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Traditional herbal medicines for the treatment of snake bite and scorpion sting by the Paliyar's tribes of Sathuragiri hills

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Abstract

This paper documents the traditional knowledge of herbal medicinal plants that are in use by ethnic people of Paliyar tribes of Sathuragiri hills, Grizzled Squirrel Wildlife Sanctuary of a part Western Ghats, Tamil Nadu, India. From this study totally 40 plant species were documented they coming under 24 families belongs to 39 genera to treat 29 species for snake bite and 22 plant species used to treat scorpion sting. Details of these plants listed with in this study details of the plants used for snake bite, scorpion sting with local name, part used and methods of preparation dosage and the mode of administrations were discussed.

Keywords: Herbal medicine, Snake bite, Scorpion sting, Sathuragiri hills, Western Ghats, Tamil Nadu.

1. Introduction

The snake and scorpion bite is a neglected health hazard worldwide (Alirol *et al.*, 2010). Most snakebite of the more than 3000 species of snakes are considered dangerous to humans (Brian, 2015) [8]. Agricultural and tropical regions report more snake bites than anywhere else. In India alone more than 2, 00,000 cases are reported and it is estimated 35,000 to 50,000 people die each year. In India, particularly in the rural areas snake bite victims turn to traditional medicine men and healers, due to lack of availability of antiserum. A good deal of research work has been done in various parts of the world on herbal antagonists of snake and scorpion venom (Samy *et al.*, 2008; Gomes *et al.*, 2010; Kumarappan *et al.*, 2011 and Basha *et al.*, 2012) [31, 13, 19, 5]. A review of past literature on ethnobotany indicates that ample research work has been done in various parts of the world on herbal antagonists of snake venom (Mebs 2000; Houghton *et al.*, 1993; Asuzu *et al.*, 2003; Yang *et al.*, 1998 and Mors, 1991) [24, 15, 2, 47, 25].

Medicinal plants are a rich source of many natural inhibitors and pharmacologically active compounds and plants application against snake bite is known. This natural resource was unexplored until in recent years when it started getting scientific attention as indicated in an array of published ethno pharmacological reviews/articles from different countries reporting many medicinal plants claimed to neutralize the action of snake venom (Blaylock 1982; Houghton *et al.*, 1993 and Kunjam *et al.*, 2013) [7, 15, 20]. Among such diseases, snake and scorpion bites are also treated by using medicinal plants the studies on herbal antidotes against snake and scorpion venom are of great importance in the management of snake bite disorders (Mukherjee *et al.*, 2006) [26].

Snake bites in rural areas are commonly treated with plant Extracts. In general the plant families Compositae, Fabaceae and Solanaceae members used as antidote in East African compendia for treat snake bite and scorpion sting. The frequent uses of leaves and roots are antivenin preparation is noted by (Watt *et al.*, 1962 and Bennet *et al.*, 2000) [46, 6].

The use of plants for medicinal purposes dates back to Vedic period. However, up to few decades back the herbal medicines were replaced by synthetic medicines due to their quick effect. Interestingly global trend is now going back; natural way of living and the necessity of green medicines are now being realized elsewhere, due to side effects of allopathic medicines. Most of the world's population still relies entirely on plant based medicines and plants yield active ingredients of most traditional medical products (Santhosh Kumar *et al.*, 2013) [35].

Ethnic people are highly knowledgeable about the vegetation and their multi socio, economic and religious values, and one among them is their medicinal values. This knowledge is passed through oral communication from generation to generation (Perumal Samy *et al.*, 1998, 2000) [30, 31].

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This is attracting the attention of several botanists and plant scientists who directing vigorous researches towards the discovery or rediscovery of several medicinal plants along with their medicinal remedies for various diseases. Several workers were reported the utility of plants for the treatment of various diseases by the different tribal and rural people inhabiting in various region of Tamil Nadu. (Shanmugam *et al.*, 2007, 2008; Ayyanar *et al.*, 2008; Ignacimuthu *et al.*, 2008; Rajendran *et al.*, 2008; Arunachalam *et al.* 2009; Balakrishnan *et al.* 2009; Chendurpandy *et al.* 2010; Maruthupandian *et al.* 2010 and Nandagopalan *et al.* 2011) [39, 40, 3, 16, 33, 1, 4, 10, 22, 28].

In the tribal areas the man-plant relations are better tuned and are the major centers of ethnomedicinal wisdom. According to the All India coordinated project sponsored by the Ministry of Environment and Forest, New Delhi, 40% of 16,000 recorded flowering plants in India have ethnomedicinal value, whereas only 10% of these are used in drug and pharmaceutical industries. The intrinsic importance of these medicinal plants can very well prove as a potential source of new drugs (Pushpangadan, 1997) [32]. Several medicinal plants with accepted therapeutic values in snake and scorpion bite treatment are now attracting attention. Recently due to unplanned developmental programs, increasing modern healthcare facilities and impact of modern civilization, natural resources as well as traditional knowledge and tribal cultures are depleting rapidly at an alarming rate. Therefore, it is imperative to explore and document this unique and indigenous, traditional knowledge of the tribal community before it diminishes with the knowledgeable persons.

Materials and Methods

Study area

Sathuragiri hills are situated in Southern Western Ghats comes under Srivilliputhur Grizzled Squirrel Wildlife Sanctuary Srivilliputhur taluk, Virudhunagar district of Tamil Nadu. Sathuragiri is located at 1200 meters (3,937.0 ft) mountain in the a part of Western Ghats of South India. It lies between 9°. 42' - 9 °.44" West latitude and between 77 °.37 - 77 °. - 41" East longitude and it has an elevation of 881 meters above sea level. Sathuragiri is in an area with a Tropical evergreen forest, Semi evergreen forest and Mixed deciduous forest climate. Only Hindu Paliyar tribes residing in this area (Fig: 1b).

Paliyar tribals

Only the indigenous people of the study area are called Paliyar/Paliyan. They are found in the hilly regions of Madurai, Dindigul, Theni, Thirunelveli, and Virudhunagar districts (Fig: 1a). It is believed that Paliyar's are indigenous people of Palani hills (Situating near to Kodaikanal a famous tourist place). In the Palani hills they are found at an altitude of up to 2200m. Generally Paliyar's are illiterate and they speak Tamil (Mother tongue of Tamil Nadu). Paliyar's when compared to various tribal communities in Tamil Nadu constitute redeliverly a small group. Paliyar's can be grouped in to three categories based on their life styles, namely, Nomadic, Seminomadic and Settled Nomadic Paliyar's don't built houses, they live temporarily in rock caves called "Pudai" semi nomadic Paliyar build temporary house and confine themselves to small territories most of their huts are dark with no window or any other opening to admit air. Settled Paliyars are more less urbanized and live as agricultural laborers. Importance of traditional and folk medicine in the treatment of various human ailments is well recognized amongst these people (Sankarasivaraman, 2000) [43].



Fig 1a: view of study area



Fig 1b: Interaction with Paliyar's Tribals

Methods

Several field trips were carried out in Sathuragiri hills from Jan 2015 to March – 2016, Covering different seasons, in order to know the phenology of the plants and Intensive and extensive field survey was made in Sathuragiri hills and villages in Virudhunagar district. The data were collected through repeated field visits and the careful interaction with the village people and Paliyar tribes. The collected specimens were identified taxonomically with the help of available Monographs, taxonomic revisions and floras and by using field keys. (Gamble, 1956; Henry *et al.*, 1987; Matthew 1983 and Jain, S.K. and Rao, R.R., 1977) [12, 14, 23, 17]. Ethnomedicine information was gathered from all categories of village people such as the local healers' village leaded, elderly persons and Paliyar tribes and the person having a through knowledge of Medical practices. Herbal Medicines for the Treatment of Snake Bite and Scorpion Sting were cross checked and conformed to the Siddha Doctors. The information gathered from one place was confirmed by different communities of village people, Paliyar tribals in different places of investigation. The collected plants specimen was deposited in the Department of Botany, National College (Autonomous), Trichy, Tamil Nadu for future reference.

Result and discussion

In the present study totally about 40 plant species of 24 families distributed in 39 genera are reported to treat, snake bite and scorpion siting, 29 species of herbal medicinal plants belonging to 28 genera of 19 families for the snake bite, 22 plants species belonging to 21 genera of 17 families for the scorpion sting and both 12 species like snake bite, scorpion sting some of the plant species are used. *Blepharis maderaspatensis*, *Gymnema sylvestre* R.Br. *Calendula officinalis* L., *Eclipta alba* L., *Eclipta prostrata* L. *Mucuna pruriens*, *Leucas aspera* (Willd) Link., *Anisomeles*

malabarica R.Br., *Gloriosa superba* L., *Azadirachta indica* A. Juss. *Dodonaea viscosa* L. Jacq., *Curcuma angustifolia* Roxb. are plants regular used to treat snake bite and scorpion sting by local tribes. The detailed information such as the botanical name, local name of the plant, plant parts used, mode of preparation and mode of application botanical products, dosage and mode of administration were documented. The medicinal plants are being taken orally either raw or in the form of cured extracts, powder, paste, infusion, decoction, juice, ash, tincture and also separately prepared used (Table-1).

During the last few decades there has been an increasing interest in the study of medicinal plants and their traditional use in different parts of India. In the recent years number of reports on the use of plants in traditional healing by either tribal people or indigenous communities of India is increasing (Savithamma *et al.*, 2007; Pattanaik *et al.*, 2008; Kosalge and Fursule, 2009; Namsa *et al.*, 2009; Upadhyay *et al.*, 2010) [38, 29, 18, 27, 44]. The herbal medicines are mostly administered in the form of juice, decoction, paste or powder, prepared in a crude method from different plant parts such as root, bark, leaves, flowers, fruits, seeds and whole plant. Tradition and

beliefs are the only basis of use of the herbal medicines. (Sarada *et al.*, 2008) [36].

Herbal remedies are considered the oldest forms of health care known to mankind on this earth. Prior to the development of modern medicine, the traditional systems of medicine that have evolved over the centuries within various communities, are still maintained as a great traditional knowledge base in herbal medicines. (Mukherjee *et al.*, 2006) [26]. Herbal medicine for the detoxicating scorpion sting and snake bite. A crushed leaf is given through nostrils to cure snake bite (Sreelatha Kutty, 2015) [41].

The people of the research area still have a potent confidence in efficacy and prosperity of herbal medication some of these plants like *Embolia officinalis* Linn (Sarkhel *et al.*, 2011) [37], *Hemidesmus indicus* L. (Chatterjee *et al.*, 2006) [9], *Tamarindus indicus* (Ushanandini *et al.*, 2006) [45], *Rauwolfia serpentina* (L.) Benth. ExKurz (Dey *et al.*, 2011) [11], *Aristolochia bracteolata* (Kuru Suresh *et al.*, 2011) [21], *Embolia officinalis* L and *Moringa oleifera* (Sumana, 2013) [42] have been earlier reported to have anti-snake venom activity in various ethnomedicinal studies.

Table 1: survey of Snake bite, Scorpion sting Paliyar tribetutilized medicinal herbs Sathuragiri hills

S. No	Botanical Name	Family	Vernacular Name (Tamil)	Part used	Mode of preparation	Mode of application	Used to treat	
							S.B	S.S
1.	<i>Abrus precatorius</i> L.	Fabaceae	<i>Kundumani</i>	Seeds	Paste	I	+	-
2.	<i>Achyranthes aspera</i> L.	Amaranthaceae	<i>Naiuruvi</i>	Roots	Decoction	I	+	-
3.	<i>Ageratum conyzoides</i> L.	Asteraceae	<i>Mukkuhipoo</i>	Leaves	Juice	I	-	+
4.	<i>Alstonia scholaris</i> (L)R.Br	Apocynaceae	<i>Veppallai</i>	Latex	Paste	E	-	+
5.	<i>Aloe vera</i> L.	Liliaceae	<i>Kathallai</i>	Whole Plant	Juice	I	+	-
6.	<i>Anisomeles malabarica</i> R.Br.	Liliaceae	<i>Peimeratti</i>	Leaves	Juice	I	+	+
7.	<i>Aristolochia indica</i> L.	Aristolochiaceae	<i>Urikakodi</i>	Leaves	Paste	E	+	-
8.	<i>Azadirachta indica</i> A. Juss.	Meliaceae	<i>Vembu</i>	Flower	Decoction	I	+	+
9.	<i>Blepharis maderaspatensis</i> L.	Acanthaceae	<i>Naikalli</i>	Leaves	Paste	E	+	+
10.	<i>Calendula officinalis</i> L.	Asteraceae	<i>Marikollunthu</i>	Leaves	Paste	I&E	+	+
11.	<i>Calotropis gigantea</i> L.R.Br	Asclepiadaceae	<i>Errukku</i>	Roots	Paste	I&E	+	-
12.	<i>Cardiospermum halicacabum</i> L.	Sapindaceae	<i>Mudakathan</i>	Leaves	Juice	I	+	-
13.	<i>Cassia tora</i> L.	Caesalpiniaceae	<i>Tagarai</i>	Seeds	Decoction	I	+	-
15.	<i>Cissua quadrangularis</i> L.	Vitaceae	<i>Pirantai</i>	Leaves	Paste	I	+	-
16.	<i>citrus limon</i> L.	Rutaceae	<i>Elumichai</i>	Fruit	Juice	I	-	+
17.	<i>Curcuma angustifolia</i> Roxb	Zingiberaceae	<i>Kattunanchal</i>	Rhizome	Paste	E	+	+
18.	<i>Datura metel</i> L.	Solanaceae	<i>Oomathai</i>	Roots	Paste	I	+	-
19.	<i>Dodonaea viscosa</i> L. Jacq.	Sapindaceae	<i>Viralli</i>	Leaves	Juice	I	+	+
20.	<i>Eclipta alba</i> L.	Asteraceae	<i>Karisalangan</i>	Leaves	Juice	I	+	+
21.	<i>Eclipta prostrate</i> L.	Asteraceae	<i>Manchal Karisalanganni</i>	Leaves	Juice	I	+	+
22.	<i>Gloriosa superba</i> L	Liliaceae	<i>Kalapakelangu</i>	Tuber	Paste	E	+	+
23.	<i>Gymnema sylvestre</i> R.Br.	Asclepiadaceae	<i>Sirukurichi</i>	Leaves	Raw	I	+	+
24.	<i>Hemidesmus indicus</i> L.	Asclepiadaceae	<i>Nannari</i>	Root	Juice	I	+	-
25.	<i>Hybanthus enneaspermus</i> L.F.	Violaceae	<i>Orithalthamari</i>	Leaves	Juice	I	-	+
26.	<i>Leucas aspera</i> (Willd) Link.	Lamiaceae	<i>Thumbai</i>	Leaves	Juice	I	+	+
27.	<i>Michelia champaca</i> L.	Magnoliaceae	<i>Chambagam</i>	Leaves	Paste	E	-	+
28.	<i>Moringa oleifera</i> Lam.	Moringaceae	<i>Kattumurungai</i>	Bark	Paste	E	-	+
29.	<i>Mucuna pruriens</i> Baker.	Fabaceae	<i>Poonaikalli</i>	Seeds	Decoction	I	+	+
30.	<i>Murraya koenigii</i> L.	Rutaceae	<i>Karuvapillai</i>	Leaves	Decoction	I	-	+
31.	<i>Musa paradisiaca</i> L.	Musaceae	<i>Vazhai</i>	Bark	Juice	I	+	-
32.	<i>Nerium oleander</i> L.	Apocynaceae	<i>Aralli</i>	Seeds	Paste	E	+	-
33.	<i>Pergularia daemia</i> Forsk	Asclepiadaceae	<i>Velliparuthi</i>	Leaves	Juice	I	+	-
34.	<i>Piper nigrum</i> L.	Piperaceae	<i>Kurumillagu</i>	Seeds	Juice	I	+	-
35.	<i>Punica granatum</i> L.	Punicaceae	<i>Madhullai</i>	Fruit Bark	Paste	E	-	+
36.	<i>Rauwolfia serpentina</i> L.	Apocynaceae	<i>Sarpagantha</i>	Roots	Paste	E	+	-
37.	<i>Ricinus communis</i> L.	Euphorbiaceae	<i>Amannakku</i>	Seeds	Paste	I	+	-
38.	<i>Solanum virginianum</i> L.	Solanaceae	<i>Kandankathari</i>	Fruits	Paste	E	-	+
39.	<i>Tephrosia purpurea</i> L.	Fabaceae	<i>Kollungi</i>	Seeds	Paste	E	-	+
40.	<i>Tribulus terrestris</i> L.	Zygophyllaceae	<i>Nerungil</i>	Seeds	Juice	I	-	+
41.	<i>Vitex trifolia</i> L.F	Verbenaceae	<i>Karunotchi</i>	Leaves	Juice	I	+	-

KEY: I (Internal), E (External) (+ used to treat), (- not used treat), S.B-Snake Bite, S.S- Scorpion sting,

Conclusion

This study indicates that there are number of medicinal plants which are used as snake bite and scorpion sting. The traditional medical system is still well functioning in the study area. The herbal drugs were helpful to local tribes and visitors of this area got benefit through this value documentation. Herbal drugs are the cheapest and only way for the treatment of different ailments. The study area is floristically very rich with strong ethnomedicinal wisdom existing among the tribal groups. Proper documentation of this ethnomedicinal wisdom may be beneficial for future generations. The plants which the tribes of the area claimed to be of potential medicinal values may further be supplemented with the experimental backup by screening of these plants for their active principles which will be useful in development of new drugs for snake bite and scorpion siting in vigorous way.

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