

**AN ETHNOBOTANICAL SURVEY OF MEDICINAL PLANTS USED BY THE TRIBAL AND NON-TRIBAL PEOPLES OF MALDA DISTRICT OF WEST BENGAL, INDIA FOR THE TREATMENT OF SKIN DISEASES**

Swapan Kumar Chowdhury

Deptt. of Botany, Sreegopal Banerjee College, Bagati, Mogra, Hooghly, Pincode-712148, West Bengal, India

***Corresponding author e-mail:** chowdhuryswapankr3@gmail.com**ABSTRACT**

The present study was aimed at exploring the traditional Ethno medicine knowledge of native tribes on the utilization of wild plant species for local healthcare management in Malda district of West Bengal, India and its present status. With this objective in view, this ethno botanical study among the local tribal and non-tribal people of this district has been carried out during January 2012 to January 2013 in search of traditional healers or practitioners who ceaselessly use their worthy knowledge to treat several skin ailments for human purposes. The information was collected by means of open-ended conversations, semi-structured questionnaire, group discussion, etc. Information obtained from the informants was also cross verified to check the authenticity. This study revealed that a total of 75 medicinal plants under 65 genera of 42 families are frequently used to treat various types of ailments with 10 herbal preparations. of 75 plants, herbs possess the highest growth forms (40%) that were used in making traditional preparation, followed by shrubs (26%), trees (24%) and climbers (9.34%). Leaves comprised the major plant parts used (49.34%), followed by stem (1.34%), Root (8%), seeds (2.6%), bark (5.34%), whole plant (10.67%), fruits (4%), Rhizome (2.67%), Latex (6.67%), Throne (1.34%) ,Resin (1.34%) and oil (1.34) to prepare in the medicinal formulations for skin problems.

Key-words: Ethno medicine, tribal and non-tribal communities, skin diseases, Malda**1. INTRODUCTION**

Malda district is an important place of West Bengal where different types of medicinal plants are grown. This district has different tribal and non-tribal communities. These tribal and non-tribal peoples are residing at the lap of the nature and are using the medicinal plants (resources of nature) for their health problems. But due to their modernization, in these communities, they gradually give up their culture and traditional knowledge to which they were accustomed from generation to generation. In this way the tribal and non-tribal communities to preserve and save their acquired valuable ethno botanical knowledge from extinction Traditional medicine based on herbal remedies has always played a key role in the health systems of

many countries. The origin and evolution of recent valuable knowledge about medicinal plants are based on the ancient medicinal knowledge reported in *Ayurveda*, *Unani* and *Siddha*. World Health Organization (WHO) reported that 80% peoples of world use several plants for various therapeutic purposes. Among of them India is a richest floristic regions of the World. Chandel et al. have reported that nearly about 70% of tribal and rural inhabitants of India are to a large extent depended on medicinal plants for their primary healthcare management due to either insufficient or inaccessible or less availability of modern healthcare system. Malda is spotted with tribal and non-tribal pockets, rich in germplasm of medicinal plants. In this regards, the Malda tribal and nontribal pocket constitute an important source of medicinal plants. In this regards,

the Malda tribal and non-tribal pocket constitute an important source of medicinal plants. The Malda a predominant tribal and non-tribal community of West Bengal is the focus of the present study.

The district of Malda is gate way of northern part of west Bengal. Malda district of West Bengal, India was formed in the year, 1813, taking out some area of the Purina (Bihar), Dinajpur (the then Bengal) and Rajsahi District of adjoining Country like Bangladesh. At present the district has two sub-division (English and chanchal) which are divided into 15 blocks in total. The geographical location of Malda district is situated between the latitude and longitude of 24°40'20"N to 25°32'08"N and 88°28'10"E to 87°45'50"E respectively with a total geographical area of 3733sq km. According to the census report 2011, the district population is 3290468 of which 227047 belongs to tribal people that is recognized as the schedule tribe population of the district.

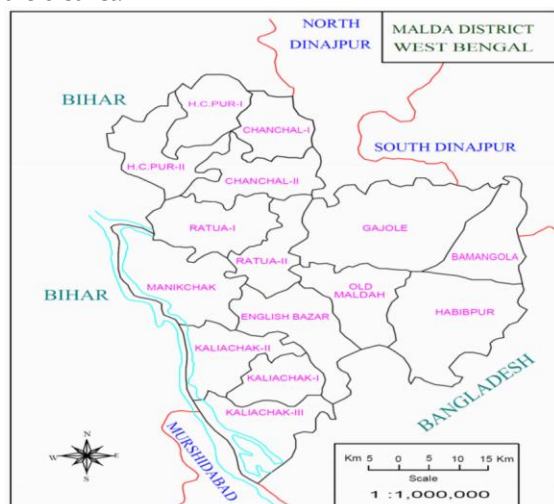


Figure 1:- Location map of survey area with different Blocks of Malda district.

Topographically, the Malda district can be divided in to two broad zone which are Rarh region and the Barind region. The district is made up of old and new alluvial type of soil mainly.

At present in the district there is no natural forest within the boundary of the district. Plantation forest covers an area of 16.94 sq.km. +Which is only 0.49% of the total areas of the district. According to the classification of the forest department of Malda district, the forested area can be classified in to – i. Low land forest and ii. High land forest. Adina forest area is the largest forest area of the district, besides this; there are some small forest areas in Old Malda, which are at Harish Chandrapur and at Gajol. The Bhaluka forest is another important forest of the district which still contents a remnant of the natural forest vegetation.

Various ethnic communities, including Santala, Rajbanshi, Namasudre, Polia, Oraon, Mundas, Malpaharias, Lodha, Sabar etc. are the inhabitants of this region. Of these Santala, Oraon is different from others due to their unique culture and tradition. They are quite popular to treat several types of local ailments of human and veterinary purposes.

Some earlier workers like Bandyopadhyay et al (2005, 2006, 2009) studied the ethno botany of Koch Bihar district; Basak (2006), Mitra (2002), Mitra et al. (2005a, 2005b, 2007, 2009) studied the ethno botany of West Dinajpur district; Sur, et al. (1987a, 1987b, 1990) have reported work carried out on the ethno botany of the Malda district.

The main aim of the present study is to collect information a traditional uses of medicinal plants used in the preparation of herbal drugs for the treatment of skin diseases by the tribal and non-tribal people living in Malda district. The objective of this study was to interact with local traditional healers and to document their knowledge on utilization of medicinal plants, their usage and the types of diseases treated.

2. MATERIALS AND METHOD

The survey was carried out during the year 2012-2013 in the tribal and non-tribal inhabited area of Malda district. Present work is entirely based on the field survey in different tribal areas of Malda district. The data has been collected from local tribal healers known as go-kaviraj or go-baidya or Ojha and also from local knowledgeable person belonging to different ethnic communities. An ethno Botanical study was undertaken in some selected places of Malda district namely, Nalagola, Bamongola, Pakuahat, Lakhipur, Aoho, Bulbulchandi, Rishipur, Chandpur, gazole, Habibpur, valuka, Manikchak, samsi, Milki, Bangitola, Jadupur, Aamrita, Kaliachak, Mothabari, Uttarlakhipur, Babla, chanchal, sattari, sobhanagar, Ratua, Sujapur, Rajnagar, Sultangang etc. with the help of semi-structured individuals interviews and group discussion. By the same way the local name of the plant is also recorded to relocate the plants once again in the field. Information is arranged here alphabetically following the sequence of Sl. No. scientific name, family, vernacular name parts used, Habit, Preparation and Uses/Ailments. The plants were properly photographed, and herbarium was prepared for each specimen and deposited at Sreegopal Banerjee College, Bagati, India. The collected specimens were identified with the help of Central National Herbarium, Kolkata, India. The survey method followed in this study was that of the guided field-walk method as described by Jain and

the collection of voucher specimen, preservation, herbaria technique was followed as per Jain and Rao.

To analysis the data more clearly, obtaining from the informants, I set up my own database using Microsoft Access version 2013 and the parameters were name of the taxon, family, vernacular name, parts used, Habit, Preparation and Uses/Ailments. I also analysed the percentage between the used parts of plant species, growth forms of the species and total number of families by putting them in the graph.

3. RESULTS AND DISCUSSION

The present study revealed that a total of 75 medicinal plants under 65 genera of 42 families were frequently used in the treatment of many types of local skin disease. The number of species most frequently used in the treatment of several disorders by each family was mentioned as Euphorbiaceae-6 species, whereas Acanthaceae and Asteraceae-5 species, Fabaceae, Rubiaceae, and Solanaceae-4 species, combretaceae and Apocynaceae-3 species, Amaranthaceae, Mimosaceae, Zingiberaceae, Cucurbitaceae, Nyctaginaceae, Begoniaceae, Moraceae, Liliaceae, Lamiaceae contributed 2 species to each family. The rest of 22 families were represented by 1 species in each as shown in **Table 4**. The scientific names of recorded species, their families, vernacular names, used parts, Ailments were illustrated in **Table 1**. The study also exhibited that herbs were the most dominant growth forms with 30 species (40%), followed by 20 shrubs (26.67%), 18 trees (24%), 7 climbers (9.34%) treating different ailments as shown in **Table 2**. *Cassia fistula*, *Amaranthus*

spinous, *Alstonia scholaris*, *Abutilon indicum*, *Acacia concinia*, *Aristolochia indica*, *Annona squamosa*, *Barelia cristata* etc. were the most important plant used in the treatment of several Skin diseases.

Various preparations of leaves were used most number of occasions with 30 times (40%), followed by Whole plant with 8 times (10.67%), seeds and Rhizome with 2 times (2.67%), barks with 4 times (5.34%), Roots with 6 times (8%), fruits and Tuber with 3 times (3%), latex with 5 times (6.67%), Stem, and resin with 1 times (1.34) etc. as shown in **Table 3** in the treatment of several human disorders.

Further, it can be concluded from **Table 1** that the most of the preparations were external use except a few of oral. Various methods of preparation like crushing, grinding, direct use and homogenizing in water or with other plant extracts were used to prepare the traditional remedy.

As the tribal people remain busy throughout the year with their practice of livelihood from the agricultural sector, they rarely visit the hospitals in towns. Simultaneously, they cannot afford the cost of modern medicines. It has also been observed that some of the villages are in such remote areas where transportation facilities are inaccessible or sometimes become detached due to some natural calamities. Hence, the villagers cannot reach the nearby hospital. As a result, the ethno medicinal practices are popular in the study area as it is more accessible, easy to prepare, low costs, and eco-friendly. Besides, the practice of medicinal plants treating the patients is an alternative source of income for the healers.

Table: 1, Enumeration of the medicinal plants used by the tribal and non-tribal people of Malda district.

SL. NO	Scientific name	Family	Vernacular name	Parts used	Habit	Used as	Uses/ Ailments
1	<i>Abutilon indicum</i> Figure-2	Malvaceae	Patari	Leaf	Shrub	Paste	Ringworm infection
2	<i>Acacia concinia</i>	Mimosaceae	Sikaki	root	Shrub	juice	Dandruffs
3	<i>Acalypha indica</i> Figure-3	Euphorbiaceae	Muktajhuri	Leaf	Herb	paste	Eczema
4	<i>Aegle marmelos</i>	Rutaceae	Bel	Leaf	Tree	juice	abscess
5	<i>Achyranthes aspera</i>	Amaranthaceae	Apang	Leaf	Herb	Paste	Eczema
6	<i>Aloe vera</i>	Liliaceae	Ghikumari	Leaf	Herb	raw	Eczema, Scabies Ringworm infection
7	<i>Alstonia scholaris</i> Figure-4	Apocynaceae	Chhatim	Latex	Tree	Raw	Wounds

8	<i>Amaranthus viridis</i> Figure-5	Amaranthaceae	Green Amaranth	Whole plant	Herb	Paste	Scabies
10	<i>Andrographis paniculata</i>	Acanthaceae	Kalmegh	Leaf	Herb	Paste	Dandruff
11	<i>Artemisia vulgaris</i> Figure-6	Asteraceae	Nagdona	Leaf	Tree	paste	Headache and sinus
12	<i>Argemone mexicana</i> Figure-7	Papaveraceae	Siyalkanta	Root	Herb	paste	decoction used for piles
13	<i>Aristolochia indica</i> Figure-8	Aristolochiaceae	Isvaramuli	Whole plant	Climber	paste	Eczema, Scabies Ringworm infection
14	<i>Artocarpus heterophyllus</i>	Moraceae	Kathal	Leaf	Tree	Juice	Itches
15	<i>Asparagus racemosus</i>	Liliaceae	shatamul	Tuber	Climber	Paste	Ringworm infection
16	<i>Annonas quamosa</i>	Annonaceae	Ata	Leaf	Tree	paste	abscess
17	<i>Azadirachta indica</i>	Meliaceae	Neem	Bark	Tree	paste	Skin diseases
18	<i>Bauhinia acuminata</i>	Caesalpiniaceae	SwetKanchan	Flower Dried	Shrub	paste	skin diseases
19	<i>Barelia cristata</i>	Acanthaceae	Janti	leaf	Shrub	paste	skin diseases
20	<i>Basella alba</i>	Basellaceae	Pui	Stem	Climber	stem ash	Cure pyorrhoea.
21	<i>Begonia malabarica</i>	Begoniaceae	Malabar Begonia	Leaf	Herb	Paste	Ringworm infection
22	<i>Boerhavia diffusa</i> Figure-9	Nyctginaceae	Punorva	Leaf	Herb	Paste	Ringworm infection
23	<i>Calotropis gigantean</i>	Apocynaceae	Akanda	Leaf and latex	Shrub	Oil latex	Eczema
24	<i>Carica papaya</i>	Caricaceae	Papaya	Latex	Shrub	paste	Itches.
25	<i>Cassia alata</i>	Fabaceae	Chakunda	Leaf	Shrub	paste	Ringworm infection
26	<i>Cassia fistula</i>	Fabaceae	Amaltaas	Bark	Shrub	paste	Eczema
27	<i>Centella asiatica</i>	Apiaceae	Thankuni	Leaf	Herb	paste	Eczema
28	<i>Chromolaena odorata</i>	Asteraceae	Assam Lata	Leaf	Tree	paste	Stop bleeding.
29	<i>Clitoria ternatea</i>	Fabaceae	Aparajita	Leaf	Climber	Paste	Ringworm infection, Scabies
30	<i>Cocos nucifera</i>	Arecaceae	Narikel	Fruit	Tree	Oil extract	Skin diseases and infection.
31	<i>Coccinia grandis</i>	Cucurbitaceae	Telakucha	Whole plant	Climber	Paste.	eczema
	Figure-11						
32	<i>Commelina benghalensis</i>	Commelinaceae	Kanchire	Leaf	Tree	paste	skin irritation
33	<i>Costus speciosus</i>	Costaceae	Keu, Keumut	Whole plant	Shrub	juice	skin infection
34	<i>Croton banplangianum</i>	Euphorbiaceae	Churchuri	Latex.	Tree	paste	Cuts and wounds.
35	<i>Croton tiglium</i>	Euphorbiaceae	Jamaal Gota	Whole part	shrub	paste	Skin affections

36	<i>Cucuma aromatica</i>	Zinziberaceae	janglihaladi	Rhizome	Herb	Paste	Skin inflammatio, Acnes
37	<i>Cucuma longa</i>	Zinziberaceae	haldi	Rhizome	Herb	Paste	Scabies, Skin inflammation
38	<i>Cynodon dactylon</i>	Poaceae	Durba	Whole plant	Tree	paste	Cuts and wounds for Stop bleeding.
39	<i>Eclipta alba</i> Figure-12	Asteraceae	Keshute	Leaf	Herb	Oil extract	Dandruff, Ringworm infection
40	<i>Eclipta prostrata</i>	Asteraceae	Bhringraj	Whole plant	Herb	Paste	Ringworm infection allergy
41	<i>Evolvulus alsinoides</i>	Convolvulaceae	Vishnu gandhi	Whole plant	Herb	Oil injectio	Scabies, Leprosy
42	<i>Ficus bengalensis</i>	Moraceae	Bot	Root and Latex	Tree	Oil extract	Dandruff, Cracks on the foot.
43	<i>Heliotropium indicum</i>	Boraginaceae	Hatisur	Leaf	Herb	Paste	Ringworm infection
44	<i>Helidesmus indicus</i>	Periplocaceae	Anantamul,	Root	Climbe r	Oil extract	Eczema, Scabies, Ringworm infection
45	<i>Hiptage bengalensis</i>	Malpighiaceae	Madhavilat a	Leaf	Shrub	Paste	Ringworm infection
46	<i>Hygrophila ariculata</i>	Acanthaceae	Kokilaksha	seed	shrub	Oil extract	Skin infection
47	<i>Ixora coccinea</i>	Rubiaceae	LalRangan	Flowers	Shrub	Oil extract	Eczema,
48	<i>Jatropha curcas</i>	Euphorbiaceae	Barbados nut	Leaf	Shrub	Paste	Eczema, Scabies, Ringworm infection
49	<i>Jatropha gossypiiifolia</i>	Euphorbiaceae	LalVarenda	Latex.	shrub	paste	Pyorrhea and boil.
50	<i>Justicia adhatoda</i>	Acanthaceae	Vasaka	Leaf	Shrub	Paste	Scabies, Ringworm infection
51	<i>Kalonchoe pinnata</i>	Crassulaceae	Patharkuch	Leaf	Herb	Paste	Cuts and wounds, Ringworm infection
52	<i>Lycopersicon esculenta</i>	Solanaceae	Tomato	Fruit	Herb	Juice	Skin infection
53	<i>Lawsonia inermis</i>	Lythraceae	Mehendi	Leaf	Shrub	Oil injectio	Dandruff, Ringworm infection
54	<i>Leucus aspera</i> Figure-14	Lamiaceae	Hulkasha	Leaf	Herb	Paste	Ringworm infection.
55	<i>Mangifera indica</i>	Anacardiaceae	Aam	Resin	Tree	Water extract	Cracks on the foot.
56	<i>Mimosa pudica</i>	Mimosaceae	lajjabati	Leaf	Herb	Paste	Eczema.
57	<i>Monodica charantia</i>	Cucurbitaceae	Karola	Leaf	Herb	Paste	Scabies, Ringworm infection
58	<i>Mirabilis jalapa</i>	Nyctanginaceae	Sandhyamal oti	Tuber	Herb	Paste	Sebaceous cysts, polyps
59	<i>Moringa pterygosperma</i>	Moringaceae	Sainjna	Bark	Herb	Paste	Eczema.
60	<i>Mussaenda frondosa.</i>	Rubiaceae	Massena	Leaf	Shrub	Paste	white Leprosy
61	<i>Rumex maritimus</i>	Polygonaceae	Jungli- palong	Root	Herb	Paste	Skin infection
62	<i>Ocimum bacilicum</i>	Lamiaceae	Common Basil	Leaf	Herb	Oil extract	Scabies, Eczema
63	<i>Phyllanthus emblica</i>	Euphorbiaceae	amlaki	Fruits	Tree	Oil extract	Scabies,

64	<i>Piper nigrum</i>	Piperaceae	Golmarich	Leaf	Climber	Paste	Ringworm infection.
65	<i>Paederia sandens</i>	Rubiaceae	Gadalpata	Leaf	Herb	Paste	Sores skin
66	<i>Pongamia pinata</i>	Fabaceae	Karanja / Gokaranja	Bark	Tree	Oil extract	Scabies, Leprosy, Ringworm infection
67	<i>Rouvolfia serpentina</i>	Apocynaceae	Shrub	Root	Shrub	Oil extract	Eczema, Scabies Ringworm
68	<i>Solanum tuberosa</i>	Solanaceae	Potato	Tuber	Herb	Paste	Skin inflammation
69	<i>Solanum nigrum</i> Figure-16	Solanaceae	Kakmachi	Leaf	Herb	Paste	Skin allergy, Rashes Skin
70	<i>Solanum virginianum</i>	Solanaceae	Kantakari	Leaf	Herb	Paste	applied on painful joints to relieve pains
71	<i>Terminalia paniculata</i>	Combretaceae	Kindal	Leaf	Tree	Paste	Alopecia
72	<i>Terminalia arjuna</i>	Combretaceae	Arjun	Bark	Tree	paste	skin diseases
73	<i>Terminalia bellirica</i>	Combretaceae	Bahera	seed	Tree	paste	Skin disease.
74	<i>Vangueria spinosa</i>	Rubiaceae	Moyena kanta	Thorn	Shrub	Paste	Piles.
75	<i>Vernonia cinerea</i>	Asteraceae	Sahadevi	Leaf	Herb	Oil extract	Leprosy, Scabies

Table 2. Analysis of the data based on habit showed that leading medicinal plants species

Habit	No. of species	Percentage (%)	Total No. of species
Herb	30	40	75
Shrub	20	26.67	75
Tree	18	24	75
Climber	07	9.34	75

Table 3. Number of plant parts used for medicinal purpose

Sl. No.	Name of the parts	Use of plant parts	Percentage	Total No. of species
1	Whole plant	08	10.47	75
2	Leaf	37	49.34	75
3	Stem	01	1.34	75
4	Flower	02	2.67	75
5	Fruit	03	4	75
6	Seed	02	2.67	75
7	Throne	01	1.34	75
8	Root	06	8	75
9	Rhizome	02	2.67	75
10	Latex	05	6.67	75
11	Tuber	03	4	75
12	Resin	1	1.34	75

Table 4. Distribution of species among different families

S/N	Family name	Number of species	Percentage (%)	Total number of species
1	Malvaceae	01	1.34	75
2	Mimosaceae	02	2.67	75
3	Euphorbiaceae	06	8	75
4	Rutaceae	01	1.34	75
5	Amaranthaceae	02	2.67	75
6	Liliaceae	02	2.67	75
7	Apocynaceae	03	4	75
8	Acanthaceae	05	6.67	75

9	Asteraceae	05	6.67	75
10	Papaveraceae	01	1.34	75
11	Aristolochiaceae	01	1.34	75
12	Moraceae	02	2.67	75
13	Annonaceae	01	1.34	75
14	Meliaceae	01	1.34	75
15	Caesalpiniaceae	01	1.34	75
16	Basellaceae	01	1.34	75
17	Begoniaceae	02	2.67	75
18	Nyctaginaceae	02	2.67	75
19	Caricaceae	01	1.34	75
20	Fabaceae	04	5.34	75
21	Apiaceae	01	1.34	75
22	Arecaceae	01	1.34	75
23	Cucurbitaceae	02	2.67	75
24	Commelinaceae	01	1.34	75
25	Costaceae	01	1.34	75
26	Zinziberaceae	02	2.67	75
27	Poaceae	01	1.34	75
28	Convolvulaceae	01	1.34	75
29	Moraceae	01	1.34	75
30	Boraginaceae	01	1.34	75
31	Periplocaceae	01	1.34	75
32	Malpighiaceae	01	1.34	75
33	Rubiaceae	04	5.34	75
34	Crassulaceae	01	1.34	75
35	Solanaceae	04	5.34	75
36	Lythraceae	01	1.34	75
37	Lamiaceae	02	2.67	75
38	Anacardiaceae	01	1.34	75
39	Moringaceae	01	1.34	75
40	Polygonaceae	01	1.34	75
41	Combretaceae	03	4	75
42	Piperaceae	01	1.34	75

4. CONCLUSIONS

The present findings are the first record of traditional medicinal plants used in the treatment of different skin diseases by the tribal and non-tribal peoples of Malda district of W.B. using standard research protocols. A total of 75 plant species under 65 genera of 42 families have been documented which are used for the treatment of different skin diseases. It can be concluded that the tribal and non-tribal peoples of study area have very good knowledge on the use of medicinal plants. But such knowledge of medicinal plants is

restricted to a few persons in a rural area. Therefore it is necessary that suitable requirements are needed in order to protect the traditional knowledge in particular area with reference to medicinal plants utilization and it was found that traditional ethno-medicine still persists among the tribal and non-tribal peoples of Malda district of W.B.

5. ACKNOWLEDGEMENT

The author is grateful to the tribal and non-tribal peoples of Malda district for their co-operation and help during the Traditional Medicinal Plants Used in the Treatment of different Skin diseases.



Amaranthus viridis



Argemone mexicana



Abutilon indicum



Achyranthes aspera



Amaranthus spinosus



Coccinia grandis



Acalypha indica



Solanum nigraum



Calotropis gigantean



Eclipta alba



Heliotropium indicum



Alistonia scholaris



Lecus aspera



Boerhavia diffusa



Moringa pterygosperma

Figure 2 -16:- some important medicinal plants.

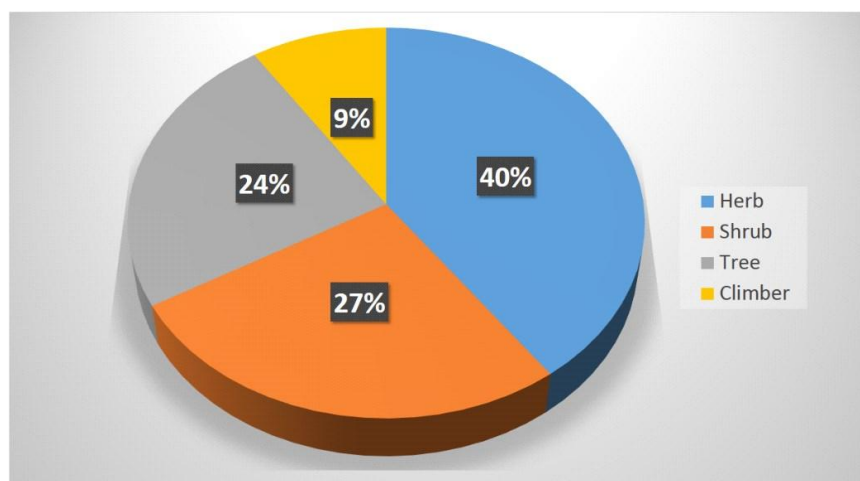


Figure: 17, Graphical representation of Habit and their percentage of plants species.

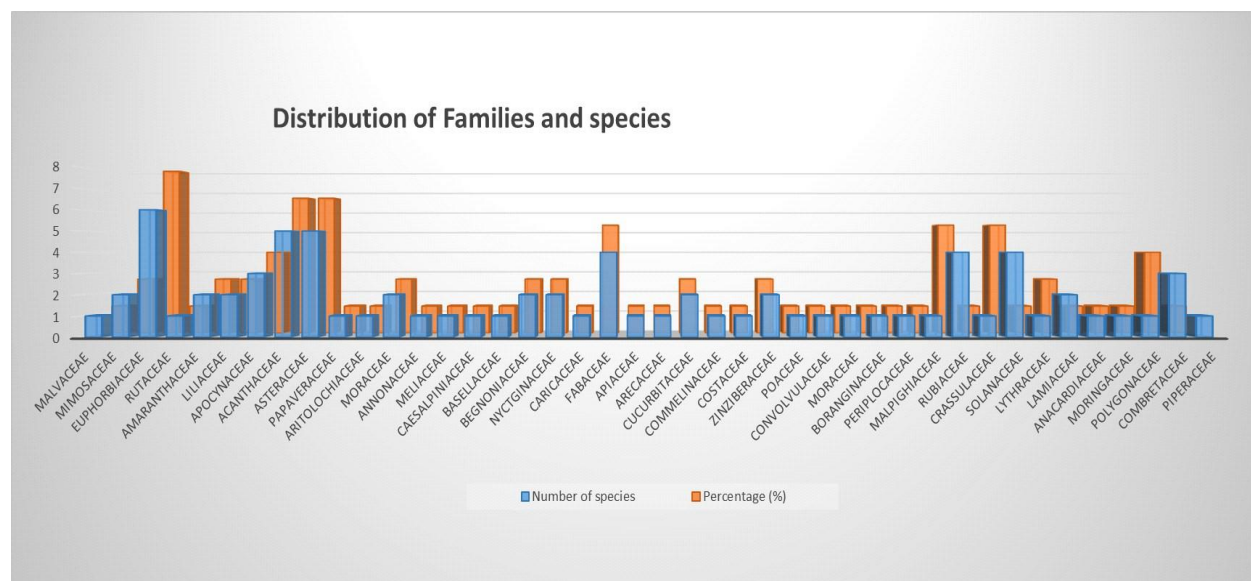


Figure: 18, Graphical representation of total number of family and their percentage

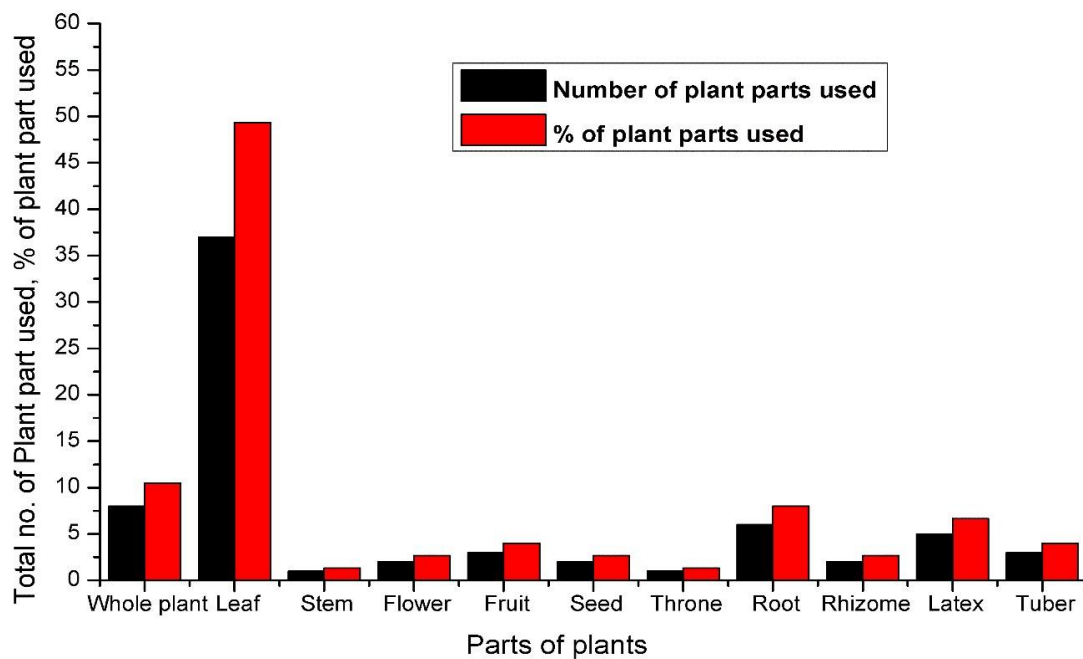


Figure: 19, Graphical representation of number of plant parts used and percentage (%) of plant parts used

REFERENCES

1. Lone PA , Bhardwaj AK, Traditional herbal based disease treatment in some rural areas of Bandipora district of Jammu and Kashmir, India, Asian J Pharm Clin Res. 2013; 6:162-71.
2. WHO. Traditional Medicine, Growing Needs and Potential, WHO Policy Perspectives on Medicines, 2 Geneva, WHO. 2002; 1-6.
3. Chandel KP, Shukla G and Sharma N, Biodiversity in Medicinal and Aromatic Plants in India, Conservation and Utilization, New, 1996; Delhi, India, NBPGR.
4. Saha MR, DeSarker D and Sen A, Ethno veterinary practices among the tribal community of Malda district of West Bengal, India. Indian, J Traditional Knowledge 2014; 13:359-67.
5. Sumit Mitra, Some less known plants from Malda district of west Bengal used for the treatment of arthritis, Rheumatism and Gout", IJPRBS, 2013; 2(4):337-340.
6. Mitra S, Studies on the Flora and Ethnobotany of West Dinajpur district, west Bengal (India). Ph. D. Thesis, University of Kalyani, (Unpubl.), 2002;
7. Mitra S, Mukherjee and Sobhan Kr, Ethno botanical usages of Grasses by the Tribal of West Dinajpur district, West Bengal. India, J. Trad. Know, 2005a; 4 (4): 396 –402.
8. Mitra S, Mukherjee, and Sobhan Kr, Root and rhizome drugs used by the tribals of West Dinajpur district, West Bengal," J. Trop. Med. Plants, 2005b; 6(2): 301 –315.
9. Mitra, S. & Mukherjee, and Sobhan Kr, Plants used as ethno-veterinary medicine in Uttar and Dakshin Dinajpur districts of West Bengal. India, In Das A. P. and Pandey A. K. (eds.) Advances in Ethnobotany. Bishen Singh Mahendra Pal Singh Private Limited. Dehra Dun. 2007; Pp. 117 – 122.
10. Mitra S, Mukherjee, Sobhan Kr, Some abortifacient plants used by the tribal people of West Bengal, Nat. Prod. Rad, 2009; 8(2): 167 – 171.
11. Sur PR, Sen R, Halder AC and Bandyopadhyay S, Observation on the ethnobotany of Malda-West Dinajpur districts, West Bengal, J Econ Taxonomic Bot. 1987; 10: 395-401.
12. Bandyopadhyay S, S.Kr and Mukherjee, Ethno veterinary medicine from Koch Bihar district, West Bengal, Indian Journal of Traditional Knowledge, 2005;(4)4:456-461
13. Bandyopadhyay S, Mukherjee, Sobhan Kr, Traditional medicine used by the ethnic communities of Koch Bihar district(West Bengal-India), J. Trop. Med. Plants, 2006;(7)2:303-312.
14. Bandyopadhyay S, Mukherjee, and Sobhan Kr. (Wild edible plants of Koch Bihar district, West Bengal Nat. Prod. Rad, 2009 ;(8)1: 64-72.
15. Sur P. R, Sen, R, Halder, A. C and Bandyopadhyay S, Observation on the ethnobotany of Malda and West Dinajpur, West Bengal , I. J Econ. Taxon. Bot, 1987a; 10(2): 395 – 401.
16. Sur P. R, Sen R, Halder A. C and Bandyopadhyay S, Observation on the ethnobotany of Malda and West Dinajpur, West Bengal – II". J Econ. Taxon. Bot. 1987b; 4(2): 453 – 459.
17. Sur PR, Sen R, Halder AC and Bandyopadhyay S, Observation on the ethnobotany of Malda-West Dinajpur districts, West Bengal-II". J Econ Taxonomic Bot. 1990; 14: 453-9.
18. Jain S. K, Dictionary of Indian Folk Medicine and Ethno botany, Deep Publications, New Delhi, 1991
19. Jain SK and Rao RR, A Handbook of Field and Herbarium Methods. New Delhi, India, Today and Tomorrow Publisher, 1977.