



Ethnobotanical Survey of Medicinal Plants used by Native Inhabitants of Protected Area of District Solan, Himachal Pradesh

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Abstract: Medicinal plants of Majathal Wildlife Sanctuary (a protected area) of district Solan, Himachal Pradesh were used to treat various ailments. Consequently, extensive field work was conducted to record the traditional use of ethno-medicinal plants and survey was conducted in 2021-2022 to understand the importance of ethnomedicinal plants for their health care. The total of 53 informants, 33 male and 20 female were randomly selected for interviews. The total of 67 plants species belonging to the 63 genera, and 38 families were found to cure many disease. The shrubs were most dominated habit (34%) and most frequently plant part used was leaves (37%). The family Fabaceae, Moraceae and Rosaceae had the most ethnomedicinal plants, with five species. On the basis of use value (UV) the most important medicinal plants were *Tinospora cardifolia* (UV=0.97). The medicinal plants *Achyranthus aspera*, *Ajuga integrifolia*, *Adhatoda vasica*, *Asparagus racemosus*, *Bauhinia acuminata*, *Cannabis sativa* were used for the treatment of various diseases namely arthritis, asthma, skin disorders, fungal infections, eye infection, dysentery, malaria, constipation.

Keywords: Ethnomedicine, Traditional knowledge, Use value, Majathal Wildlife Sanctuary, *Tinospora cardifolia*

India is one of the world's top 17 mega-diverse countries with a total area of 32, 87,263 km², of which 4.9 percent comes under protected areas. Protected area (PA) referred to geographic area that has been acknowledged, dedicated to, and managed-either legally or by other efficient means-in order to accomplish the long-term protection of nature and the related ecological services and cultural values (IUCN 2008). In India, a network of 668 PAs has been built, including 102 National Parks, 515 Wildlife Sanctuaries, 47 Conservation Reserves, and four Community Reserves (MoEF, 2016). From ancient time, the locally available plant species used for curing human diseases by utilizing the traditionally accepted remedies (Sharma *et al* 2015). All over the world, 10 to 18% of wild plant species are used for medicinal purpose (Kunwar and Bussmann 2008). India is one of the 12 super biodiversity hotspots, with 45000 plant species spread across 16 agro-climatic regions, 15 biotic provinces, and 10 vegetative zones. Around 15000 medicinal plant species have been listed in country, with 7000 plants used in Ayurveda, 700 in Unani, 600 in Siddha, 450 in Homeopathy, and 30 in modern medicine (Siwach *et al* 2013).

The Indian Himalayan Region is known for its diverse plant species, some of which are widely used by indigenous communities for medicine, fruit, fodder, and wood, religious, and other purposes. Around 279 fodder species, including trees, shrubs, and herbs, have been recorded from the Western Himalayan area in previous studies (Samant *et al* 2006). India is rich in ethnic diversity and it resulted in an

exceedingly considerable body of ethnobotanical research (Ramya *et al* 2009, Bahadur *et al* 2011). Orthodox drugs are now used by 80 percent of people in developed countries for healthcare (Thakur *et al* 2014). In earlier ethnobotanical studies of all over the world reported that drugs are derived from different plant sources (Mahmood *et al* 2011). In Himachal Pradesh, about 3,500 plants species are well known in which almost 1,500 species are curative (Bhardwaj and Seth 2017). The rural societies of Himachal Pradesh are using medicinal herbs for the treatment of common health problems like cough, cold and fever, headache, body ache, dysentery, diarrhoea and in some cases they treating serious ailments like fractures and scorpion bites (Sharma *et al* 2015). This survey on ethnomedicinal plants is a first attempt of study and collection of plants with the assistance of native inhabitants of Majathal Wildlife Sanctuary, district Solan in Himachal Pradesh, India. During survey a great deal of knowledge is recorded by the local villagers about ethnomedicinal plants and their important role for preparation of medicines which helps in various diseases. Aim of this survey is to identify new or lesser known medicinal plant species used by local people for their health care.

MATERIAL AND METHODS

Study Area

Majathal wildlife sanctuary: Majathal wildlife sanctuary is located in altitude ranging is 1310.6m (amsl), latitude 31°27'99"N and longitude 77°10'29"E in the Solan district of

Himachal Pradesh. This Sanctuary covers 30.86 km² areas. Sutlej river is the part of the catchment area. Sutluj River covers the sanctuary area from north and mountain ridge bounded from south. The Sanctuary also covers a portion of the southern slopes of the Sutlej Valley with steep land. The Harshang temple is one among the places of worship (Singh et al. 1990). The chir pine (*Pinus roxburghii*) and Ban Oak (*Quercus leucotrichophora*) forests, and subtropical *Euphorbia* are the major vegetation type (Mishra 1996). The slopes are largely covered in grassy tracts and sparingly wooded with chir pine and ban oak, regularly extending continuously from the ridge-tops down to about 1,000 m (Garson 1983). The map of the study site given in (Fig. 1).

Survey and data collection: The current study was done in peripheral villages of Majathal Wildlife Sanctuary. This study was carried out in between 2021-2022 with the help of informants or villagers of surrounding wildlife sanctuary on the bases of interviews and group discussion to know the ethnomedicinal importance of plants. There are 10 peripheral villages in Wildlife Sanctuary enlisted with altitudinal ranges (amsl): Rudal (1197m), Saryali (1327m) Pajina (1175m), Pariab (1634m), Sohra kanaitan (1554m), Daund (1520m), Jandoi (773m), Matrech (1321m), Dhar Parli (1808m), Dhar Warli (1801m). Demographic distribution (age, education, gender) of the participant was recorded. The information collected included local name, part used, mode of administration, Ailments/diseases treated and indigenous medicinal uses (Table 1). Botanical names of plant species were validated from the online website www.theplantlist.org.

Data analysis: The ethnobotanical data collected from Majathal Wildlife Sanctuary, district Solan of Himachal Pradesh, India through interviews and direct observation was analysed by using quantitative methods as given below

(Phillips et al., 1994). The relative importance of plants was determined by using the formula below to calculate the use-value (Phillips et al 1994).

$$UV = \Sigma U/n$$

Where U denotes the number of usage reports listed by each informant for a certain plant species, and n denotes the cumulative number of informants chosen for interviews and community conversation. If the usage values are high, it means the plant is significant, and if they are close to zero (0), it means there are few comments of its use. The usage value makes no distinction between whether a plant is used for several or single uses (Musa et al 2011).

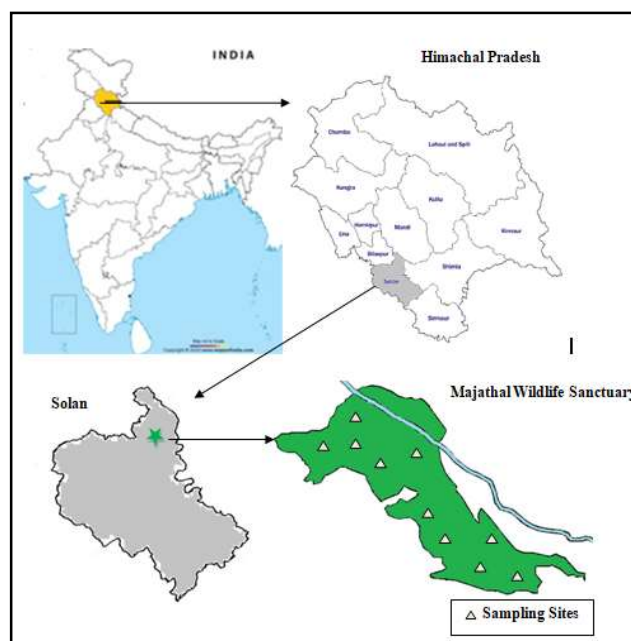


Fig. 1. Google map showing study site in district Solan, Himachal Pradesh, India

Table 1. Demography and literacy among the informants

Age groups	No. of informants				
25-35	2				
36-50	12				
51-60	20				
61-70	11				
70-75	8				
Education and literacy	Age groups				
	25-35	36-50	51-60	61-70	70-75
Never attended school	0	0	0	03	05
Attended school for 1-5 classes (Primary level)	0	0	2	05	02
Attended school for 6-8 classes (Middle level)	0	0	12	03	01
Attended school for 9-10 classes (Metric level)	0	4	04	0	0
Attended school for 11-12 classes	2	8	02	0	0

Table 2. Ethnomedicinal plants studied in Majathal wildlife sanctuary

Plant name	Family	Local name	Habit	Part used	Total citation (ΣU)	UV values	Mode of administration	Ailments/diseases treated
<i>Achyranthus aspera</i> L.	Amaranthaceae	Puthkanda	Herb	Leaves	42	0.73	Oral/Topical	Leaf decoction used for gastric problems and leaf paste is used externally for insect bite.
<i>Adhatoda vasica</i> Nees	Acanthaceae	Bansa, Basuti, Vasaka	Shrub	Whole plant, leaves, root	41	0.78	Oral/Topical	Leaves and root for the treatment of asthma, cough, bronchitis.
<i>Aerva sanguinolenta</i> Blume	Amaranthaceae	Chaya	Herb	Whole plant	23	0.43	Topical	Leaves paste applied on fresh cut for 3 days.
<i>Ageratum conyzoides</i> Linn.	Asteraceae	Buti	Herb	Leaves	32	0.60	Topical	Leaf paste applied on cuts to stop bleeding.
<i>Albizia lebbek</i> (L.) Benth.	Fabaceae	Fuli	Tree	Seeds	21	0.39	Topical	Seed oil used for wound healing.
<i>Ajuga integrifolia</i> Buch.-Ham.	Lamiaceae	Neelkanthi	Herb	Leaves	29	0.54	Topical	Leaves used as diuretic, rheumatism.
<i>Asparagus racemosus</i> Willd	Asparagaceae	Shatavri, Satmuli	Climber	Leaves	33	0.62	Topical	Leaves paste for wound healing.
<i>Bambusa vulgaris</i> Schrad	Poaceae	Bans	Tree	Stem, leaves	41	0.76	Topical	Stems and leaves for piles, kidney disorder, laxative, swelling.
<i>Bauhinia variegata</i> L.	Fabaceae	Kachnar, karale	Tree	Roots, bark, flower, pods	46	0.85	Oral/Topical	Decoction of roots prevents obesity, bark is used as ulcer and leprosy, flower and pods are used as vegetable.
<i>Berberis lycium</i> Royle	Berberidaceae	Kashmal	Shrub	Root	49	0.93	Topical	Root paste for wound healing, diabetes, blood purifier.
<i>Bergenia ciliata</i> (Haw.) Sternb.	Saxifragaceae	Dakachru, pashan-bhed	Rhizomatous herb	Rhizome, Leaves, Flowers.	45	0.85	Topical	Decoction of rhizomes for fever, joint pain, kidney and bladder stone.
<i>Bidens pilosa</i> L.	Asteraceae	Gumber	Herb	Leaves	26	0.49	Oral/Topical	Leaves for malaria, skin infection, stomach, liver disorder.
<i>Boenninghausenia albiflora</i> Hooks	Rutaceae	Pissumar buti	Shrub	Aerial Plant Parts	29	0.53	Topical	Poultice of the aerial plant parts good for healing wounds.
<i>Callistemon viminalis</i> (Sol. Ex Gaertn.) G. Don	Myrtaceae	Cheel	Shrub	Leaves	20	0.36	Topical	Leaves to treat skin infection.
<i>Cannabis sativa</i> L.	Cannabaceae	Bhang	Herb	Whole plant	43	0.81	Oral/Topical	Whole plant for the treatment of depression, sleep disorder, anxiety.
<i>Carissa spinarum</i> L.	Apocynaceae	Garna	Shrub	Fruits	39	0.73	Oral	Fruits for the treatment of indigestion, malaria, fever, cough, cold.
<i>Celtis australis</i> Linn.	Ulmaceae	Khidak	Tree	Roots	33	0.62	Topical	Paste of root applied on cuts and wounds.
<i>Centella asiatica</i> (L.) Urb.	Apiaceae	Brahmi	Herb	Whole plant	48	0.89	Oral/Topical	Whole plant for jaundice, asthma, toothache, skin disorder.
<i>Cynodon dactylon</i> (L.) Pers.	Poaceae	Drub	Herb.	Whole plant	44	0.82	Oral/Topical	Decoction of <i>C. dactylon</i> treat kidney stone. Leaf paste is applied for wounds, piles and Leaf juice is installed into eyes for catarrhal condition.
<i>Catharanthus roseus</i> Linn.	Apocynaceae	Peri-winkle	Herb,	Roots, Leaves	33	0.62	Topical	Decoction of roots and leaves prescribed against hypertension and diabetes

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Table 2. Ethnomedicinal plants studied in Majathal wildlife sanctuary

Plant name	Family	Local name	Habit	Part used	Total citation (ΣU)	UV values	Mode of administration	Ailments/diseases treated
<i>Datura stramonium</i> Linn.	Solanaceae	Datura	Herb	Leaves	29	0.53	Topical	Fresh leaves tied on wounds for early cure.
<i>Delphinium denudatum</i> Wall. ex Hook	Ranunculaceae	Nirbisi	Herb	Whole plant	36	0.67	Topical	Plant paste applied on cuts for immediate relief and healing.
<i>Duranta repens</i> Linn.	Verbenaceae	Daranta	Shrub	Leaves	29	0.54	Topical	Paste of fresh leaves mixed with coconut oil applied to cure wounds
<i>Eucalyptus citriodora</i> Hook.	Myrtaceae	Safeda	Tree	Leaves	23	0.43	Topical	Decoction of leaves used to wash wounds and sores.
<i>Euphorbia helioscopia</i> L	Euphorbiaceae	Dudhi	Herb	Whole Plant. Leaves	30	0.56	Oral/Topical	Paste of the plant applied for healing wounds. 5-10ml of leaf juice mixed with honey given for persistent cough.
<i>Ficus auriculata</i> Lour.	Moraceae	Tiamble	Tree	Leaves, Root	23	0.43	Topical	Leaves paste for wounds, diarrhea, dysentery. Latex of root for vomiting, diarrhea, jaundice.
<i>Ficus benghalensis</i> L	Moraceae	Bargad	Tree	Bark, fruit	25	0.47	Oral/Topical	Bark and fruit to control diabetes. Latex for wound, swelling, toothache and skin disorder.
<i>Ficus palmata</i> Forssk	Moraceae	Fagura	Tree	Leaves, fruit	47	0.87	oral	Decoction of leaves to treat gastrointestinal disorders.
<i>Ficus religiosa</i> L.	Moraceae	Pipal	Tree	Leaves, bark,	42	0.78	Oral/Topical	Leaves juice cure diarrhea, asthma, migraine, constipation, toothache. Bark is used for ulcers, wound healing, diarrhea, leucorrhoea.
<i>Foeniculum vulgare</i> Gaertn.	Apiaceae	Saunf	Herb	Leaves	44	0.83	Topical	Paste of leaves applied for healing wounds and skin rashes.
<i>Fragaria indica</i> Andr.	Rosaceae	Aakhe	Herb	Fruit	39	0.73	Oral/topical.	A decoction can be used externally (or the fresh leaves and fruit can also be crushed) and be applied as a poultice to treat boils and abscesses, swellings
<i>Fumaria parviflora</i> Lam.	Fumariaceae	Bansulpha	Herb	Whole Plant	29	0.53	Topical	Paste of the plant applied for suppuration of boils and healing cut injuries
<i>Geranium wallichianum</i> Sweet	Geraniaceae	Bhanda	herb	Root	23	0.43	Topical	Decoction of roots taken good for kidney stones.
<i>Hedera helix</i> Linn	Araliaceae	Dakari	Climber	Leaves, Fruits	37	0.68	Oral	Leaves and berries taken orally as an expectorant to treat cough and bronchitis
<i>Hypericum cernuum</i> Roxb.	Hypericaceae	Pinli	Shrub	Seeds	29	0.54	Topical	Seed oil massaged for quick relief of rheumatism.
<i>Indigofera cassioides</i> DC.	Fabaceae	Kathi	Shrub	Leaves	42	0.78	Oral/Topical	Leaves treat arthritis, inflammation, cough and liver problems.
<i>Indigofera heterantha</i> Brandis	Fabaceae	Sakena	Shrub	Leaves	30	0.56	Topical	Juice of leaves applied to treat cuts and wounds
<i>Jacaranda mimosifolia</i> Linn	Bignoniaceae	Jacaranda	Tree	Leaves	24	0.45	Topical	Leaf paste applied for healing wounds
<i>Jasminum grandiflorum</i> Linn.	Oleaceae	Chameli	Shrub	Leaves, flowers	23	0.43	Oral/Topical	Leaves chewed for healing mouth ulcer and gum infection. Oil from flowers used in skin disorders, headache and eye ailments.

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Table 2. Ethnomedicinal plants studied in Majathal wildlife sanctuary

Plant name	Family	Local name	Habit	Part used	Total citation (ΣU)	UV values	Mode of administration	Ailments/diseases treated
<i>Juglans regia</i> L.	Juglandaceae	Akhrot	Tree	bark, kernel, leaves, fruit.	36	0.67	Oral/topical	Extract of bark treat asthma and skin disorders.
<i>Justicia adhatoda</i> L.	Acanthaceae	Arusa	Shrub	Leaves, roots, flower, bark	24	0.45	Oral/topical.	Decoction of leaves treat cough, cold.
<i>Leucas mollissima</i> Wall.	Labiatae	Bish-khapru.	Herb	Leaves	37	0.70	Topical	Poultice of fresh leaves applied to cure sores, headache, wounds and bites of poisonous insects.
<i>Morus nigra</i> L.	Moraceae	Tut	Tree	Ripe berry, twigs, root bark,	28	0.52	Oral/topical	Decoction of root bark for constipation, menopause, runny nose.
<i>Murraya koenigii</i> (L.) Spreng.	Rutaceae	Curry patta	Shrub	Leaves	41	0.77	Oral	Leaves decoction for diarrhea, diabetes, morning sickness and good for eyesight.
<i>Parthenium hysterophorus</i> Linn.	Astraceae	Congress grass	Herb	Root	36	0.67	Oral	Root decoction given to check dysentery.
<i>Phyllanthus emblica</i> L.	Phyllanthaceae	Amla	Tree	Fruit	50	0.93	Oral/topical	Fruit used jaundice, dye hair and to treat diarrhea.
<i>Pinus roxburghii</i> Sarg	Pinaceae	Chir	Tree	Bark extract	34	0.63	Topical	Bark extract for inflammatory disorders.
<i>Prinsepia utilis</i> Royle	Rosaceae	Bhekal	Shrub	Seeds	26	0.49	Topical	Seed oil for massaging rheumatic joints.
<i>Prunus persica</i> (L.) Batsch	Rosaceae	Aru	Tree	Fruits	36	0.67	Oral	Fruits are eaten for constipation
<i>Psidium guajava</i> L.	Myrtaceae	Amrood	Tree	Leaf, fruit	35	0.66	Oral/Topical	Leaves for intestinal conditions fruit is used for high blood pressure.
<i>Punica granatum</i> L.	Lythraceae	Anar	shrub	Fruits	41	0.77	Oral	Powdered rind of fruit (2-3g, 30-45 days) taken with luke warm water empty stomach for diabetes.
<i>Pyrus communis</i> L.	Rosaceae	Nashpati	Tree	Leaves, fruit	32	0.59	Oral/topical	The leaves for their antibacterial and antifungal properties, and as contraceptive,
<i>Quercus leucotrichophora</i> A. Camus	Fagaceae	Ban	Tree	Seeds	36	0.67	Oral	Decoction of seeds (10ml, thrice daily) given for checking dysentery and diarrhoea.
<i>Ricinus communis</i> L.	Euphorbiaceae	Arand	Shrub	Leaves, Seeds	09	0.39	Topical	Leaves coater with oil and warmed, are commonly applied over the abdomen to give relief in the flatulence in the children. Poultice of leaves good for healing cuts, bruises and swollen joints. Seed oil taken along with milk to check constipation.
<i>Rubus ellipticus</i> Smith	Rosaceae	Aakhae	Shrub	Leaves, fruits, roots	32	0.59	Oral/topical	Leaves treat fevers and diarrhea, Young shoots are chewed for treatment of throat infections; a paste of root and leaves is applied for treatment of skin diseases and boils; and the stem is used as toothbrush.

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Table 2. Ethnomedicinal plants studied in Majathal wildlife sanctuary

Plant name	Family	Local name	Habit	Part used	Total citation (Σ U)	UV values	Mode of administration	Ailments/diseases treated
<i>Rumex hastatus</i> D. Don	Polygonaceae	Khati-meethi	Shrub	Leaves	39	0.73	Oral/topical.	Fresh leaves used in the treatment of constipation. A paste of fresh leaves is used against nettle sting
<i>Syzygium cumini</i> (L.) Skeels	Myrtaceae	Jamun	Tree	Leaves,fruits, bark.	43	0.81	Oral/topical.	The bark is acrid, sweet, digestive, astringent to the bowels, anthelmintic and used for the treatment of sore throat
<i>Terminalia arjuna</i> (Roxb. Ex DC.) Wight and Arn	Combretaceae	Arjun	Tree,	Stem Bark,	24	0.45	Oral/topical	The bark of Arjun is astringent, sweet, acrid, cooling, aphrodisiac, urinary astringent, and expectorant
<i>Tinospora cordifolia</i> (Willd.) Miers	Menispermaceae	Giloy	Climber	Stem	51	0.97	Oral	Stem boosts immunity, improve digestion.
<i>Thymus vulgaris</i> Roxb.	Lamiaceae	Ban-ajwain	Shrub	Leaves, Flowers	28	0.51	Oral/Topical	Poultice of leaves and flowers applied to check headache.
<i>Urtica dioica</i> L.	Urticaceae	Chee	Herb	Leaf,bark	31	0.57	Topical	The leaf extract of <i>Urtica dioica</i> has been reported to improve glucose homeostasis in vivo.
<i>Viola serpens</i> Wall. ex Ging.	Violaceae	Banafsha	Herb	Leaves, Flowers	38	0.71	Oral/Topical	Flowers eaten as such for irritating throat
<i>Vitex negunda</i> L.	Lamiaceae	Banna, Sambhalo	Shrub	Leaves	40	0.75	Topical	Leaves to relieve muscle aches and joint pains.
<i>Withania somnifera</i> (L.) Dunal	Solanaceae	Ashwagan dha	Shrub	Leaves	31	0.58	Topical	A paste of Ashwagandha leaves when applied on a local inflammation acts as anti-inflammatory. Regular use of Ashwagandha helps to reduce blood sugar and cholesterol levels.
<i>Woodfordia fruticosa</i> (L.) kurz	Lythraceae	Dhawai, Dhaun	Shrub	Flowers	23	0.42	Topical	Dried flowers considered good against piles and dysentery.
<i>Zanthoxylum armatum</i> DC.	Rutaceae	Tirmir	Shrub	Branches	25	0.47	Oral	Branches used for brushing teeth.
<i>Ziziphus nummularia</i> (Burm. f.) Wight and Arn.	Rhamnaceae	Ber	Shrub	Branches, Leaves, Fruits.	24	0.46	Topical	Leaves decoction for cough, cold.

RESULTS AND DISCUSSION

Demography of informants: A total of 53 informants (33 males and 20 females) between age group 25-75 years were interviewed with a questionnaire. The age and educational background of informants were also recorded during the interview. The informants were divided into 5 groups on the basis of their age (Table 2).

The current study is the first systematic record of ethnomedicinal plants (67 species belonging to 63 genera and 38 families) utilised by the local people of peripheral villages surrounding Majathal Wildlife Sanctuary, Solan, Himachal Pradesh. Ethnobotanical data was collected from different age groups between 25 to 75 years. The older informants who were not well educated had a greater understanding of the

therapeutic uses of the plants. Medicinal plants and their conventional formulations have long been a part of social life in sanctuary areas, and they've proven to be very effective in treating a number of health problems. The reliance of the people on medicinal plants increased because of a lack of other healthcare resources close to their households. The local people of study area had a strong understanding of ethnomedicinal plants because they used different plant species to treat various diseases. Interviews and direct observation approaches were used to gather ethnobotanical data, which was then analysed using quantitative techniques such as use-value analysis (UV). The plants habits-wise, shrubs were most frequently used. (34%), followed by trees, herbs, climbers and rhizomatous herb (Fig.3). The most

dominant plant part used was leaves (37%) followed by fruits, roots and bark, flowers, whole plant (Fig. 4). Depending of the illness, different ways of using these plant parts are used. Dried powder and juice extraction and administrated via orally or topically (Table 3). The family Fabaceae, Moraceae and Rosaceae had the most ethnomedicinal plants, with five species, followed by Myrtaceae, with four. The Asteraceae, Lamiaceae and Rutaceae, contributed three plant species. Eight families contributed two species each. Rest of the documented families contributed one species each (Fig. 2). On the basis of use value (UV) the most important medicinal plant was *Tinospora cordifolia* (UV=0.97), followed by *Berberis lyceum*, *Phyllanthus emblica*, *Centella asiatica*, *Ficus palmate* (Table 3).

In current observations *Tinospora cordifolia* stem extract used for diabetes, fever, upset stomach, peptic ulcer, high cholesterol and strong the immune system and *W. semnifera* leaves are chewed every alternate day to reduce swelling and conjunctivitis. *Asparagus racemosus* roots and leaves extract used for kidney disorders, infertility, fevers, stomach ulcer and diarrhoea and *Vitex negundo* used to cure stomach, swellings and relief from pain. Plants namely *Achyranthus aspera*, *Ajuga integrifolia*, *Adhatoda vasica*, *Asparagus racemosus*, *Bauhinia acuminata*, *Cannabis sativa*, *Carissa spinarum*, *Delphinium denudatum*, *Ficus roxburghii*, *Ficus palmata*, *Ficus religiosa*, *Justicia adhatoda*, *Phyllanthus emblica*, *Solanum indicum*, *Terminalia chebula*, *Berberis lyceum*, *Viola canescens*, *Urtica dioica* and *Zanthoxylum armatum* were used for the treatment of various diseases namely arthritis, asthma, skin disorders, fungal infections, eye infection, dysentery, malaria, constipation, wound healing, cough and cold, liver problems, kidney and bladder stones, mouth ulcers, immunity, sore

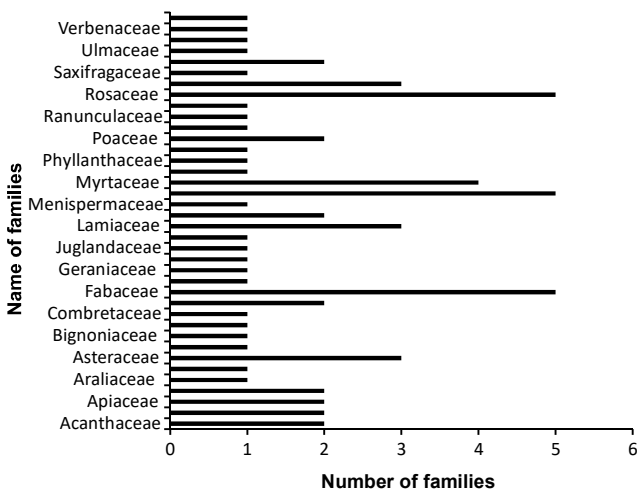


Fig. 2. Representation of the families and number of plants species at study site

throat, headache, jaundice, fever, piles, leucorrhoea, tumour ,gastric problems, insects bite, toothache, stomach-ache, diarrhoea etc. Local people have good knowledge for medicinal plants as per used value. These plants are very valuable for human health care system.

Tinospora cordifolia is an important drug of ayurvedic system of remedy for the cure of various diseases such as diabetes, jaundice, fever and skin diseases etc. have been

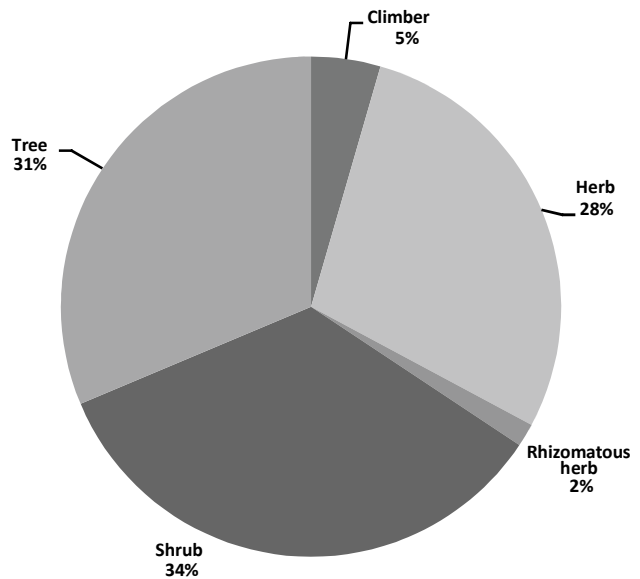


Fig. 3. Utilization pattern of Ethnomedicinal plants used in the Majathal Wildlife Sanctuary, Solan

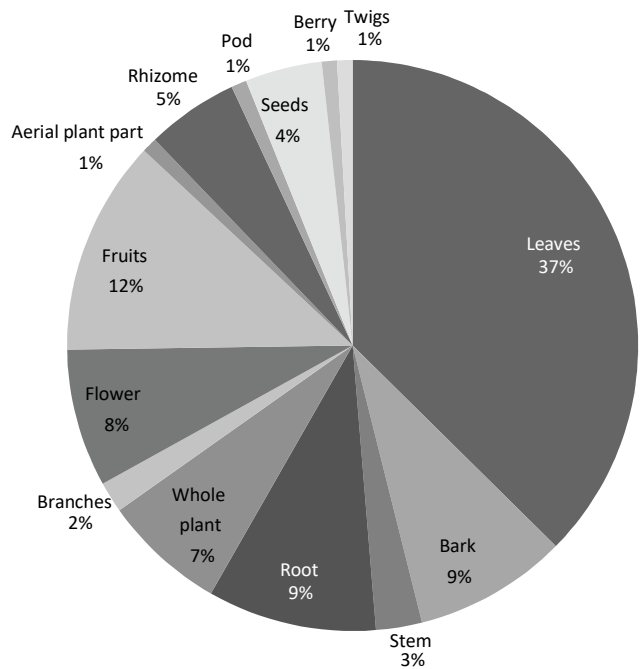


Fig. 4. Utilization pattern of plants parts used in Majathal Wildlife Sanctuary, Solan

reported (Sinha et al 2004). In Ayurveda, *Withania semnifera* (Ashwagandha) is considered one of the best refreshing agents. Ayurvedic and Unani medicines use its seeds, stems, leaves and root for the in the treatment of joint inflammation, rheumatoid arthritis, nervous disorders, and epilepsy. Dried roots are used to treat hiccups, colds, cough, and feminine illnesses, as a sedative, senile debility, ulcers, and other ailments. Carbuncles, inflammation, and swellings may all be treated with the leaves. Asthma is treated with a bark decoction, and is often used to treat bed sores locally. Antioxidant compounds used in this herb help to slow down the ageing process and scavenge free radicals. (Uma devi et al 2012). Seed oil of *Vitex negundo* is a rich source of unsaturated fatty acids such as nervonic acid and used to prevent stroke sequela, cerebral palsy, forgetfulness, Alzheimer's disease, memory loss, insomnia and other brain diseases (Lin et al 2008).

CONCLUSION

The current research indicate that many plants are used by local people to cure different diseases as part of their healthcare system. The use of medicinal plants by villagers has a long history and here we reported 67 medicinal plant species used in needs. Many plants are used for the treatment of fever, pain, diarrhoea, jaundice etc. Villagers have no other source of medicine near their household so that they are depends on plants for their healthcare. People use the plants part for the treatment of disease by two routes one is orally and second is topical. Many new uses of plant species discovered during the survey that have significant medicinal value have never been explored before. In the study location, several new or lesser-known species were discovered. The plant species studied in the chosen research field have a high medicinal value. So, therefore proper documentation of medicinal plants from study area is necessary. This form of research has never been conducted in Majathal Wildlife Sanctuary before, so it will be extremely beneficial for future.

ACKNOWLEDGEMENT

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