Ethnobotanical Survey of Medicinal Plants in kalrayan hills, Eastern Ghats, Tamil Nadu

S. Manikandan*, G. M. Alagu Lakshmanan
Department of Botany, Annamalai University, Annamalai Nagar - 608 002, Tamil Nadu, India
*E-mail address: gsmani143@gmail.com

ABSTRACT
An ethnomedicinal survey among the kalrayan hills, Salem district, Tamil Nadu during September 2010 to February 2012. A total of 64 species of ethnomedicinal plants belonging to 34 families and 10 species of ethno veterinary plants belonging to 10 families were reported with the help of standard flora among local healers, village head man and elderly tribal persons. The medicinal plants used by village people, tribal and are arranged alphabetically followed by botanical name, family name, local and English name and their therapeutic uses.

Keywords: Ethnomedicine; Ethnoveterinary plants; kalrayan hills; Tamil Nadu

1. INTRODUCTION
India is a veritable emporium of medicinal and aromatic plants. It has been estimated that out of 15,000 higher plants occurring in India, 9,000 are commonly useful, of which 7,500 are medicinal, 3,900 are edible, 700 are culturally important, 525 are used for fibre, 400 are fodder, 300 for pesticide and insecticide, 300 for gum, resin and dye and 100 for incense and perfume. In terms of the plant materials for traditional medicine, it is estimated that local communities has used over 7,500 plants species. Indian flora has innumerable medicinal plants, which are collected from forest by the tribal villagers. Many of them are being exported to the developed countries. Since ancient time, mankind depended mainly on the plant kingdom to meet its need for medicine, fragrance and flavours. Indian sub-continent is blessed with most varied and diverse soil and climatic conditions, which are suitable for the growth of almost every plant species. Medicinal and aromatic plants and their derivatives to the tune of nearly Rs 200 crores are produced annually in the country. Apart from meeting its domestic requirement, the country exports large quantities of medicinal and aromatic plants and derivatives. There is a considerable scope for India to contribute towards the increasing worldwide demand for medicinal and aromatic plant products. Usage of plants in medicine had been a long practice by man from ancient times. This practice of using plants in medicine is still prevailing not only among the tribals and others living in the rural areas.
2. MATERIALS AND METHODS

2. 1. Study area

The kalrayan hills is located in the Eastern Ghats range of eastern coast and situated diagonally south east towards Salem in the Villupuram District of Tamil Nadu. The total area is 1000 square kilo metres.

The latitude and longitude are N 11°38’ and 12°01’ and E 78°37’ and 78°51’ respectively. The hills range from 2000-3000 feet from sea level. This hills present along with Pachamalia, Javadi and Shevaroy hills. The Kalrayan hills divided into two sections such as Northern (Little Kalrayan) and Southern (Big Kalrayan) sections. The Northern Kalrayan average 2100 feet in height while the southern kalrayan average 3000 feet. Some streams are along with hills. They are Manimuktar, Gomuki and Mayura. The most prevalent soil type in this hill ranges from Red loam to black clay is the soil.

The annual temperature in summer seasons (April-June) is 40 °C and also in winter seasons (November-January) is 11 °C. Total annual rainfall recorded 971 mM at Kallakurichi. According to 2005 census, the population of Kalrayan hills exceeded more than 1,45,000. In which the children population 60,000.

The Male population 40,000 and the women population 45,000. There are three major types of tribal peoples are living in this area such as Ariya gounder, Kurumba gounder and Jadaya gounder, and who are basically agriculturalists and rearing domestic animals such as cow, goat, sheep, buffalo and pigs. Major livelihoods of tribals are cattle farming, agriculture, Collection of fuel wood and forest resources such as herbal medicines, honey and some edible fruits and tubers from the nearby forests.

2. 2. Methodology

Field trips ranging from 2 days to a week were made in the study area in every month of the year of study (September 2010 to February 2012) in the Kalrayan hills. The interviews were conducted in the local language in Tamil. Ethnoveterinary information included with the local name of the particular plant, parts utilized, medicinal uses and methods of preparation and administration. The collected ethnoveterinary information was recorded on field note books and plants were identified using the Flora of the Presidency of Madras (J S Gamble 1935), Flora of Tamil Nadu (A. N. Henry and N. C. Nair) and Flora of Tamil Nadu Carnatic (Matthew 1983).

Ethnoveterinary information was gathered from all categories of village people such as the local healers village, head man, elderly persons and the person having a through knowledge of veterinary practices. Some of the commonly occurring veterinary disease were cross checked and conformed with the officials of the local veterinary department. The information gathered from one place was confirmed by different communities of village people, tribals and ethnic group in different places of investigation.

2. 3. Herborization

All the species cited as medicinal plants were collected from the field at reproductive stage, with the help of informants in duplicate. A field sheet was recorded with collectors name, vernacular name, local name and ecological parameters. The herbarium samples were dried, processed, identified taxonomically and the names were confirmed with the help of standard flora.
3. RESULTS AND DISCUSSION

The present study revealed that the local people of Kalrayan hills, Salem district, Tamil Nadu, were using 64 species of medicinally important plants belonging to 60 genera and 34 families (Table 1). These medicinally important plants were categorized into five major types. They are herbs (28), shrubs (6), climbers (2) and trees (28). The most medicinally important species were observed in Fabaceae (6), Euphorbiaceae (5) and Rutaceae (4) family. These are commonly occurring medicinally important plants used to treat 62 types of diseases, and the common diseases like cold, cough, fever, asthma, tuberculosis and as an antidote for poison and in wound healing.

This is the constant with the other general observation which has been reported earlier in relation to medicinal plant studies by the Indian traditional system of medicine like Siddha and Ayurveda (Kirtikar and Basu, 2001; Gogte 2000, Anonymous 1992).

| Plant Name                  | Family            | Local Name  | English Name     | Parts Used | Therapeutic uses                                      |
|-----------------------------|-------------------|-------------|------------------|------------|------------------------------------------------------|
| Abrus precatorius L.        | Fabaceae          | Kuntrinmani | Crab’s Eye       | Root       | Bronchitis, fever, hepatitis                          |
| Abutilon indicum D.         | Malvaceae         | Thuthi      | CountryMallow    | Leaves     | Dysentery, jaundice, piles, ulcer                     |
| Aegle marmelos L.           | Rutaceae          | Vilvam      | Bael tree        | Leaves, Fruit | Blood sugar reduction, Skin boils, Diabetics, Cold and cough. |
| Albizia lebbeck L.          | Fabaceae          | Vaagai      | Siris tree       | Bark, Leaves, Seed | Toothache, Antidote, Eye diseases                   |
| Aristolochia bracteolata Lam. | Aristolochiaceae | Aduthinnappalai | Bracteated Birthwort | Root | Decoction of roots is used to cure stomach pain. |
| Artocarphus heterophyllus L. | Moraceae          | Pala        | Jack fruit       | Root, Leaves | Skin diseases, Ulcer, Asthma                        |
| Asparagus recemosus W.      | Liliaceae         | Thannervitan kizhangu | Indian asparagus | Root | Diarrhoea, cough, bronchitis                           |
| Borassus flabellifer L.     | Arecaceae         | Panai       | Palmyra Palm     | Root, young rachis | Toothache, toothbrush                               |
| Borroria verticillata L.    | Rubiaceae         | Nathaisoori | Shaggy Button Weed | Root | Leucorrhoea                                          |
| Butea monosperma L.         | Fabaceae          | Purasu      | Flame of the Forest | Seeds | Ringworm                                             |
| Calamus rotang L.           | Arecaceae         | Pirambu     | Rattan           | Tuber | Cold, Cough and Fever                                |

Table 1. Ethnomedicinal plants used by tribals of kalrayan hills in salem district, Tamilnadu.
| Plant Name | Family | Part Used | Medical Uses |
|------------|--------|-----------|--------------|
| Calotropis procera | A. | Earukku, Velleruku, Milk Weed, Bark, Flowers | Dysentry, Cold, Cough and Asthma |
| Calophyllum inophyllum L. | | Punai, Indian Laurel, Seeds | Scabies |
| Capparis divaricata L. | | Thoratti, Indian Caper, Bark, Leaves | Dysentery, Stomach Problems |
| Cardiospermum halicacabum L. | | Mudakkaruthaan, Ballon Vine, Leaves | Plant leaf extract reduces body pain and decoction of whole plant is used for curing rheumatism. |
| Cassia auriculata L. | | Aavarai, Tanner’s Cassia, Young stem, Leaves | Toothbrush, Stomach ulcer. |
| Cassia fistula L. | | Konrai, Golden Shower, Young leaves | Foetid smell of mouth. |
| Cissampelos pareira L. | Menispermaceae | Ponmusutai, Velvet-Leaf Pareira, Root, leaves | Fistula, Antidote, Blood purification |
| Cissus quadrangularis L. | Vitaceae | Pirantai, Adamant Creeper, Whole plant | Stem and leaf paste used to cure bone fracture and root paste used for gas trouble. |
| Clausena dentate | Rutaceae | Aana, ---, Fruit | Rarely edible |
| Coccinia grandis (L.) Voigt | Cucurbitaceae | Kovai, Ivy-Gourd, Whole plant | Leaves juice taken for internally for ulcer. |
| Dodonaea viscosa J. | Sapindaceae | Virali, Jamaica Switch Sorrel, Leaves | Wounds, Swelling |
| Euphorbia hirta L. | Euphorbiaceae | Amman patcharisi, Pill-bearing Spurge, Leaves, flower, fruits | Asthma, respiratory infections |
| Evolvulus alsinoides L. | Convolvulaceae | Vishnukaranthai, ---, Whole plant | Brain disorders, epilepsy, nervous problems |
| Ficus mollis V. | Moraceae | Kal-Athi, ---, Bark | Urinary infections |
| Ficus religiosa L. | Moraceae | Arasu, Bot-tree, Leaves | Latex is given to children in fever and dullness. |
| Garcinia indica C. | Guttiferae | Pazhampuli, Kokam Butter tree, Leaves | Cosmetic ingredients |
| Gmilina arborea | Verbinaceae | Kumala, Candahar tree, Root Bark | Impotency, Prolong coitus time. |
| Indigofera tinctoria L. | Fabaceae | Avuri, Neeli, Indigo, Leaves | Used in bronchitis, dry cough, respiratory infections, tuberculosis. |
| Plant Name                  | Family       | Part Utilized                                                                 | Description                                                                 |
|----------------------------|--------------|-------------------------------------------------------------------------------|-----------------------------------------------------------------------------|
| *Ixora bractiata* L.       | Rubiaceae    | Thetti, Root Bark                                                              | Root bark paste with coconut pulp applied for inflammation.                |
| *Jatropha curcas* L.       | Euphorbiaceae| Kaatu-amanakku, Whole plant                                                   | Roots are poultice for fractures, Seeds are purgative treats diarrhoea.     |
| *Limonia acidissima* L.    | Rutaceae     | Vila, Bark                                                                    | Insect bites, diarrhoea, dysentery, snake bite.                             |
| *Macaranga peltata* L.     | Euphorbiaceae| Vaadha neeki, Wood                                                            | As cheap timber.                                                            |
| *Madhuca longifolia* L.    | Sapotaceae   | Iluppai, South Indian Mahua                                                   | Skin diseases                                                              |
| *Mangifera indica* L.      | Anacardiaceae| Maa, Mango, Bark                                                              | Gargle for mouth ulcer, foetid smell.                                      |
| *Melia azedarach* L.       | Meliaceae    | Malai vembu, Persian Lilac, Leaves, Seed oil, bark                            | Small box, viral fever, skin infections, bark extracts to control women hormone problems, antiseptic. |
| *Melothria maderaspatana* L.| Cucurbitaceae| Musumusukai, Leaves                                                           | Allergic, Asthma                                                           |
| *Michelia champaca* L.     | Magnoliaceae | Senpagam, Golden Champa                                                        | Bark, Leaves, Flowers.                                                     |
| *Mimosa pudica* L.         | Mimosaceae   | Thottasuringi, Sensitive plant, Leaves                                         | Used to Blood purifier, diarrhoea, dysentery.                               |
| *Mimusops elengi* L.       | Sapotaceae   | Mahizham, Spanish-Cherry, Bark, Leaves, Flowers                               | Toothache, Uterus problems                                                 |
| *Mucuna puriens* L.        | Fabaceae     | Poonaiicali, Horse-eye Bean                                                   | Male sterility, Nervous diseases                                            |
| *Murraya paniculata* L.    | Rutaceae     | Kattu karuveppilai, ---                                                       | Root, Leaves                                                               |
| *Ocimum sanctum* L.        | Lamiaceae    | Thulasi, Sacred Basil                                                         | Common cold, weakness, stress, to treat coughs in children.                |
| *Pergularia daemia* (Forrsk.) Chiov. | Asclepiadaceae | Uthamani, Hairknot Plant                                                      | Leaves juice used for urinary problems, fever, asthma and gas trouble.    |
| *Phoenix sylvestris* L.    | Arecaceae    | Echam, Wild Date Palm                                                         | Toothache                                                                  |
| Plant Name                        | Family         | Part Used          | Use                                      |
|----------------------------------|----------------|--------------------|------------------------------------------|
| **Phyllanthus amarus** Schum. & Thonn. | Euphorbiaceae | Kizha-Nelli        | Whole Plant                              |
| **Phyllanthus emblica L.**       | Euphorbiaceae  | Nelli              | Root, Bark, Leaves, Fruits               |
| **Piper betle L.**               | Piperaceae     | Vetrilai           | Betel pepper, Leaves                     |
| **Portulaca quadrifida L.**      | Portulacaceae  | Siru pasalai keerai| Leaves                                  |
| **Pterocarpus marsupium L.**     | Fabaceae       | Vengai             | Indian Kino tree, Bark, Flowers, Gum     |
| **Phyllanthus emblica L.**       | Euphorbiaceae  | Nelli              | Root, Bark, Leaves, Fruits               |
| **Piper betle L.**               | Piperaceae     | Vetrilai           | Betel pepper, Leaves                     |
| **Portulaca quadrifida L.**      | Portulacaceae  | Siru pasalai keerai| Leaves                                  |
| **Pterocarpus marsupium L.**     | Fabaceae       | Vengai             | Indian Kino tree, Bark, Flowers, Gum     |
| **Phyllanthus emblica L.**       | Euphorbiaceae  | Nelli              | Root, Bark, Leaves, Fruits               |
| **Piper betle L.**               | Piperaceae     | Vetrilai           | Betel pepper, Leaves                     |
| **Portulaca quadrifida L.**      | Portulacaceae  | Siru pasalai keerai| Leaves                                  |
| **Pterocarpus marsupium L.**     | Fabaceae       | Vengai             | Indian Kino tree, Bark, Flowers, Gum     |
| **Piper betle L.**               | Piperaceae     | Vetrilai           | Betel pepper, Leaves                     |
| **Portulaca quadrifida L.**      | Portulacaceae  | Siru pasalai keerai| Leaves                                  |
| **Pterocarpus marsupium L.**     | Fabaceae       | Vengai             | Indian Kino tree, Bark, Flowers, Gum     |
| **Phyllanthus emblica L.**       | Euphorbiaceae  | Nelli              | Root, Bark, Leaves, Fruits               |
| **Piper betle L.**               | Piperaceae     | Vetrilai           | Betel pepper, Leaves                     |
| **Portulaca quadrifida L.**      | Portulacaceae  | Siru pasalai keerai| Leaves                                  |
| **Pterocarpus marsupium L.**     | Fabaceae       | Vengai             | Indian Kino tree, Bark, Flowers, Gum     |
| **Phyllanthus emblica L.**       | Euphorbiaceae  | Nelli              | Root, Bark, Leaves, Fruits               |
| **Piper betle L.**               | Piperaceae     | Vetrilai           | Betel pepper, Leaves                     |
| **Portulaca quadrifida L.**      | Portulacaceae  | Siru pasalai keerai| Leaves                                  |
| **Pterocarpus marsupium L.**     | Fabaceae       | Vengai             | Indian Kino tree, Bark, Flowers, Gum     |
| **Phyllanthus emblica L.**       | Euphorbiaceae  | Nelli              | Root, Bark, Leaves, Fruits               |
| **Piper betle L.**               | Piperaceae     | Vetrilai           | Betel pepper, Leaves                     |
| **Portulaca quadrifida L.**      | Portulacaceae  | Siru pasalai keerai| Leaves                                  |
| **Pterocarpus marsupium L.**     | Fabaceae       | Vengai             | Indian Kino tree, Bark, Flowers, Gum     |

In other side most of the local healers and peoples are using the ethnoveterinary medicinal species (Table 2) such as *Cassia tora* L. (*Ceasalpinaceae*), *Cissus quadrangularis*. 
L. (Vitaceae), *Citrullus colocynthis* L. (Cucurbitaceae), *Dalbergia latifolia* Roxb. (Fabaceae), *Dendrocalamus strictus* Nees. (Poaceae), *Lannea coramandalica* Merr. (Anacardiaceae), *Leucas aspera* L. (Lamiaceae), *Pedalium murex* L. (Pedaliaceae), *Taddalia asiatica* Lam. (Rutaceae) and *Wattakaka volubilis* L. (Asclepiadaceae). These plants were used for the treatment of skin diseases, fever, cough, worms and swellings in cow, goat and pigs.

### Table 2. Ethnoveterinary plants and their therapeutic uses.

| Botanical Name | Family             | Local Name | English Name          | Animals treated | Therapeutic Uses                                                                 |
|----------------|--------------------|------------|-----------------------|-----------------|-----------------------------------------------------------------------------------|
| *Cassia tora* L. | Ceasalpinaceae     | Usithagarai | Sickle Senna          | Cow, goat       | Seed is mixed with water and ground into paste and applied topically to cure skin diseases. |
| *Cissus quadrangularis* L. | Vitaceae          | Pirantai   | Adamant Creeper       | Goat            | Leaves are ground with pepper and garlic and made into a decoction. The decoction is given to cure fever. |
| *Citrullus colocynthis* L. | Cucurbitaceae     | Varikurumathai | Colocynth Bitter Apple | Cow, goat       | Root is ground with water and the decoction obtained is given to cure cough.       |
| *Dalbergia latifolia* Roxb. | Fabaceae          | Eettimaram | East Indian Rosewood  | Cow, goat       | Stem bark is ground with garlic and pepper and the mixture is given for the animals which are lazy in grazing. |
| *Dendrocalamus strictus* Nees. | Poaceae           | Kalmungil  | ---                   | Cow             | Roasted fruits are given once a day to treat dysentery and cough until cure.         |
| *Lannea coramandalica* Merr. | Anacardiaceae     | Uthiyamaram | ---                   | Pigs            | Stem bark is ground with ginger and garlic and the paste is given to cure fever.    |
| *Leucas aspera* L. | Lamiaceae          | Thumbai    | White Dead Nettle     | Cow             | The leaf juice used to cure cut wounds and worms                                   |
| *Pedalium murex* L. | Pedaliaceae        | Perunerunjil | Caltrops             | Cow             | Leaf is ground with ginger and common salt and given to cure fever                 |
| *Toddalia asiatica* Lam. | Rutaceae          | Milagaranai | Forest Pepper         | Cow, goat       | Leaf is mixed with onion, pepper and garlic, ground into a paste and given to cure swellings. |
| *Wattakaka volubilis* (L. f.) Stapf. | Asclepiadaceae    | Perunkurinjan | ---                   | Cow, goat       | Leaf paste is mixed with common salt and applied on affected places to treat all types of swellings. |
Different types of preparations were made from medicinally important plants include decoction, juice, powder, oil, paste and whole plant extract. Some plants were even used in more than one form of preparations. Majority of the plants preparation were in the form of decoction obtained from the roots, seeds, stems, leaves and flowers. In this, the leaves are the predominant part utilized in ethnomedicinal treatments.

**Ethnomedicinal Plants - Useful Parts (%)**

- Root: 34%
- Tuber: 7%
- Stem: 7%
- Bark: 16%
- Leaves: 14%
- Flowers: 1%
- Fruit: 2%
- Seed: 2%
- Wood: 2%
- Gum: 1%
- Whole Plant: 2%

**Ethnoveterinary Plants - Useful Parts (%)**

- Root: 50%
- Stem: 20%
- Leaves: 10%
- Fruit: 10%
- Seed: 10%
4. CONCLUSIONS

Tribal knowledge of plants in many tribal communities is changing because of rapid socioeconomic and cultural changes. Documentation of this knowledge is valuable for the communities and their future generations and for scientific consideration of wider uses of traditional knowledge in treating domestic animals. The low cost and almost no side effects of these traditional preparations with medicinal plants make them adaptable by the local community. The wealth of this tribal knowledge of medicinal plants points to a great potential for research and the discovery of new drugs to cure the diseases of animals. So, further scientific assessment of these medicines for phytochemical, biological and pre-clinical and clinical studies is, however, greatly needed.

Basically, medicinal plants play an important role in providing knowledge to the researches in the field of ethnobotany and ethnopharmacology. The observations of present study showed that traditional medicine plays a significant role among the local healers and people of kalrayan hills.

References

[1] Anonymous, Ethnobotany in India, A Status report, All India coordinated research project in ethnobotany, Ministry of Environment Forests, Government of India, New Delhi, 1994.
[2] Anonymous, Annual Report, Indian Council of Forestry Research and Education, Dehradun, 1992-1993, 193-207.
[3] Anonymous, Envis Newslett 1(2) (2002) 5.
[4] Anonymous, The Useful Plants of India, Publications and Information Directorate, New Delhi, 1992.
[5] Anonymous, Ethnobotany in India, A Status report, All India coordinated research project in ethnobotany, Ministry of Environment Forests, Government of India, New Delhi, 1994.
[6] Gamble J. S., Fischer C. E. C., The flora of the Presidency of Madras, Reprinted Edition, Vol. I-III, (Botanical Survey of India, Calcutta), 1959.
[7] Henry A. N., Kumari G. R., Chitra V., Flora of Tamil Nadu, India, Series I, Vol II & III, Botanical Survey of India, Southern Circle, Coimbatore, 1987.
[8] Nair N. C., Henry A. N., Flora of Tamil Nadu, India, Series I, Vol I, Botanical Survey of India, Southern Circle, Coimbatore, 1983.
[9] Mathew K. M., An excursion flora of Tamil Nadu, India, Oxford and IBH Publishing Co. Ltd., New Delhi, 1991.
[10] Jain S. K., Goel A. K., A Manual of Ethnobotany, (ed.) S K Jain, (Scientific Publishers, Jodhpur), 1995; 142.
[11] Binu Thomas A., et al, Int. Journal of Biological Tech. 2(2) (2011) 72-75.
[12] Ganesan S., et al, Indian Journal of Traditional Knowledge 7(2) (2008) 347-354.
[13] Selvaraju A et al, Medicinal Plants 3(3) (2011).
[14] Sankaranarayan S., et al, *J. Med. Plants Research* 4(12) (2010) 1089-1101.
[15] Balakrishnan V., et al, *Global Journal of Pharmacology* 3(1) (2009) 15-23.
[16] Mutheeswaran S., et al, *Journal of Ethnopharmacology* 137 (2011) 523-533.
[17] S. Dhanam, *International Letters of Natural Sciences* 11(2) (2014) 197-208.

(Received 09 June 2014; accepted 21 June 2014)