduction

The abundance of herbal knowledge that has been gathered over time is plenty in plants that are generally viewed as explicit in the treatment of specific illnesses or diseases. Knowledge of specific cures that may settle their ailment can add a lot to a prescription based on suitable activities and system support. Treating such skeleto-muscular disorders with these kinds of therapeutic plants is highly recommended as people hardly experience any side effects. The benefits that the patients receive from such treatments are direct from nature and hence trustworthy. The golden fact is that, these herbal treatments is applicable to all irrespective of age and sex factors. Indeed, even today in the vast majority of the rural areas, individuals are relying upon traditional healing systems for their essential medical services. Their dependability on just therapeutic plants is even more for individuals occupying the deep forests of Western Ghats of India. Traditional medicinal practice is the least expensive and most secure method adopted in all countries of the world especially more in developing countries.

Ethnomedical practices are ideal to a great extent as healing plants are more affordable, promptly accessible and trustworthy and they have very few side effects than present day prescriptions. A couple of reports on ethnomedicinal benefits of plants by the Kani tribals were available [1, 2, 3, 4, 5] in the adjoining areas of Kanyakumari district. A report on valuable ethnomedicinal survey in the Pachamalai hills, a part of Eastern ghats and its adjoining areas were available [6]. The aim of this investigation is to evaluate the variedness of ethnomedicinal plant species made use of by the Kani

tribals of Pechiparai forest range (southern Western Ghats) in Kanyakumari district of Tamil Nadu and to record the conventional medical practices in healing Skeleto-Muscular System Disorders.

### Methodology

The current investigation was carried out in Pechiparai forest areas of Kanyakumari district (8° 03' and 8° 35' N and 77° 15' and 77° 36' E), that is situated in the Western Ghats (Fig. 1, 2). This district encompasses an expanse of about 1684 sq km, surrounded by three Seas (Gulf of Mannar, Indian Ocean and Arabian Sea), southern Western Ghats and plains of Kerala. The annual rainfall varies from 89–254cm and maximum and minimum temperatures were 24°C–28°C in winter and 26°C–32°C in summer respectively.

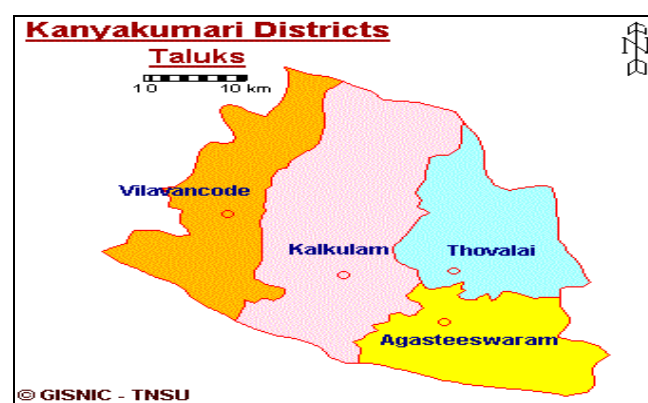


Fig 1: Vilavancode and Kalkulam Taluks in Kanyakumari District

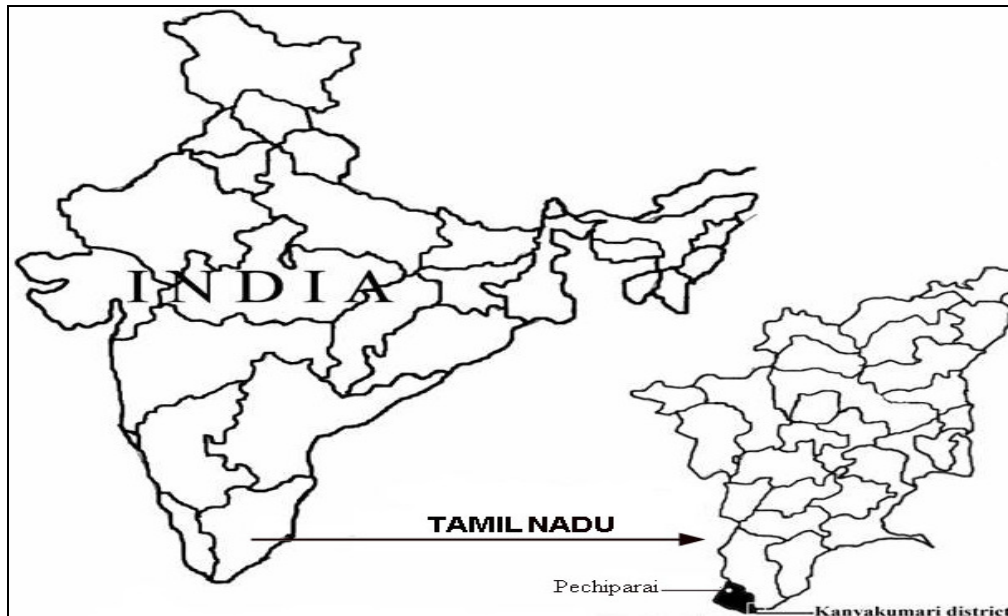


Fig 2: Location map of Pechiparai in Kanyakumari district of Tamil Nadu, India

Paddy, tapioca and oilseeds such as groundnut and coconut in addition to cash crops such as cashew, rubber, fruits and spices are produced in this district. The district of Kanyakumari can be categorized into three definite areas such as the uplands, the middle and the low lands (Kanyakumari district website). The uplands consisting of hills and hill bases is appropriate for the cultivation of plants like rubber (*Hevea brasiliensis*), cloves (*Syzygium aromaticum*), nutmeg (*Myristica fragrans*), pepper (*Piper nigrum*) and pineapple (*Ananas comosus*), etc. The Middle region consisting of plains and valleys is appropriate for the cultivation of plants like paddy (*Oryza sativa*), tapioca (*Manihot esculenta*), banana (*Musa paradisiaca*), coconut (*Cocos nucifera*), etc. The low lands comprises of the coastal belts and is best for growing coconut (*Cocos nucifera*), cashew (*Anacardium occidentale*), mango (*Mangifera indica*), tamarind (*Tamarindus indica*) etc.

The current ethnobotanical examination was regulated amongst the people of the Kani tribal settlement of the Pechiparai forest range (Klapparai, Modaramalai, Valayam Thuki, Mamalaikadu, Vilamalai, Andipothai and Puravilai villages) in Kanyakumari district during April to June 2019. By the method of direct interview of the local traditional practitioners, the required data on plants was collected. With an intensive trek across the forest range alongside the local traditional practitioners, identification of the desired plants was carried out. The then accumulated ethnomedicinal plants were further botanically identified making use of the Flora of Presidency of Madras [7] and the Flora of Tamil Nadu Carnatic [8]. Herbarium specimens were deposited at the herbarium of Department of Botany, Pachaiyappa's College, Chennai for further reference.

## Results and Discussion

### Documentation of folklore indigenous ethnomedicinal information

The present study discovered totally sixty-seven herbal medications species based on 59 traditional ethnomedicinal plants belonging to 38 families. The documentation and reports were prepared with the able aid of the native Kani Tribes at Kanyakumari district, Tamilnadu. The collected plant data is sorted alphabetically by the botanical name of

the plant followed by the local name (Tamil), family, habit, plant part used and detailed ethnomedicinal uses (Table 1). The practitioners of the Kani tribe are utilizing these plants to fix various ailments such as skin conditions, bowel issues, diabetes, urinary infections, fever, cough, cold, snakebites, ear pain, getting rid of intestinal worms, receding hairline, headache, stomach upsets, rashes, inflammations, wounds, oral health issues etc. With reference to the data and evidences published in previous studies throughout India, the needed information on the native medicinal plants for the current study was gathered. It was found that there were 38 families having medicinal values. The dominant families that exhibited great scope with respect to the count of medicinal plants in the current study are, Acanthaceae with 8 species and it is followed by Fabaceae with 6 species, Apocynaceae, Euphorbiaceae and Poaceae with 3 species each, Caesalpiniaceae, Rubiaceae and Verbenaceae with 2 species each respectively. 30 families were represented with only one species (Fig. 3).

### Habit form and plant part utilization

The current research brought to light that the Kani tribal community in Pechiparai forest range were using 59 species of plants belonging to 38 families of ethnomedicinal usage. The dominant folklore medicinal plant and the key source of folklore medicine were herbs (25) followed by shrubs (14), Trees (12), Climbing shrubs (3), Straggler (1), Twining shrub (1), Shrubby (1), Climber (1), Vine (1) (Fig. 4). The frequently used herbaceous plants among the tribal communities is a result of prosperity of herbaceous folklore medicinal plants in their surroundings [9, 5, 10, 11, 12] and Tirunelveli hills, abundantly using number of herbs as folklore medicine compared to climbers, shrubs and trees [13]. Of the different plant parts taken for study, the leaves (19) formed the majority which were used on a regular basis for the complete preparation of the medicine wholly or in proportions mixed with other plants and it was followed by whole plant (10), bark (4), root (4), fruit (3), stem (2), flower (2), seed (2), leaves and root (2), tuber (2), bulb (2), leaves and flower (1), leaves and bark (1), stem and leaves (1), corm (1), aerial root (1), aerial part (1) and shoot (1) (Fig. 5). The numerous tribal communities mostly used

leaves for the synthesis of herbal medicines [14, 15, 16, 17, 18, 12, 19, 20]. The frequent use of leaves predominantly in such preparation is because of its easy access as they are plucked simply than other parts of the plants such as flowers, bark, fruits and underground parts etc. [21] and in research point of view leaves are the most active in photosynthesis and manufacturer of primary and secondary metabolites [22].

Many different herbs can be used to support the musculoskeletal system. The present investigation comprises of 59 species of medicinal plants belonging to 38 families. Of the plants examined 16 were used to heal rheumatism, 10 plants for headache, 9 plants to treat swelling, followed by 7 plants used for treating bone fractures, 10 plants used for body pain 4 plants each for nervous disorders and Joint pains, 3 plants were used to cure paralysis under skeleto-muscular system disorders.

Majority of the native people interviewed were traditional healers accustomed with the species relating to common ailments such as rheumatism, body heat, headache, body pain, bone fractures, joint pains with swellings, nervous problems and plant medications were used on a continual basis. Similar to the other rural and tribal groups [23, 24, 25, 26, 27], the information regarding the medicinal plants was imparted from the elders and the members of the community who have an essential understanding of mode of gathering, synthesising and handling of medicinal plants to treat diseases. The current investigation demonstrates that the Pechiparai forest regions have an incredible variety of therapeutic plants with rich ethnomedicinal utilities, since this kind of study should be elevated to understand the possible utilization of their plant resources, just as a way to more readily advance essential medical services.

**Table 1:** List of plants utilized by Kani traditional practitioners at Pechiparai forest range against to heal skeleto- muscular system disorders

S. No.	Botanical Name	Local Name	Family	Habit	Plant Part Used	Ethnomedicinal Uses
1	<i>Abrus precatorius</i> L.	Kunnimuthu, Kundumani	Fabaceae	Straggler	Leaves	Leaves are pounded and made into paste and applied on painful swelling in joints.
2	<i>Aloe vera</i> (L.) Burm.f.	Chothukathazhai	Asphodelaceae	Herb	Leaves	Leaves are pounded and added with sugar and taken to reduce body heat.
3	<i>Amorphophallus paeoniifolius</i> (Dennst.) Nicolson	Kattu karunai	Arecaceae	Shrub	Corm	Corm is into paste and added with seeds of <i>Pithecellobium dulce</i> and applied externally on the affected areas for 21 days to cure swelling in the testis.
4	<i>Antidesma bunius</i> (L.) Spreng.	Thoppuli	Euphorbiaceae	Tree	Leaves	Leaves are ground into paste and applied on affected parts and massaged to treat rheumatism till it cure.
5	<i>Arachis hypogaea</i> L.	Nilakadalai, Verkadalai	Fabaceae	Herb	Seed	Oil extracted from dried seeds applied over the joints to treat joint pain.
6	<i>Atalantia monophylla</i> (L.) Corr. Serr.	Kaattu elumichai	Rutaceae	Tree	Fruit	The oil extracted from the fruit is applied externally for 30 days (two times a day) Rheumatism and Joints pain.
7	<i>Barleria cristata</i> L.	Poochimul, mulluchedi	Acanthaceae	Herb	Flower	A handful of flowers and a crab is pounced and boiled in water and filtered, the extract is taken orally to reduce body heat.
8	<i>Barleria cuspidata</i> Heyne ex Nees	Mullu Nochi	Acanthaceae	Shrub	Whole plant	Whole plant is boiled in one liter of water and reduced to 100 ml and added with neem oil, applied over the knee for 20-25 days to treat rheumatism.
9	<i>Blepharis maderaspatensis</i> (L.) Heyne ex Roth.	Murivu Porunthi Pachilai	Acanthaceae	Herb	Leaves	Leaves are ground into paste and applied externally or taken orally for 15 days to treat bone fracture and deep cuts.
10	<i>Brassica juncea</i> (L.) Czern. & Coss.	Kaduvu, Kaduku	Brassicaceae	Herb	Leaves and flower	Leaves and flowers are ground into paste and applied on the fore head to heal headache.
11	<i>Bupleurum wightii</i> Mukh.var	Kattu Geeragam	Apiaceae	Herb	Fruit	Dried fruits are soaked in water for 12 hours and boiled; the decoction is taken orally to reduce body heat.
12	<i>Calotropis gigantea</i> (L) R.Br.	Arkkam, Erukku	Asclepiadaceae	Shrubby	Leaves	Leaves are slightly heated and placed on the swelling area of the legs and tied with a cloth to heal Swelling in legs.
13	<i>Canabis sativam</i> L.	Kanjavu, Kanja	Cannabaceae	Herb	Leaves	Dried leaves are boiled in water and the extract is applied over the affected areas to treat nervous problems for 7 days to cure nervous disorders.
14	<i>Cardiospermum halicacabum</i> L.	Uzhinja, Mudakkurathan	Sapindaceae	Climber	Leaves	Leaves are boiled in coconut oil and applied on the body to cure for twice a day (morning and evening) for 10-15 days to heal rheumatism and pain.
15	<i>Cassia fistula</i> L.	Kattu Konnai, Sarakkondrai	Caesalpiniaceae	Tree	Bark	Fresh bark is pounded and boiled in water and the decoction is taken orally for body pain.
16	<i>Cissus quadrangularis</i> L.	Piranda, Pirandai	Vitaceae	Shrub	Stem	Stem or Root is ground into paste, boiled in coconut oil and tied up on fractures area for 30 days to cure bone fracture.
17	<i>Cleome viscosa</i> L.	Kattu Kaduku, Naikkadugu	Capparidaceae	Herb	Leaves	Leaves are ground into paste, boiled with little coconut oil and applied on the fore head to cure headache.

18	<i>Clerodendrum inerme</i> (L.) Gaertn.	Changanguppy, Changukuppy	Verbenaceae	Shrub	Whole plant	Root, stem and leaves are cut into pieces, boiled in water and used for bathing to treat once in a day for 30 days to treat Rheumatism.
19	<i>Clerodendrum phlomidis</i> L.f.	Vathamudakki, Thazhuthaazhai	Verbenaceae	Shrub	Leaves and root	Fresh leaves and roots are boiled in coconut oil and applied over the knee joints for 30 days to treat Paralysis, Joints pain with swelling.
20	<i>Clitoria ternatea</i> L.	Kakkalam, Neela Kakkalam, Sangupoo	Fabaceae	Vine	Leaves	Leaves of the plant are ground into paste, mixed with the albumin of hen egg and applied on the knee for 15 days to treat rheumatism.
21	<i>Coffea Arabica</i> L.	Coffee	Rubiaceae	Shrub	Leaves	Leaves are added with leaves of <i>Mangifera indica</i> and <i>Azadirachta indica</i> are boiled, the steam is inhaled to treat headache.
22	<i>Coleus amboinicus</i> Lour	Navara Pachilai, Karpuravalli	Lamiaceae	*Herb	Leaves	Juice extracted from leaves is boiled with equal amount of coconut oil and applied on the head to cure longstanding headache.
23	<i>Crinum asiaticum</i> L.	Thyvazhai	Amaryllidaceae	Herb	Bulb	Bulb is made into paste and applied on the affected parts of thigh and tied with cloth to treat painful swelling in thigh.
24	<i>Crotalaria verrucosa</i> L.	Kelukeluppai	Fabaceae	Shrub	Leaves	Leaves are ground into paste and applied over the swelling parts of the leg to heal.
25	<i>Cymbopogon citratus</i> (DC.) Stapf	Tharuppai, Chukkunaripul	Poaceae	Shrub	Leaves and root	Root is added with leaves of <i>Adhatoda vasica</i> and boiled in water, cooled to a moderate temperate and used for bathing for 15 days to curing rheumatism and body pain.
26	<i>Cynodon dactylon</i> (L.) Pers.	Aruvampul, Arugampullu	Poaceae	Herb	Leaves	Paste of leaf is added with albumin of hen egg and applied over the part of the fractured bone to heal soon.
27	<i>Cyperus rotundus</i> L.	Muttankai kizanghu, Korai, Korai kizanghu	Cyperaceae	Herb	Tuber	Paste of rhizome is mixed with little jaggery and take orally to reduce body heat.
28	<i>Ecbolium viride</i> var. <i>viride</i>	Kattu Kanakambaram	Acanthaceae	Shrub	Leaves	Leaves are boiled in water and taken orally for joint pain.
29	<i>Elettaria cardamomum</i> (L.) Maton, var.	Elakkai, Yelam	Zingiberaceae	Herb	Fruit	Dried fruit are soaked in water for 12 hours and the decoction is taken orally to reduce body heat.
30	<i>Ervatamia heyneana</i> (Wall.) T. Cooke	Kundalam Palai	Apocynaceae	Tree	Bark	Bark of the plant and whole plant of <i>Cardiospermum haliacabum</i> is boiled in 2 liter of water, reduced to 100 ml, added with neem oil and applied over the knee for 48 days to treat rheumatism.
31	<i>Eucalyptus globulus</i> Labill.	Thailmaram, Eucaly,	Myrtaceae	Tree	Leaves and bark	Oil extracted from the leaves and bark is applied for body pain and headache.
32	<i>Ficus benghalensis</i> L.	Alamaram	Moraceae	Tree	Aerial root	Paste of aerial roots added with albumin of hen egg and applied externally and tied around the fractured area for 15 days to heal bone fracture.
33	<i>Hemidesmus indicus</i> (L.) R. Br.var.	Narunatti, Nannaari	Periplocaceae	Twining shrub	Root	Paste of root is applied over swellings and rheumatic pains.
34	<i>Hopea parviflora</i> Bedd.	Kunthirikkam, Pongu, Kongu	Dipterocarpaceae	Tree	Bark	Shade dried bark is powdered and made into paste; added with little coconut oil and applied on swellings due to cramps and sprains.
35	<i>Hybanthus enneaspermus</i> (L.) F.v. Muell.	Orilaitthamarai, Orithalthamarai	Violaceae	Herb	Whole plant	Whole plant is ground into paste and mixed with little coconut oil and applied on the zenith of the head for cooling effect.
36	<i>Hygrophila schulli</i> (Hamilt.) M.R. Almeida & S.M. Almeida	Neermulli	Acanthaceae	Herb	Leaves	Leaves and roots are ground into paste, mixed with coconut oil and applied for rheumatism.
37	<i>Indoneesiella echiioides</i> (L.) nees.	Saamipul	Acanthaceae	Herb	Aerial part	Arial part of the plant is ground into paste and applied over the forehead to treat headache.
38	<i>Jasminum grandiflorum</i> L.	Pitchi, Kodimalli	Oleaceae	Climbing shrub	Root	Roots of the plant along with rhizome of <i>Zingiber officinale</i> is ground, mixed with neem oil, boiled and applied externally for bone fractures and swellings.
39	<i>Justicia adhatoda</i> L.	Adhathoda	Acanthaceae	Shrub	Leaves	Leaves are slightly heated up and placed over the knee and tied with a strip of cloth to treat rheumatism.
40	<i>Justicia gendarussa</i> Burm.f.	Vattamkolli, Neernochoi	Acanthaceae	Shrub	Stem and leaves	Stem and leaves are boiled with extract of exocarp of tender coconut and the decoction is taken orally to treat rheumatism. Paste of grounded leaves is mixed with albumen of hen egg, applied over the fractured bone. Paste of grounded whole plant is taken orally for paralysis; applied over fore head for headache.
41	<i>Mimusops elengi</i> L.	Elanji, Magizhil,	Sapotaceae	Tree	Flower	Shade dried flowers are powered, mixed with butter

		Magizham Maram				milk and taken orally for tiredness and body heat and inhaled for headache.
42	<i>Naregamia alata</i> Wight & Arn.	Nilavilathi, Nilanarakam	Meliaceae	Herb	Whole plant	Whole plant along with leaves of <i>Moringa pterygosperma</i> is pounded, mixed with a cup of milk, boiled and taken orally for 48 days to heal rheumatism.
43	<i>Nelumbo nucifera</i> Gaertn.	Thamarai, Ambal	Nelumbonaceae	Herb	Tuber	Tuber is pounded, boiled in gingili oil, filtered and applied over the head for cooling effect.
44	<i>Vigna mungo</i> (L.) Hepper	Uzhunthu	Fabaceae	Herb	Seed	Powdered seed are added with albumin of hen egg; the paste is applied over the fractured portion of bone for 15 days to heal bone fracture.
45	<i>Phyllanthus amarus</i> Schum and Thonn.	Kizha Nelli	Euphorbiaceae	Herb	Whole plant	The whole plant is ground with rhizomes of <i>Curcuma aromatica</i> , made into paste, applied externally for body pain and swellings caused by injury.
46	<i>Pterocarpus marsupium</i> Roxb.	Vengai	Fabaceae	Tree	Stem	Paste of fresh stem is boiled with neem oil apply for 21 days to treat rheumatism.
47	<i>Ricinus communis</i> L.	Amanakku	Euphorbiaceae	Shrub	Leaves	Paste of slightly heated leaves is applied for 20-25 days to heal rheumatism.
48	<i>Santalum album</i> L.	Sandanam	Santalaceae	Tree	Shoot	Wood paste is applied over Wood powder is apply to the body to reduce body heat, and applied on forehead for head ache.
49	<i>Saraca asoca</i> (Roxb.) Willd.	Asoka, Asokam	Caesalpiniaceae	Tree	Bark	Powder of the shade dried bark is added with coconut oil, boiled and applied for 21 days to heal bone fractures.
50	<i>Sida cordifolia</i> L.	Nilatutthi	Malvaceae	Shrub	Leaves	Paste made from leaves is added with common salt and applied over the swelling in legs.
51	<i>Smilax zeylanica</i> L.	Parangi Chakkai, Kattukodi, Karuvilanchi	Smilacaceae	Climbing shrub	Root	Decoction of boiled roots is taken orally for 15 days to cure rheumatism.
52	<i>Solanum nigrum</i> L.	Kuttathi, Manathakkali	Solanaceae	Herb	Whole plant	Extract of whole plant is added with honey and taken orally for heat troubles.
53	<i>Spermacoce hispida</i> L.	Naththai Chedi	Rubiaceae	Herb	Whole plant	Paste prepared from whole plant is and applied on the head for headache.
54	<i>Tabernaemontana divaricata</i> (L.) R. Br. Roem. & Schult.	Nandiyavatti, Nandiyavattam	Apocynaceae	Shrub	Root	Paste prepared from root is applied and massaged for paralysis.
55	<i>Tinospora cordifolia</i> (Willd.) Miers	Kattu Payaru, Seenthal Kodi	Menispermaceae	Climbing Shrub	Whole plant	Decoction of boiled whole plant is taken orally or added with neem oil and applied externally for 15 days to heal rheumatism.
56	<i>Urginea indica</i> (Roxb.) Hook.ex.G.Don	Kattu ulli, Nari Vengayam	Hyacinthaceae	Herb	Bulb	Smashed bulb is added with water, heated and taken bath regularly; paste prepared from the leaves and bulbs is applied over the knees to treat rheumatism.
57	<i>Vetiveria zizanioides</i> (L.) Nash	Vetti veer	Poaceae	Herb	Whole plant	Whole plant is boiled in pure water and the decoction is taken orally to cure rheumatism and body heat.
58	<i>Wedelia chinensis</i> (Osbeck) Merr.	Manjal karisalai, Manjal Karisalamkanni	Asteraceae	Herb	Whole plant	Whole plant is ground into paste and applied on the forehead to heal headache.
59	<i>Wrightia tinctoria</i> (Roxb.) R. Br.var.rothii (G.Don) Hook.f.	Palai, Vetpalai	Apocynaceae	Tree	Leaves	Paste prepared from leaves is applied externally over the swellings to heal.

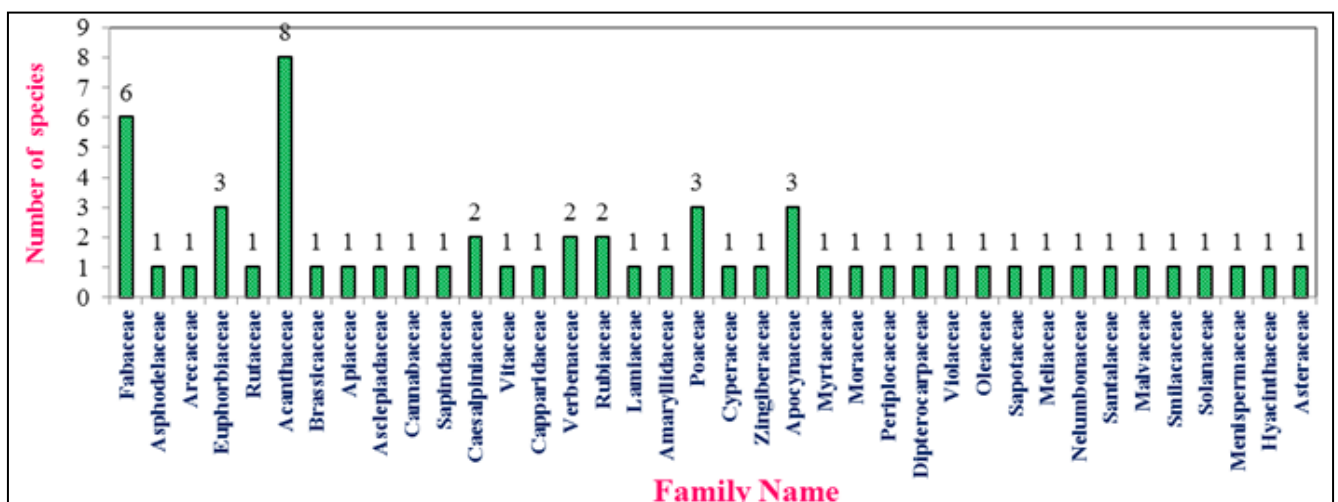


Fig 3: Name of the families with respective plant species at Kani tribal people in Pechiparai forest range

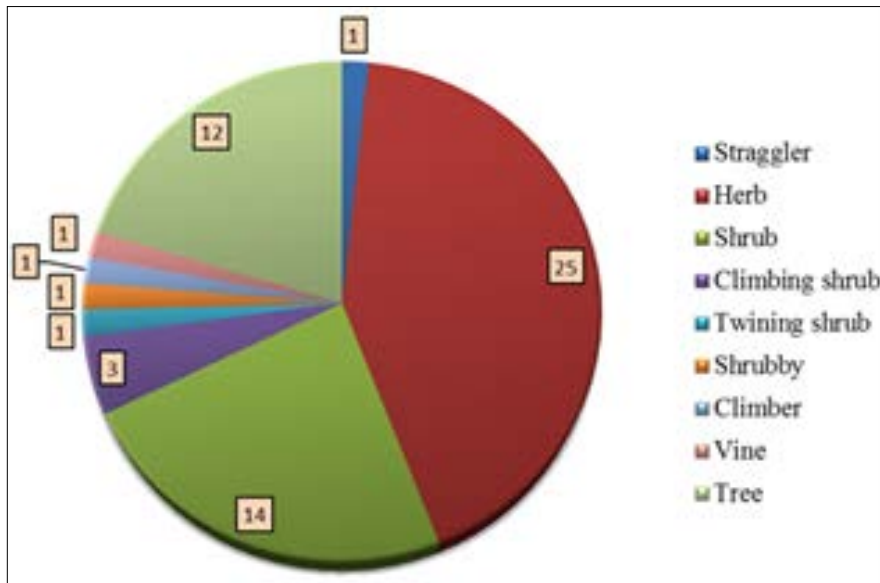


Fig 4: Distribution of plants under different habits at Kani tribal people in Pechiparai forest range

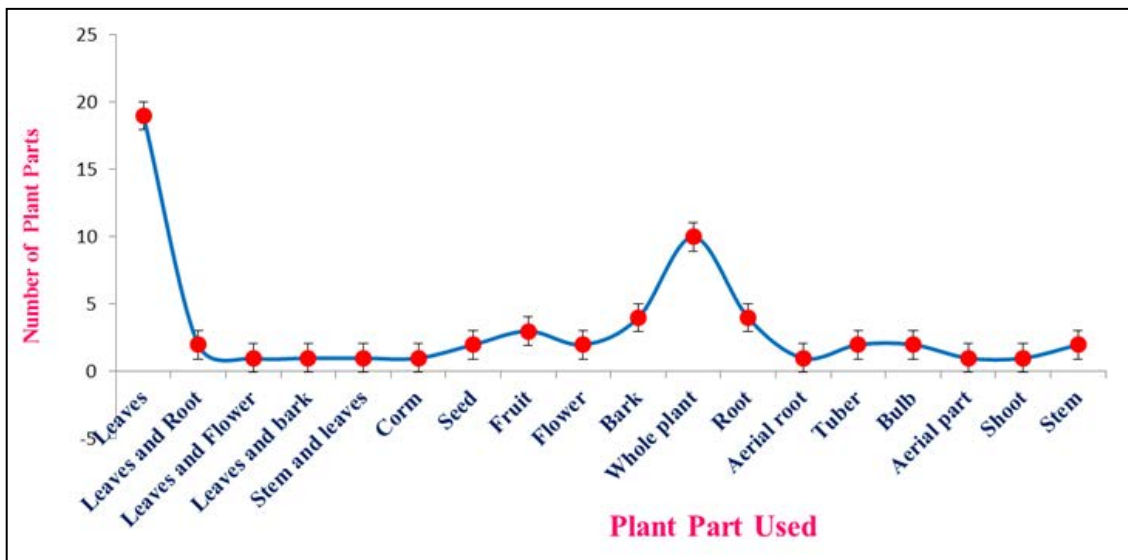


Fig 5: Plant part utilization at Kani tribal people in Pechiparai forest range

**Conclusion**

The current examination revealed that folklore medicines and information on the plants and their therapeutic properties were still used by the Kani native people. Since herbs are a part of nature in itself, its usage in treatments is only beneficial as they are devoid of any side effects, safe in usage and easily accessible. Generally a great deal of herbs are utilized for the treatment of different afflictions identified with various seasons. There is a need like never before to promote and generate awareness on these plants to safeguard human lives. These home grown entities today stand as the symbol of good life in contrast to the engineered drugs that are believed to be hazardous to individuals and the environment. The synthetic drugs of present day outperformed the herbs despite the fact that herbs have been evaluated for their medicinal, flavouring and aromatic characteristics for quite a long time. However, the blind run behind these synthetic drugs has come to an end and people are reverting to the natural medicines hoping for wellbeing and safety. It's high time to let people around the world know about them.

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**Conflict of interest**

We declare that we have no conflict of interest.

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