



RESEARCH ARTICLE

# Ethnomedicinal Plants Used by the Tribal Communities of West Champaran District of Bihar, India

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## ABSTRACT

The present paper deals with 67 ethnomedicinal plant species belonging to 61 genera and 36 families used for prevention and treatment of various diseases by the tribal and indigenous non-tribal communities of West Champaran district of Bihar. This first-hand ethnomedicinal information was collected directly from a field survey of 108 remote tribal villages and forest areas of the district. Among them family Leguminosae is represented by maximum number of plants (9 species) followed by Lamiaceae (7 species). Habit-wise analysis revealed that herbs are dominated with 23 species followed by trees. These plant species are arranged in alphabetical order followed by family, habit, local name(s), locality (ies), field number (s) along with a method of preparation and mode of ethnomedicinal uses in detail. After comparison and cross checking of collected uses with relevant standard literatures, it is revealed that 11 ethnomedicinal uses of plants (marked by \*) have not recorded earlier.

Keywords: Ethnomedicine, Tribes, West Champaran, Bihar.

## INTRODUCTION

West Champaran district of Bihar lies between 26°16' and 27°31' north latitude and 83°50' and 85°18' east longitude. The district was carved out of the old Champaran District in the year 1972 as a result of re-organization of the district in the state. The district headquarters are located in Bettiah. It is said that Bettiah got its name from Baint (Cane) plants commonly found in this district. The name Champaran is a degenerate form of *Champaka Aranya*, a name which dates back to the time when the district was a tract of the forest of Champa (*Magnolia*) trees and was the abode of solitary ascetics. The district is known for its fluid border with Nepal and occupies an area of 5,228 square kilometers. In 1989 West Champaran district became home to Valmiki Tiger Reserve, which has an area of 880 km<sup>2</sup>. It is also home to Valmiki and Udaypur Wildlife Sanctuary. According to the 2011 census West Champaran district has a population of 3,922,780. This district has 3 sub-division, 18 blocks/circles and 1483 villages.



Fig. 1 Map showing ethnobotanically surveyed areas of West Champaran District, Bihar

## MATERIAL AND METHODS

The different tribal communities residing in the district are Baiga, Banjara, Bedia, Chero, Chik Baraik, Gond, Gorait, Kharia, Kharwar, Khond, Lohara, Mahli, Mal Paharia, Munda, Oraon, Santal, Sauria, Paharia, etc. with total population of 44,912 (Bhatt and Bhargava, 2006). These tribal people as well as other rural people of the areas are utilizing many plants and plant products in their day to day life for food, medicine, fiber, dye, fodder, fuel and other purposes. The medicine men (*Vaidya, Kaviraj*) usually collect

plant parts from nearby forest areas and given to the patient/victims after preparation of paste, powder, pills, extract and decoction for the treatment of their diseases, ailments and disorders.

## MATERIALS AND METHODS

The field survey was carried out during the year 2018 and interviewed old and experienced men, women and medicine men (*Vaidyas*) for the first hand information on ethnomedicinal uses of the plants from 108 rural villages and forest areas of West Champaran district. During the survey interaction was done with several tribal (Oraon, Kharwar, Chero) and other non-tribal people of the district. The informants were taken to forest for showing the exact plant species as well as collection of voucher specimens. Care has been taken to record only those medicinal information whose curative potentialities have been confirmed by the informants. Repeated and cross queries were done for confirmation and verification of the information.

The voucher specimens were dried, poisoned, mounted, stitched and labeled on herbarium sheet. These plant specimens were identified with the help of keys and botanical description, described in regional Floras like Bhattacharya and Sarkar (1998), Haines (1921-25), Mooney (1941, 1950) and Singh et al. (2001). These voucher specimens have been deposited in Ethnobotanical Herbarium of Central Botanical Laboratory (CBL), Howrah, after matching and verification with the authentic specimens housed in Central National Herbarium (CAL). The updated botanical names, families were checked from widely accepted website <http://www.theplantlist.org> and the names of authors were verified from Brummitt and Powell (1992).

Further, these recorded ethnomedicinal uses were compared and cross checked with well-known standard Indian literatures (Ambasta, 1986; Anonymous, 1948-76; Chopra et al., 1956; Jain, 1991; Jain and Jain 2016; Kirtikar and Basu, 1935) and published research papers on ethnobotany of the district (Dwivedy and Singh, 2016; Singh and Singh, 2014). In this present paper the plant species are arranged alphabetically for easy reference along with their family in bracket, followed by habit, local name(s) in italic, district wise locality(ies), voucher number(s) and detail Ethnomedicinal information.

## ENUMERATION

*Abrus precatorius* L. (Leguminosae); Climber; *Gonji*; Bashwa Forest-28 (CBL-41434)

Roots are pasted with water and taken orally to neutralize the effect of any kind of poison. Leaves are sweet in taste. Seeds (small part) are used for abortion.

*Achyranthes aspera* L. (Amaranthaceae); Herb; *Chirchiri*, *Utta Chid chidiya*, *Apamarg*; Gamharia, Daruwa Badi, Naurangia Don (CBL-41318, 41407)

Whole plant is boiled and made a lotion (Malham) and applied on all kind of skin diseases like ring worm, white patches, leucoderma, itching etc. Stem is used as tooth brush to treat toothache.

*Acorus calamus* L. (Araceae); Herb; *Bachh*; Naurangia Don (CBL-41451)

Rhizome powder is given in stomach trouble and rheumatism (Vat). Rhizome garland is worn by the patient suffering from fever and rheumatism to cure.

*Aerva sanguinolenta* (L.) Blume (Amaranthaceae); Herb; *Chidchidia*; Gonauli (CBL-41368)

Roots are washed, pasted and applied on scorpion sting.

*Argyreia bella* Raizada (Convolvulaceae); Climber; *Bhakan Poi*; Lal Bhitia, Kaila (CBL-41286, 41439)

Leaves are boiled and dipped into mixture of gram flour (Besan) and prepared 'Pakodi'. It is given in stomach pain.

*Aristolochia indica* L. (Aristolochiaceae); Climber; *Lakhan buti*; Naurangia Don (CBL-41472)

\*Leaves (2-3) are pasted and given with water for 2-3 times in the treatment of typhoid fever.

*Artemisia nilagirica* (C.B.Clarke) Pamp. (Compositae); Herb; Dauna; Ghatyo Tola, Santepur, Naurangia Don (CBL-41391)

Leaves are mixed with leaves of *Achyranthes* and taken extract. It is mixed with mustard oil and warmed on sunlight. The prepared lotion is applied to cure body pain and gout pain for 2 - 4 days.

*Bauhinia purpurea* L. (Leguminosae); Small Tree; *Kuilara*, *Kachnar*, *Sahul*; Jamauli, Bajani, Kaila, Sirisia, Langadi-20 (CBL-41264, 41442)

Flowers are cooked and prescribed in the treatment of constipation.

*Calotropis gigantea* (L.) Dryand. (Apocynaceae); Shrub; *Akuwan*, *Madar*; Gamharia, Kaila, Naurangia Don (CBL-41317)

Stem is burnt and the ashes are applied on wounds. Latex is applied on skull to re-grow hair after hair falling. Leaf is coated with oil, warmed and applied on paining part of

body. Floss (Bhuwa) are used for stuffing pillows and used during headache.

*Cassia fistula* L. (Leguminosae); Tree; *Chawan Prass*, *Ahiroga*; Sirisia, Shivnaha (CBL-41343)

Leaf extract is applied on ring worm (Dad) to cure.

*Centella asiatica* (L.) Urb. (Apiaceae); Herb; *Brahmbuti*, *Tal puren*; Naurangia Don (CBL-41464)

Leaves are given with leaves of *Aegle* and squash of sugar crystal (Mishri) to reduce the effect of hotness. Leaf powder is applied on leprosy affected part.

*Croton bonplandianus* Baill. (Euphorbiaceae); Herb; *Mirchi ghas*, *Marchaiya khar*; Pachrauta (CBL-41329)

Plant sap is applied to cure black rashes/spots on face.

*Cyanthillium cinereum* (L.) H. Rob. (Compositae); Herb; *Shankhpuspi*; Naurangia Don (CBL-41456)

Whole plant is pasted with leaves of *Centella* (Brahmbuti, Talpuren) and the powder (1 spoon) is given in morning in the treatment of all kinds of piles.

*Datura stramonium* L. (Solanaceae); Shrub; *Dhatura*, *Dhutuwa*; Gamharia, Naurangia Don (CBL-41322, 41461)

\*Seeds are boiled in sesame oil (Til) and applied on paralytic (Phalis) parts of the body.

*Dioscorea glabra* Roxb. (Dioscoreaceae); Climber; *Tin Fankai*, *Chilmilia*; Jamauli, Bajani (CBL-41253)

Rhizomes are used in piles.

*Diplocyclos palmatus* (L.) C. Jeffrey (Cucurbitaceae); Climber; *Shivlingi*; Pachrauta (CBL-41330)

Seeds (7) are eaten daily for 15 days to increase sperm count in semen. During these period sour things, fish, brinjal should be avoided.

*Ficus benghalensis* L. (Moraceae); Tree; *Bar*; Sirisia (41345) Latex is filled in puffed sugar balls (Batasa), and taken in morning for the treatment of spermatorrhoea, hotness and stomach related troubles.

*Ficus racemosa* L. (Moraceae); Tree; *Gular*; Gamharia (CBL-41321)

Fruits are also cooked as pudding (Halwa) and given for cooling purpose.

*Grevillea robusta* A. Cunn. Ex R.Br. (Proteaceae); Tree; *Sudarshan*; Naurangia Don (CBL-41459)

\*Leaf powder is given in the treatment of leprosy.

*Hibiscus rosa-sinensis* L. (Malvaceae); Shrub; *Udhal*, *Gudhal*; Naurangia Don (CBL- 41473)  
Flowers (5) are eaten early morning to stop bleeding from any part like nose, mouth, rectum, ear, urine.

*Holarrhena pubescens* Wall. ex G.Don (Apocynaceae); Tree; *Dudh Kuriyan*; Jamauli, Bajani, Sirisia (CBL- 41267)  
Bark powder is given in the treatment of gastric troubles. Bark powder is mixed with 'Triphala', *Rauwolfia* and *Asparagus* and given in stomach ache. Bark paste is applied as poultice on paining part of the body. Flowers are eaten in the treatment of limb pain.

*Hyptis suaveolens* (L.) Poit. (Lamiaceae); Shrub; *Ban Tulsi*; Bajani, Jigna (CBL- 41291)  
\*Leaves are kept in a glass of water for overnight and the resultant water is taken in the morning to pass urine normally.

*Ipomoea carnea* Jacq. (Convolvulaceae); Shrub; *Berharm*, *Behawa*; Dhamraha (CBL- 41298)  
\*Latex is applied on fungal infection between toes in rainy season.

*Jatropha curcas* L. (Euphorbiaceae); Shrub; *Bagred*, *diesal plant*; Naurangia Don, Domat (CBL- 41470)  
Stem twigs are used as tooth brush in the treatment of mouth sore.

*Lagerstroemia parviflora* Roxb. (Lythraceae); Tree; *Ashidh*; Jamauli (41265)  
Gum (Lasa) is looks like crystal sugar (Mishri) and it is given in stomach pain for 2 days.

*Leea indica* (Burm. f.) Merr. (Vitaceae); Shrub; *Gaduwasan*; Dukarihawa Forest, Kaila-23 (CBL- 41423)  
\*Roots are pasted and applied on mouth sores to cure.

*Leucas cephalotes* (Roth) Spreng. (Lamiaceae); Herb; *Chhota Gumma*; Naurangia Don (CBL- 41457)  
Tender leaves are boiled and made chutney, which is prescribed to clean stomach, fever, flatulence and vomiting sensation (Pet Gumna).

*Leucas decemdentata* (Willd.) Sm. (Lamiaceae); Herb; *Ban Gumma*; Jamauli (CBL- 41272)  
\*Roots are powdered and given with water in the morning in the treatment of fever.

*Leucas zeylanica* (L.) W.T.Aiton (Lamiaceae); Herb; *Gunima*; Bajani, Pachrauta (CBL- 41289)  
Leaves are pasted and given with water in gastric troubles.

*Madhuca longifolia* var. *latifolia* (Roxb.) A.Chev. (Sapotaceae); Tree; *Mahua*; Jata Shankar Van Path, Sirisia (CBL- 41387)  
Bark powder is used in toothache. Flowers are eaten for vigour and vitality. Fruits are cooked with milk and made pudding (Halwa). It is (2 spoonful) taken in the morning daily for weakness as tonic. Fruits (Kunayi) are dried and eaten. It is prescribed to old age person to reduce body pain. Stem twig is used as tooth brush to reduce toothache.

*Mallotus philippensis* (Lam.) Müll.Arg. (Euphorbiaceae); Tree; *Ruyana*; Jamauli, Dohram, Sikatia (CBL- 41255)  
Small twigs are used as tooth brush (Datun) to reduce toothache.

*Melia azadirach* L. (Meliaceae); Tree; *Bakain*; Naurangia Don, Bajani (CBL- 41465)  
Leaves are pasted and taken with water to remove *Ascaris* from stomach. Leaf paste is applied on skull to kill lice. Leaves are burnt with leaves of *Bombax*, *Ficus bengalensis* and mixed with coconut oil and applied on wounds.

*Mimosa himalayana* Gamble (Leguminosae); Woody climber; *Avari kanta*, *Tairy*; Jamauli, Shivnaha (CBL- 41263, 41378)  
New buds/leaves (Tausa) are pasted with water and given (1-2 spoon) in the treatment of fever.

*Mimosa pudica* L. (Leguminosae); Herb; *Lajwanti*, *Bajonia Khar*; Bajani, Sikatia (CBL- 41288)  
Roots are pasted and given 2 - 3 times in stomach pain. Roots are also pasted and given with black pepper (2 <sup>1</sup>/<sub>2</sub>) in jaundice.

*Moringa oleifera* Lam. (Moringaceae); Tree; *Sajuwan*; Harkatua, Naurangia Don (CBL- 41295, 41466)  
Leaves, flowers and fruits are cooked as vegetable and given to enhance the blood quantity and to avoid piles. It is also given in pox (Chechak).

*Nerium oleander* L. (Apocynaceae); Shrub; *Kanel*; Naurangia Don (CBL- 41471)  
Leaves are warmed on fire and the extract is poured in ear during earache.

*Nyctanthes arbor-tristis* L. (Oleaceae); Shrub; *Ratrani*, *Sigarhar*, *Pariyad*; Daruwa Badi, Naurangia Don (CBL- 41401)  
Bark decoction is given in the treatment of fever. Leaves are boiled with water, black pepper and salt and taken as tea 2 - 4 times in the treatment of fever, cough and body pain.

*Ocimum tenuiflorum* L. (Lamiaceae); Herb; *Tulsi*; Pachrauta, Gamharia (CBL- 41325)

Leaf decoction is given in fever, cold and cough. Seeds are chewed in sexual weakness.

*Oxalis corniculata* L. (Oxalidaceae); Herb; *Amauta*; Jata Shankar Van Path (CBL- 41390)

Leaves are chewed during mouth sore (Chhala).

*Persicaria barbata* (L.) H.Hara (Polygonaceae); Herb; *Mirmiriya jhad*; Domat (CBL- 41302)

\*Leaves are burnt and the smoke is used to cure fungal infection between toes. Leaves are boiled and the resultant water is used to cure filaria.

*Phlogacanthus thyriformis* (Roxb. ex Hardw.) Mabb. (Acanthaceae); Shrub; *Chuha*; Naurangia Don (CBL- 41469)  
Flowers are used for making chutney and it is also prescribed in diabetes and constipation. Leaf paste is given in the treatment of fever.

*Phyllanthus reticulatus* Poir. (Phyllanthaceae); Shrub; *Siket*; Dumariya (CBL- 41305)

Stem is used as tooth brush (Datun) to reduce toothache.

*Pogostemon benghalensis* (Burm.f.) Kuntze (Lamiaceae); Herb; *Shito Basoni Jhang, Kohbar*; Bajani, Sikatia (CBL- 41293)

Leaves are pasted and applied on whole body in the treatment of allergic reddish rashes. Leaves are warmed and fomented on waist of women in waist pain.

*Pongamia pinnata* (L.) Pierre (Leguminosae); Tree; *Karanj, Karuwani*; Dumariya, Gamharia (CBL- 41307)

Seed oil is applied on forehead for cooling purpose.

*Putranjiva roxburghii* Wall. (Putranjivaceae); Tree; *Patjeev*; Langadi-20, Bhadiyadi (41441)

Seeds are used for making necklace and worn to the patient suffering from allergy/red rashes (Jalput) in summer.

*Rauvolfia serpentina* (L.) Benth.ex Kurz (Apocynaceae); Herb; *Sarpgandha, Dharbaruwa*; Naurangia Don, Lal Bhitia, Sirisia (CBL- 41453)

Root powder is given in stomach related troubles, fever and cold. Root is rubbed on stone and the paste is given 2-3 times in fever. It is also given to neutralize the effect of snake poison.

*Ricinus communis* L. (Euphorbiaceae); Shrub; *Ledy, Redy, Andi*; Gamharia, Naurangia Don (CBL- 41319)

Seed oil is applied on forehead of infants for cooling purpose in summer. Seed oil (2 - 4 drops) is mixed with lime stone (Chuna) as size of black pepper and applied on goitre (Ghenga) and outgrowth (Gilti). Oil is massaged below feet.

*Scoparia dulcis* L. (Plantaginaceae); Herb; *Chinia, Chinia buti*; Pachrauta, Naurangia Don (CBL- 41327)

Leaves are chewed to cure burning sensation (Jalan) in stomach. Leaves are pasted with black pepper and given to check burping (Dakar).

*Shorea robusta* Gaertn. (Dipterocarpaceae); Tree; *Sal, Sakhuwa*; Sirisia, Bajani, Naurangia Don (CBL- 41354)

Seeds are powdered with 'Triphala', *Rauvolfia*, 'Lodh', 'Kawaru' and given (1 spoon) morning and evening in the treatment of filaria (Hathipanw). Resin is burnt in earthen pot (Handi) and the smoke is inhaled in eyes during redness or hurt.

*Smilax ovalifolia* Roxb. ex D.Don (Smilacaceae); Woody climber; *Dayeen Lata, Ram Datuwan, Gabnaha*; Jamauli, Bajani, Sirisia, Daruwa Badi (CBL- 41260)

New tender stems (Tusa) are fried with oil and spices and made vegetable (Bhujia). It is given in stomach pain. Stem twig is used as tooth brush to reduce toothache.

*Solanum americanum* Mill. (Solanaceae); Herb; *Upartakwa Mirch, Khursani, Bhat Kunwa*; Jigna, Santepur, Naurangia Don (CBL- 41323, 41397, 41463)

Whole plant is boiled in earthen vessels (Handi) and the vapour is taken in the treatment of swelling.

*Solanum virginianum* L. (Solanaceae); Herb; *Chher Gorakha, Kat kataiya*; Bajani, Pachrauta (CBL- 41290)

Leaves are pasted and applied on forehead in headache. Fruits are dried and fried with rectified butter (Ghee) and given in dry cough. Fruits are cut into small pieces, powdered and fried with ghee. It is given with black pepper (2 - 4) in morning and evening in the treatment of cough. Fruits are burnt and the smoke is inhaled to remove worm and reduce pain in infected teeth.

*Spatholobus parviflorus* (DC.) Kuntze (Leguminosae); Woody climber; *Charni, Banwad, Mahay, Mahain*; Jamauli, Bajani, Daruwa Badi, Sirisia (CBL- 41252)

\*Seed oil is applied as fungal infection between toes in rainy season.

*Spermadictyon suaveolens* Roxb. (Rubiaceae); Shrub; *Badrunia*; Jamauli (CBL- 41279)

Leaf paste is applied to cure skin diseases.

*Streblus asper* Lour. (Moraceae); Tree; *Sihor*; Pachrauta, Mandiha, Gobardhana, Sikatia, Langadi (CBL- 41336)

Plant sap is applied on heels to cure cracks.

*Swertia angustifolia* Buch.-Ham. ex D. Don (Gentianaceae); Herb; *Chiraita*; Naurangia Don (CBL- 41455)

Plant decoction is given in digestive troubles. It is also given to purify the blood.

*Tectona grandis* L.f. (Verbenaceae); Tree; *Sagwan*; Naurangia Don (CBL- 41467)

The apical bud (Tusa) is pasted and applied on ring worm (Dad, Dinay) for 2 days only.

*Tephrosia candida* (Roxb.) DC. (Leguminosae); Shrub; *Neel Phool*; Sirisia (CBL- 41359)

\*Leaf paste is applied to cure skin diseases.

*Terminalia arjuna* (Roxb. ex DC.) Wight & Arn. (Combretaceae); Tree; *Kawa, Arjun*; Domat, Naurangia Don (CBL- 41482)

Bark decoction is given in proper heartbeat, asthma, BP and other heart trouble.

*Terminalia chebula* Retz. (Combretaceae); Tree; *Harre*; Sirisia (CBL- 41350)

Fruit powder is eaten in cough and digestive trouble.

*Trichodesma indicum* (L.) Lehm. (Boraginaceae); Herb; *Bhuechapada*; Sirisia (CBL-41358)

Leaf paste is applied to cure skin diseases.

*Uraria rufescens* (DC.) Schindl. (Leguminosae); Herb; *Lampatiya*; Gonauli (CBL-41360)

Leaf paste is applied to cure skin diseases.

*Urena lobata* L. (Malvaceae); Herb; *Chidchidia, lapta*; Jamauli, Bajani, Gamharia (CBL-41262)

Roots are powdered and given with water in gastric troubles.

*Vallis solanacea* (Roth) Kuntze (Apocynaceae); Woody climber; *Dudh latiya (Ujarka)*; West Champaran: Ghajula (CBL-41338)

Stem twig is used as tooth brush to reduce toothache.

*Vernonia amygdalina* Delile (Compositae); Shrub; *Sugar plant*; Naurangia Don (CBL-41468)

Leaf powder is given in the treatment of diabetes.

*Vitex negundo* L. (Lamiaceae); Shrub; *Senuwar*; Banuhava Parsa (CBL-41361)

Leaves are boiled with water, and then a cotton cloth is dipped in that water to foment the knee to reduce pain.

*Woodfordia fruticosa* (L.) Kurz (Lythraceae); Shrub; *Dhair, Dhair*; Sirisia, Kaila (CBL-41349)

Stem bark is boiled with water and that water is applied on burnt part of body till cure.

## DISCUSSION

A total number of 109 ethnomedicinal information on 67 plant species belonging to 36 families and 61 genera have been collected from the tribal and rural people of West Champaran district of Bihar during the study. Of these, it is analyzed that these plants are used for 29 diseases/ disorders/ ailments like Abortion (1), Asthma (1), Body pain (4), Burning sensation (01), Constipation (3), Cooling purpose (3), Cough and cold (4), Cut and wounds (3), Dabetes (3), Earache (2), Fever (9), Filaria (3), Gastric trouble (3), Hair fall (01), Headache (3), Jaundice (1), Kill lice (1), Mouth sores (4), Nephroletic problems (1), Paralysis (1), Piles (3), Poison antidote (3), Pox (1), Rheumatism (2), Skin diseases (18), Spermatorrhoea (1), Stomach problems (15), Tooth ache (9), Vigour and vitality(3) etc. were observed dominant in the area. The above analysis reveals that tribal and rural people of this district are using highest number of plant species for Skin diseases (18 species) followed by stomach problems (15 species), Fever (9 species) and toothache (9 species) (Fig.2). As far as families are concern family Leguminosae is represented by maximum number of plants (9 species) followed by Lamiaceae (7 species) and Apocynaceae (5) (Fig. 3). Habit-wise analysis revealed that herbs are dominated with (23 species) followed by trees (19 species) and shrub (16 species) (Fig.4). After comparison and cross checking of collected uses with relevant literatures, it is revealed that 11 ethnomedicinal uses of plants (marked by \*) have not recorded earlier.

## CONCLUSION

Due to less interest of young generation towards traditional knowledge, urbanization and unscientific exploitation of natural forests, these valuable knowledge as well as plant species are getting depleted leading to their extinction. Therefore, it is necessary to collect and document such precious knowledge from the tribal and remote areas before their complete depletion and also increase awareness among the tribal communities for sustainable use of plant wealth and their conservation. These ethnomedicinal plants should be analyzed chemically for identification of their active constituents responsible for their efficacy to these diseases by various pharmaceutical industries /laboratories to give a lead to development of new herbal drug molecules. Some potential plant species should be identified for the establishment of herbal cottage industries in the tribal areas for the socio-economic augmentation of the country as a whole and tribal in particular.

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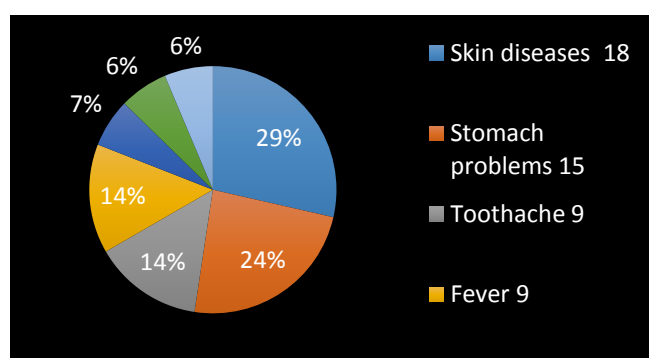


Fig. 2. Disease wise analysis

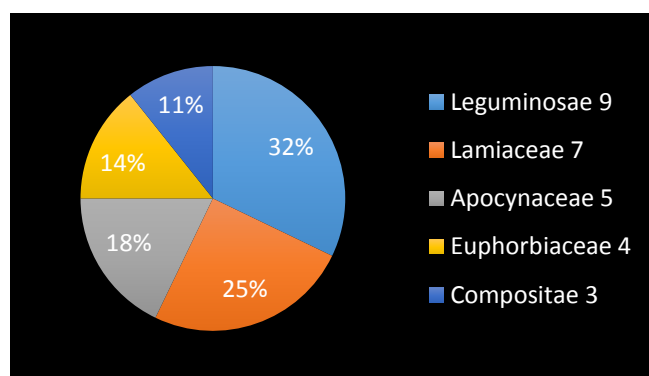


Fig. 3. Dominant families of ethnomedicinal plants

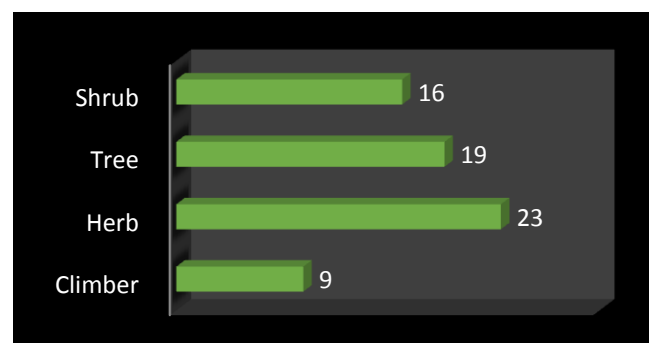


Fig. 4. Habit wise analysis

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