Biodiversity and its Significance

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Chapter **17**

Conservation of Medicinal Plants Diversity of Meghalaya in India

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An exploration was undertaken for the identification of medicinal plants frequently used by the Khasi, Jaintia and Garos communities of Meghalaya. A total of 298 medicinal plant species for treating different diseases were identified (124 species were used by the Khasi, 89 species by Jaintia and 85 species by Garos). Of the 298 medicinal plant species mentioned, 5 species were common to all the tribes, 9 species were common to the Khasi and Jaintia tribes, 13 species were common to the Khasi and Garos and 5 species were common to the Jaintia and Garos tribes. Based on the survey and findings, various conservation and management steps have been discussed to protect medicinal plants.

INTRODUCTION

Meghalaya, which lies between 25°47″ - 26°10″ N latitude and 89°45″ – 92°45″ E longitude and covers an area of 22,549 km^2, comprises the South Garo Hills, West Garo Hills, East Garo Hills, West Khasi Hills, East Khasi Hills, Ribhoi and Jaintia Hills districts. The altitude ranges from 50 – 1960 m. It is bounded on the North, East and West by Assam and on the South, by Bangladesh (Fig. 17.1). The State is in an emerging state of development, even though the traditional culture and heritage have thrived through the passage of time and other inclusions of western culture. The people in the State who belong to the 3 major tribes like Khasis, Jaintias and Garos have their own healing practice and health care system, where many plant species are used. The majority of the population are rural folk. People who are employed or under any service, dominate the urban sectors. The rural folk lead a very simple life with their main occupations ranging from agriculture to cattle rearing. Poultry, silkworm rearing and piggery are the other important occupations followed, but more emphasis is being laid on the

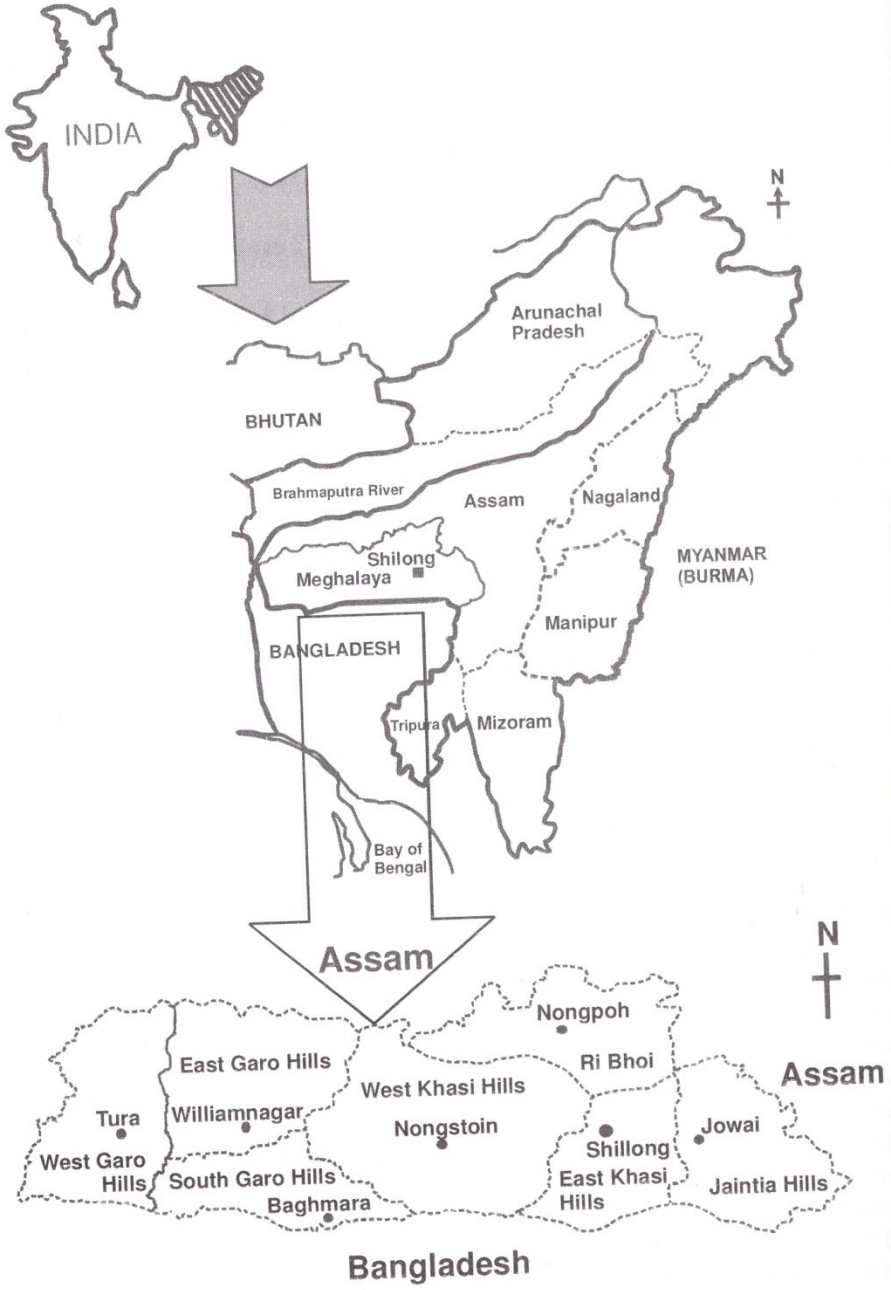

Fig. 17.1. District Map of Meghalaya

agricultural sector. Food crops like paddy, potato, maize, vegetables and others horticultural crops are usually grown commonly.

The people in the State are generally very knowledgeable about the wild medicinal plants around them, many of which have local names and are important to them medically or feature in folklore. This traditional knowledge is the best starting point for effective *in situ* conservation, which requires accurate and up-to-date information on the status of medicinal plants and, the extent and nature of the plants used by local communities and the capacity of the resource base to support different economic activities. This knowledge can be used in evaluating and creating awareness of the importance of medicinal plants, as it is generally easier for the general public to relate to this, than to the results of scientific trials.

The State possesses a variety of plant wealth that is yet to be fully tapped on a commercial scale, which in turn could accrue abundant benefits to the farmers too. In fact, Meghalaya has a great potential for the plantation of medicinal plants because of ideal agroclimatic conditions and suitable soil. Nature, in its generous abundance, has bestowed on Meghalaya a unique array of vegetation, ranging from tropical and sub-tropical to temperate or near temperate (Kanjilal *et al.*, 1982; Elias, 1994). This is due to the diverse topography, varied and abundant rainfall and differential climatic and edaphic conditions in the state, and within small regions.

In a wider context, there is a growing demand for plant based medicines, health products, pharmaceuticals, food supplements, cosmetics, etc. in the national and international market. Conservation and sustainable use of medicinal plants are issues on which immediate focus is required in the context of conserving biodiversity and promoting and maintaining the health of local communities, besides generating productive employment for the poor, with the objective of alleviating poverty in tribal and rural areas.

The international trade in medicinal plants is estimated at US $70 billion and is growing at a rate of seven percent annually. The Planning Commission of the Government of India has plans to increase the trade in medicinal plant extracts to Rs. 3,000 crores by the year 2005, and Rs. 10,000 crores by the year 2010. New opportunities are thus being created that could lead to the generation of employment in the medicinal plant sector (Bhattacharya and Mittra, 2002). Domestic demand of medicinal plants in 1999 – 2000 was estimated at Rs. 1,099 crores, which is expected to rise to Rs. 2,000 crores by the year 2004-2005, as per CERPA estimates (Anon, 2001).

The tradition of collecting, processing and applying plants and plant-based medications, long and carefully maintained by individuals with a profound knowledge, has been handed down from generation to generation among the tribals. The value of this ethnomedicine and traditional pharmacology is now being increasingly recognised in modern human and veterinary medicine (Maydell, 1990; Hamann, 1991; Anon, 1992.). These medicinal plants mostly grow naturally and are collected by the local people and sold to traders who, in turn, sell them to the pharmaceutical and cosmetic industry and to exporters. These important resources have declined significantly in the recent past, which has led

to near extermination of some of the most valuable plants. Recently, it has been noted that increasing biotic influences, including socio-economic development, and unrestrained commercial exploitation of forest wealth have threatened the survival of the rich genetic resources of this region, amounting to a great loss of national heritage. However, the most important cause of depletion and danger for medicinal plants comes from man–made pressures. Illegal and unscientific collections, over-exploitation and trade have resulted in the extinction of at least, some species.

At present, the medicinal plants sector is not well organised and needs special attention. Cultivation is clearly a sustainable alternative to the present collection of medicinal plants from the wild. This can be a potential provider of returns to the farmers. No serious efforts have been made in the State to promote the cultivation of medicinal plants of importance. The only efforts made are those of the Department of Environment and Forests and the Non-Government Organisations. Similarly, there is a serious lack of awareness among the people about the potential and scope of medicinal plants.

The present study is focussed on the dual objectives of identification of the concerned species and their analysis in terms of plant parts used and uses for different ailments, etc. with a view to prioritise and select medicinal plants for development in the state. It is not possible here to describe all the medicinal plants of the State. However, a list of very significant medicinal plants is presented here. The aim is to highlight the most frequently used medicinal plants in the tribal areas of Meghalaya, and stress the need for sustainable management of medicinal plants resources.

MATERIALS AND METHODS

Along with a survey of locally available information on the use of traditional herbal medicine collected through personal interview, records in the State's Departments, reports and literatry research, fieldwork was also considered necessary. Short field visits were made to specific areas. During the field visit, interaction with knowledgeable local people and other stakeholders were made to collect information and to solicit their views on medicinal plants and their conservation. The methodology followed during the fieldwork was mainly based on detailed questionnaires and a standard format. Carefully planned fieldwork, spread over four years from 1998 to 2002, was carried out in different tribal pockets of Meghalaya. The purpose of the study was not only the collection of first hand information about the relationship of medicinal plants with the community, but also to verify the already published data, wherever possible.

Studies were carried out among different tribes of the State. The plants were identified, using relevant flora and by matching the specimens in the herbaria of the Botanical Survey of India at Shillong and at North Eastern Hill University, Shillong. Where necessary, interpreters were employed in order to acquire details of uses and other information on plants and their environment. Tribal markets or weekly *haats* were also visited to study the plants and plant products sold there. As the rural folk of the region are largely dependent on wild plants and plant

products for their existence, their local markets are full of wild vegetables, fruits and medicinal plants. These markets are both permanent as in Shillong, Sohra, Nongstoin, Jowai, Nongpoh, Tura, Williamnagar, Baghmara and other big towns, or are held on a fixed day each week in small villages. These weekly *haats* are tapped for their rich source of information. The vegetables and fruits collected from the wild and their products are the commonest commodity in these tribal markets, as well as the domesticated variety of crops and animals.

RESULTS AND DISCUSSION

The plants listed were widely used as medicines in Meghalaya, before the advent of chemical medicines. They have important components, which can cure an extensive range of diseases (Table 17.1 – 17.3). Two hundred and ninety eight medicinal plant species (124 species used by the Khasis, 89 species by the Jaintias and 85 species by the Garos) with their uses to treat different diseases were identified. Of the 298 medicinal plant species mentioned, 5 species were common to all the tribes, 9 species were common to the Khasi and Jaintia tribes, 13 species were common to the Khasi and Garo tribes and 5 species were common to the Jaintia and Garo tribes.

Table 17.I: Medicinal Plants used by the Khasi tribe

Sl. No.	*Botanical Name*	*Local Name*	*Family*	*Trend of Occurrence*	*Parts used*	*Used as Medicine*
1.	*Acorus calamus* (L.)	U-bet	Araceae	C	Lf	Influenza and headache
2.	*Adenostemma lavenia* (L.)	Soh-byrthit	Compositae	C	Lf	Cuts, wounds and antidote in insect bite
3.	*Adiantum phillipense* (Linn.)	Tyrkhang khyllai	Adiantaceae	R	Lf	Bone fracture
4.	*Ageratum conyzoides* (Linn.)	Ksang-dngiem	Asteraceae	A	Lf	Cuts and wound
5.	*Ajuga bracteosa* (Wall.ex. Benth)	Tiew khmut tuta	Lamiaceae	F	Lf	Astringent and respiratory congestion
6.	*Albizzia chinensis* (Osb)	Dieng phallut	Mimosaceae	C	Bk	Ringworm and antidote in insect bite
7.	*Allium hookeri* (Thw)	Ja uat	Liliaceae	C	Bu	Burns and boils
8.	*Allium tuberosum* (Roxb)	Jyllang	Liliaceae	A	Wp	Hypertension
9.	*Alnus nepalensis* (D. Don)		Betulaceae	C	Rt, Bk	Diarrhoea
10.	*Alysicarpus monilifer* (DC)		Fabaceae	F	Wp	Snake bite
11.	*Ambrosia artimisifolia* (L.)	'bat japan rit	Asteraceae	C	Lf	Cuts and wounds

Sl. No.	Botanical Name	Local Name	Family	Trend of Occurrence	Parts used	Used as Medicine
12.	*Amomum aromaticum* (Roxb)	Ilashi saw	Zingiberaceae	A	Rh	Nausea and vomiting
13.	*Anaphalis adnata* (Wall.ex.DC)	Skhor blang	Asteraceae	C	Lf	Haematoma
14.	*Arisaema jacquemontil* (Bl)	Hadembsein	Araceae	C	Rt	Ring worm and skin diseases
15.	*Antidesma bunius* (L.)	Soh-syllai	Euphorbiaceae	A	Lf	Rheumatism
16.	*Artemisia nilagirica* (Cl)		Asteraceae	A	Wp	Anthelmintic and bodyache
17.	*Astilbe rivularis* (Buch.-Ham)	Pdah	Saxifragaceae	F	Lf	Toothache, blood purification
18.	*Averrhoa carambola* (L.)	Sohpyrshog	Averrhoaceae	A	Fr	Jaundice and measles
19.	*Azadirachta indica* (A. Juss.)	Dieng nim	Meliaceaae	F	Lf	Diarrhoea and dysentery
20.	*Bauhinia variegata* (L.)	Dieng tharlong	Caesalpiniaceae	C	Fl	Piles and dysentery
21.	*Begonia josephi* (D. Don)	Jajew	Begoniaceae	C	Wp	Stomach ache and indigestion
22.	*Begonia palmate* (D. Don)	Jajewmaw	Begoniaceae	C	Lf	Food poisoning and vomiting
23.	*Begonia rubrovenia* (Hk)	Jajew	Begoniaceae	C	Lf	Fever, giddiness and headache
24.	*Berberis wallichiana* (DC)	Dieng niangmat	Berberidaceae	F	St	Dysentery and conjunctivitis
25.	*Betula alnoides* (Buch Ham)	Dienglieng	Betulaceae	C	Rt	Indigestion and flatulence
26.	*Biophytum sensitivum* (L.)DC		Oxalidiaceae	F	Lf	Headache, giddiness and fever
27.	*Bonnaya reptans* (Spreng.)	Kra-thang syndat	Scrophulariaceae	F	Lf	Urinary ailments
28.	*Buddleja macrostachya* (Benth)	Jalong krem	Buddlejaceae	F	Lf	Venereal disease
29.	*Cannabis sativa* (L.)	Kynja	Cannabiaceae	A	Lf, Fr	Skin diseases and stomach ache
30.	*Capsicum annuum* (L.)	Soh-mynken syiar	Solanaceae	C	Fr	Antidote in snake bite
31.	*Casearia vareca* (Roxb)		Flacourtiaceae	F	Lf	Amoebic dysentery and intestinal worm
32.	*Cinnamomum glanduliferum* (Meissn)	Diengsing	Lauraceae	C	Lf	Fever, cold, cough and rheumatis
33.	*Cinnamomum pauciflorum* (Nees)	Dieng tarthia	Lauraceae	C	Bk, Sh	Antiseptic
34.	*Cinnamomum tamala* (Nees and Eberm.)	La tyrppad	Lauraceae	C	Lf	Toothache
35.	*Citrus latipes* (Swingle)	Sohkymphor	Rutaceae	C	Fr	Gout, rheumatism and ringworm

Sl. No.	*Botanical Name*	*Local Name*	*Family*	*Trend of Occurrence*	*Parts used*	*Used as Medicine*
36.	*Clerodendrum colebrookianum* (Walp.)	Sla jarem	Verbenaceae	C	Lf	High blood pressure
37.	*Clematis gouriana* (Roxb)	Sladienglum	Ranunculaceae	C	Rt	Cough and cold
38.	*Colocasia esculcenta* (Schott)	La wang	Araceae	F	Lf, Rh	Fever and rickets
39.	*Conyza bonariensis* (Linn.)	'bat symbai pum pum	Asteraceae	F	Lf	Astringent
40.	*Costus speciosus* (J. Konig ex Retz. Smith)	Sla pangmat	Zingiberaceae	F	Rh	Bronchitis, inflammation, anemia and rheumatism
41.	*Crassocephalum crepidioides* (Benth)	Jali	Asteraceae	F	Lf	Constipation and other stomach disorders
42.	*Curcuma angustifolia* (Roxb)	'niang-soh-pet	Zingiberaceaae	F	Lf	Gripe
43.	*Curcuma domestica* (Velaton)	Shynrai stem	Zingiberaceae	A	Rh	Skin diseases and bone fractures
44.	*Cuscuta reflexa* (Roxb)	Jawieh raid	Cuscutaceae	F	Wp	Gastric ulcer and rheumatic pain
45.	*Daphne bholua* (Ham ex.Don)		Thymelaeaceae	F	Rt	Intestinal troubles.
46.	*Datura stramonium* (L)	Tiew shulim	Solanaceae	F	Lf	Paralysis, stroke and rheumatism
47.	*Delphinium altissimum* (Wall)	Bat soh-plihrit	Ranunculaceae	C	Lf, Rt	Plaster to glandular swellings
48.	*Dendrobium moschatum*	Tiew dieng	Orchidaceae	F	Ju	Ear problem
49.	*Desmodium gangeticum*(L.)DC		Papilionaceae	F	Rt	Dysentery
50.	*Dicranopteris linearis* (Burm.f)	Tyrkhang	Gleicheniaceae	C	Lf	Epilepsy and fits
51.	*Dicrocephala bicolor* (Roth)	Liang poh tiew	Asteraceae	C	Lf	Cuts, wounds bleeding
52.	*Drymaria cordata* (L.) Willd.ex Roem and Schult)	Bat-nongrim	Caryophyllaceae	A	Ju	Burns, skin diseases and antidote in snake bites
53.	*Elephantopus scaber* (L.)	'Batshrut sriang	Asteraceae	C	Lf	Abortion, urinary disorders and as a contraceptive
54.	*Eleusine indica* (L.)	Lang krai	Poaceae	C	Ju	Jaundice
55.	*Elsholtzia blanda* (Benth)	Bat-skain	Lamiaceae	C	Ju	Mosquito bites and mosquito repellent
56.	*Engelhardia spicata* (Bl)	Dieng lyba	Juglandaceae	C	Inf	Scabies and skin diseases
57.	*Erigeron karvinskianus* (DC)	'Bat tiew star	Asteraceae	C	Lf	Cuts and wounds as an astringent

Sl. No.	Botanical Name	Local Name	Family	Trend of Occurrence	Parts used	Used as Medicine
58.	*Erythrina arborescens* (Roxb.)	Dieng-song	Papilionaceae	F	Lf	Skin diseases
59.	*Eupatorium adenophorum* (L.)	Bat iong	Asteraceae	A	Lf	Cuts and wounds
60.	*Ficus virens* (Ait)	Diengsoh phohkhlaw	Moraceae	C	Lf	Loss in appetite
61.	*Flemingia ontanana* (Willd)		Fabaveae	F	Rt	Body ache and muscular pains
62.	*Garcinia cowa* (DC)	Soh synrum	Clusiaceae	F	Fr	Headache, cold and dysentery
63.	*Garuga pinnata* (Roxb)	Dieng khiang	Burseraceae	F	Fr, Ju	Indigestion, Conjunctivitis and asthma.
64.	*Gaultheria fragrantissima* (Wall)	'La thynrait	Ericaceae	A	Lf	Bone fractures, rheumatism and sprain
65.	*Glochidion zeylanicum* (Juss.)	Jalwai	Euphorbiaceae	F	Lf	Dysentery and stomachache
66.	*Gmelina arborea* (Roxb)	Dieng laphiang	Verbenaceae	F	Be	Purgative and insect stings
67.	*Gomphostemma parviflorum* (Wall.ex Benth)		Labiatae	F	Lf	Headache, giddiness and fever
68.	*Gynocardia odorata* (R.Br)	Sohliang	Flacourtiaceae	F	Sd	Leprosy, nausea and rheumatism
69.	*Hedere nepalensis* (K.Koch)	Soh poramshre	Araliaceae	F	Be	Purgative and mumps
70.	*Hedyotis scandens* (Roxb)	Mo-shoh shu	Rubiaceae	C	Lf	Gastric troubles, cough and cold
71.	*Hedyotis verticillata* (L.) Lam	Jyrmi skei	Rubiaceae	F	Lf	Reduces body temperature
72.	*Hibiscus rosa sinensis* (L)	Tiew china	Malvaceae	C	Fl	Urinary disorders and skin diseases
73.	*Hodgsonia heteroclite* (Roxb.)	Soh risa	Curcubitaceae	F	Rt	Fever
74.	*Holmskioldia sanquinea* (Retz.)		Verbenaceae	F	Rt	Fever
75.	*Houttuynia cordata* (Thunb)	Jamyrdoh	Saururacae	A	Lf	Blood purification, sores and boils
76.	*Hedychium coronarium* (Koen)	Kymbat khawiang	Zingiberaceae	A	Rh	Respiratory ailment and bodyache
77.	*Hedychium gracile* (Roxb)	Shynrai khlaw	Zingiberaceae	A	Rh	Chest pain
78.	*Hedychium spicatum* (Buch-Ham ex Sm)	Sying khlaw	Zingiberaceae	A	Rh	Sore throat and stomachache
79.	*Hypocharis radicata* (L.)	Bat jhur kthang	Asteraceae	C	Lf	Stomachache
80.	*Indigofera tinctoria* (L.)		Papilionaceae	C	Rt	Wounds
81.	*Ipomea uniflora* (Roem and Schult)	Tiew turoi	Convolvulaceae	C	Lf	Cholera and vomiting

Sl. No.	*Botanical Name*	*Local Name*	*Family*	*Trend of Occurrence*	*Parts used*	*Used as Medicine*
82.	*Itea chinensis* (HK and Arn)	Dieng myllong	Saxifragaceae	C	Lf	Skin diseases
83.	*Kaempferia rotunda* (L.)	Ingsmoh	Zingiberaceae	C	Rh	Stomach trouble and as general tonic
84.	*Lindera pulcherrima* (Benth)	Sia-sia	Lauraceae	F	Bk	Rheumatic pains
85.	*Litsea khasiana* (Meissn)	Dieng mosu	Lauraceae	C	Rt	Chronic bronchitis.
86.	*Lycopodium clavatum* (L)	Tmain khla	Lycopodiaceae	C	Wp	Skin diseases and rheumatism
87.	*Lygodium scandens* (L)	Tyrkhang kiew dieng	Schizaeaceae	C	Wp	Swelling, skin diseases and Bone fractures
88.	*Maesa indica* (Roxb) Wall	Dieng soh jala	Myrsinaceae	C	Be	Vermifuge
89.	*Mahonia nepalensis* (D.Don)	Dieng-tiang-mat	Berberidaceae	F	Ju	Eye diseases
90.	*Mahonia pycnophylla* (Fedde)	Ningmat	Berberidaceae	F	Ju	Eye diseases
91.	*Mallotus philippensis* (Lamk) Muell	Dieng chandan	Euphorbiaceae	F	Fr	Tapeworm
92.	*Melia azedarach* (L.)	Dieng ja rasang	Meliaceae	F	Bk	Anthelmintic and febrifuge
93.	*Mimosa pudica* (L)	Bat iambait	Momosaceae	C	Lf	Boils, sores and diabetes
94.	*Nepenthes khasiana* (Hk.f.)	Ksetphare	Nepenthaceae	R	Ju	Stomachache, eye sores or urinary troubles
95.	*Osbeckia stellata* (Buch.Ham ex D. Don)	Soh-lyngkthut	Melastomaceae	A	Lf	Wounds of various types and snake bites
96.	*Oxalis corniculata* (L.)	Jabuit	Oxalidaceae	A	Wp	Diarrhoea
97.	*Pandanus fasciculus* (Lamk.)	Sla shylliah	Pandanaceae	F	Ju	Skin diseases and leprosy
98.	*Parochetus communis* (Buch. Ham ex D. Don)	Khia-knoi	Papilionaceae	F	Ju	Stomachache
99.	*Phenera khasiana* (Baker)	Jarmi bin khlaw	Caesalpiniaceae	F	Sd	Demulcent in dried and cracked skin
100.	*Piper griffthii* (DC)	Mrit khlaw	Piperaceae	F	Sd	Cough and cold
101.	*Pithecellobium bigeminum* (I) Mart	Dieng yap yar	Mimosaceae	C	Sd	Blood purification
102.	*Plantago erosa* (Wall.)	Shkor blang	Plantaginaceae	C	Lf	Bandaging of wounds, boils and removal of pus
103.	*Pouzolzia hirta* (Bl.)	Memsleh	Urticaceae	C	Rt	Hair tonic and hair growth
104.	*Potentilla fulgens* (Hk.)	Lynniang	Rosaceae	C	Rt	Diarrhoea and diabeties.

Sl. No.	Botanical Name	Local Name	Family	Trend of Occurrence	Parts used	Used as Medicine
105.	*Pseudognaphalium luteoalbum* (L.) Hall et Burtt	Tiew kubi	Asteraceae	C	Lf	Gout and rheumatism
106.	*Psidium guajava* (L.)	Soh priam	Myrtaceae	C	Lf	Chronic dysentery
107.	*Rhus semialata* (Murr)	Sohma	Anacardiaceae	C	Fr	Stomachache and diarrhoea
108.	*Ricinus communis* (L.)	Ryndia khlaw	Euphorbiaceae	F	Lf	Rashes and skin diseases
109.	*Rorippa indica* (L.)	Tyrso khlaw	Brassicaceae	F	Sd	Bleeding gums in scurvy
110.	*Rorippa nasturtium-aguaticum* (L.) Hayak	Tyrso-um	Brassicaceae	C	Wp	Pneumonia or other Pulmonary ailments
111.	*Rubia cordifolia* (L.)	Rhoi	Rubiaceae	C	Lf	Ulcers and insect stings
112.	*Rubus ellipticus* (Sm)	Soh-shiah	Rosaceae	F	Fr	Dysentery
113.	*Schefflera hypoleuca* (Kurz) Ham	Sla tymphu	Araliaceae	F	Rt	As tonic after child birth
114.	*Schima wallichii* (Choisy)	Diengngan	Theaceae	C	Lf	Flatulence
115.	*Schisandra neglecta* (Sm.)		Schisandraceae	F	Lf	High fever
116.	*Smilax glabra* (Roxb.)	Khong	Smilacaceae	C	Ju	Skin diseases
117.	*Taxus baccata* (L.)	Dieng she Blei	Taxaceae	R	Lf	Tumours and ulcer
118.	*Terminalia chebula* (Retz.)	Soh salukah	Combretaceae	C	Fr	Diuretic and conjunctivitis.
119.	*Thallictrum foliosum* (DC)	Jatira khlaw	Ranunculaceae	F	Rt	High blood pressure and malarial fever
120.	*Toddalia asiatica* (Retz)	Soh sat khlaw	Rutaceae	C	Rt	Malaria and other periodic fevers
121.	*Vitex negundo* (L.)	Tyllai skip	Verbenaceae	F	Lf	Muscular pain and swelling
122.	*Zanthoxylum acanthopodium* (DC)	Ja-iur	Rutaceae	F	Sd	Stomach disorders, fish poison and vermicide
123.	*Zingiber zerumbet* (Sm.)	Ing-Blei	Zingiberaceae	A	Rh	Cough, cold and relieves stress
124.	*Zizyphus mauritiana* (Lam.)	Sohbroi	Rhamnaceae	A	Fr, bk	Fever and diarrhea

Abbreviations Used: A- Abundant; C- Common; F- Frequent; R – Rare; Lf-leaf; Bu-bulb; Bk-bark; Wp-whole plant; Rt-root; Rh- rhizome; Fr-fruit; Fl- flowerl; St-stem; Sh- shoot; Ju-juice; Inf-inforesecence; Be – berries; Sd- Seed; La-latex; Tu-tuber; Pit-pitcher; Pu-pulp.

Table 17.2: Medicinal Plants used by the Jaintia tribe

Sl. No.	*Botanical Name*	*Local Name*	*Family*	*Trend of Occurrence*	*Parts used*	*Used as Medicine*
1.	*Acasia pennata* (L.) Willd	Chiah poswa	Mimosaceae	F	Lf, La	Skin diseases
2.	*Acorus calamus* (L.)	Bat-ksuid	Araceae	C	Rt	Chest congestion, Malaria and headache
3.	*Adiantum phillippense* (L.)	Krah keriah	Adiantaceae	C	Wp	Bone fracture and sprain
4.	*Aegle marmelos* (L.)	Sohbel	Rutaceae	F	Fr	Diarrhoea and dysentery
5.	*Ageratum conyzoides* (L.)	Sla iewtung	Alliaceae	A	Lf	Cuts and wounds
6.	*Alchornea tillaeafolia* (Muell.-Arg.)	Ksiang lenti	Euphorbiaceae	F	St	Sprains
7.	*Allium tuberosum* (Roxb.)	Jyllang	Asteraceae	R	Wp	Cough and cold
8.	*Alpinia bracteata* (Rosc.)	Latara	Zingiberaceae	F	Rh	Toothache
9.	*Alpinia galangal* (L.)	Phlang sow	Zingiberaceae	F	Rh	Skin diseases
10.	*Amorphophallus bulbifer* (Roxb.)	Thynrewpsen	Araceae	F	Rt, St	Skin diseases
11.	*Aristolochia catcartii* (Hk.f and T)	Patiksang	Aristolochiaceae	R	Rt	Food poisoning
12.	*Aristolochia saccata (Wall.)*	Krahlahit	Aristolochiaceae	R	Tu	Haemorrhage and stomachache
13.	*Aristolochia tagala* (Cham.)	Khurthlong	Aristolochiaceae	F	Rt, Fr	Rheumatism and bone fracture
14.	*Asparagus racemosus* (Willd.)	Phlang chokriawsea	Aspagaraceae	A	Rh	Urinary trouble
15.	*Borreria articularis* (L.) Willd.	Phlang bhoi	Rubiaceae	C	Lf	Stomach disorder
16.	*Botrychium ternatum* (Thund.)	Tyrkhang	Botrychiaceae	C	Rt	Dysentery
17.	*Buddleja macrostachya* (Benth.)	Jalong krem	Buddlejaceae	F	Lf	Skin diseases
18.	*Camellia kissi* (wall.)	Sli sohlwit	Theaceae	F	Rt	Skin diseases
19.	*Careya urens* (L.)	Styngkrain	Barringtoniaceae	F	Bk	Dysentery
20.	*Cassia tora* (L.)	Tawblei	Caesalpiniaceae	F	Lf	Ringworm and skin diseases
21.	*Centella asiatica* (L.) Urban	Khlein syiar	Apiaceae	A	Wp	Boil, tumours and dysentery
22.	*Centranthera grandiflora* (Benth.)	Phlang stem	Scrophulariaceae	F	Rt	Insect stings
23.	*Cinnamomum camphora* (L.) Nees and Eberm	Dieng-pingwait	Lauraceae	F	Lf	Cough, cold and fever
24.	*Cissus repens* (Lam.)	Jiaherew	Vitaceae	F	Rt	Boils and muscular pain
25.	*Citrus medica* (L.)	Soh-kwit	Rutaceae	C	Fr	Fever, headache and body ache

Sl. No.	Botanical Name	Local Name	Family	Trend of Occurrence	Parts used	Used as Medicine
26.	*Clerodendrum viscosum* (Vent.)	Slijerem	Verbenaceae	C	Lf	Fever, diarrhoea and dysentery
27.	*Clerodendrum wallichii* (Merr.)	Lekynrum chia blang	Verbenaceae	C	Lf	Skin disease and germicide
28.	*Curcuma domestica* (Velaton)	Shynrai	Zingiberaceae	A	Rh	Cough, cold, allergy and boils
29.	*Curcuma ontana* (Rosc.)	Chyrmit khlow	Zingiberaceae	F	Rh	High temperature and headache
30.	*Curcuma zeodaria* (Rosc.)	Chyrmit loom	Zingiberaceae	C	Rh	Bone fractures
31.	*Cuscuta reflexa* (Roxb.)	Jawieh raid	Cuscutaceae	F	Wp	Balm on body and rheumatic pain
32.	*Daphne cannabina* (Hook.f)	Murit	Thymeliaceae	C	Bk	Toothache
33.	*Davallia trichomanoides* (Bl)	Krah beuh	Davalliaceae	F	Lf	Food poisoning
34.	*Drymaria cordata* (L.) Willd. Ex Roem and Schult.	Slia-slia	Caryophyllaceae	C	Wp	Dysentery, burn and skin diseases
35.	*Emblica officinalis* (Gaertn.)	Sohmylleng	Euphorbiaceae	A	Fr	Conjunctivitis
36.	*Eryngium foetidum* (L.)	Dhonia khlow	Apiaceae	F	Lf	Headache
37.	*Eupatorium adenophorum* (L.)	Phlang Burma	Asteraceae	C	Lf	Cuts and wounds
38.	*Eupatorium odoratum* (L.)	Phlang Dkhae	Asteraceae	C	Lf	Cuts and wounds
39.	*Fagopyrum cymosum* (Trev.)	Jarain	Fagaceae	A	Lf, Rt	Intestinal worms and dandruff
40.	*Flemingia vestita* (Backer.)	Sohphlang	Leguminasae	F	Tu	Anthelminthic
41.	*Garcinia lancifolia* (Roxb.)	Soh-suit	Clusiaceae	C	Fr	Stomach trouble
42.	*Gaultheria fragrantissima* (Wall.)	Lathynrait	Ericaceae	F	Lf	Arthritis, rheumatism and other ailments of the joints
43.	*Gongronema nepalense (Wall.)*	Krah skun	Asclepiadaceae	C	Lf	Boils and ringworms.
44.	*Habenaria crniifera* (Lindl.)	Phlang stem	Orchidaceae	C	Rh	Stomach disorders
45.	*Hedyotis uncinella* (Hk.and Arn.)	La jam	Rubiaceae	C	Lf	Insect stings
46.	*Houttuynia cordata* (Thunb.)	Jamyrdoh	Saururaceae	A	Wp	Lowering blood sugar
47.	*Hydrocotyle javanica* (Thunb.)	Kynbat-syiar	Apiaceae	C	Wp	Fever
48.	*Ipomea pileata* (Roxb.)	Chermew skun	Convolvulaceae	C	Lf	Skin disease
49.	*Ixora acuminata* (Roxb.)	Krah kshiang	Rubiaceae	F	Lf	Diarrhoea, dysentery and influenza

Sl. No.	*Botanical Name*	*Local Name*	*Family*	*Trend of Occurrence*	*Parts used*	*Used as Medicine*
50.	*Kaempferia rotunda* (L.)	Phlang san	Zingiberacae	C	Lf, Rh	Stomach disorders, swellings and boils
51.	*Lindernia ruelloides* (Colsm.)	Krah thang shyndat	Scrophulariaceae	F	Lf	Urinary complaints
52.	*Macropanax dispermus* (Bl.)	Sli soh resa	Araliaceae	F	Lf	Insect sting
53.	*Mahonia acanthifolia* (G. Don)	Krah niang mat	Berberidaceae	C	St, Bk	Eye diseases
54.	*Mimosa pudica* (L.)	Krah meriu	Mimosaceae	C	Rt	Snake bite, boils and sores
55.	*Mussaenda frondosa* (L.)	Chermew kynthah blang	Rubiaceae	F	Lf	Body swelling and jaundice
56.	*Nepenthes khasiana* (Hk.f.)	Tiew rakot	Nepenthaceae	R	Pit	Indigestion and kidney trouble
57.	*Osbeckia nepalensis* (Hk.f.)	Sli lekum	Melastomataceae	C	Rt	Bodyache and swelling
58.	*Paedaria foetida* (L.)	Nangra puhung, Batiewtung	Rubiaceae	F	Lf, Rt	Skin diseases and stomach disorders
59.	*Panax pseudoginseng* (Wall.)	Jynseng	Araliaceae	R	Rh	General tonic to relieve stress
60.	*Passiflora edulis* (Sims.)	Soh brab	Passifloraceae	C	Lf	Liver tonic, heart problems and blood pressure
61.	*Phlogacanthus thyrsiformis* (Hardw.)	Jia merembut	Acanthaceae	F	Lf	Indigestion and stomach trouble
62.	*Polygonum capitatum* Buch.-Ham.ex D. Don.)	Samtympei	Polygonaceae	C	Lf	Stomachache
63.	*Polygonum nepalensis* (Meissn.)	Ja-ut	Polygonaceae	A	Lf	Blood pressure
64.	*Polygonum perfoliatum* (L.)	Shrat	Polygonaceae	C	Lf	Dysentery and diarrhoea
65.	*Portulaca oleracea* (L.)	Jehu-sia	Portulacaceae	F	Wp	Gonorrhoea and blood purification
66.	*Pouzolzia hirta* (Bl.)	Taknor	Urticaceae	C	Lf	Hair tonic
67.	*Pueraria phaseoloides* (Benth.)	Sliniang terhu	Fabaceae	C	Lf	Toothache
68.	*Rhododendron arboreum* (Sm.)	Tiewsaw	Ericaceae	R	Lf	High blood pressure and diarrhoea
69.	*Rhus semialata* (Murr.)	Sohma	Anacardiaceae	R	Fr	Diarrhoea and dysentery
70.	*Sarcandra glabra* (Thunb.)	Soh-krismas	Chloranthaceae	F	Lf	Fever and blood deficiency
71.	*Scoparia dulcis* (L.)	Krah lebekor	Scrophulariaceae	F	Lf, Inf	Kidney and urinary trouble
72.	*Smilax perfoliata* (Lour.)	Lekynrum doh	Smilacaceae	F	Fl	Tonic and blood purification
73.	*Solanum barbisetum* (Nees.Ed.)	Sohshiah	Solanaceae	F	Lf	Low blood pressure and blood sugar

Sl. No.	Botanical Name	Local Name	Family	Trend of Occurrence	Parts used	Used as Medicine
74.	*Solanum khasianum* (Clarke.)	Sohpdok	Solanaceae	F	Fr	Toothache
75.	*Solanum xanthocarpus* (Schrad and Wendl.)	Sohngang	Solanaceae	F	Be	Low blood pressure
76.	*Sonchus asper* (L.)	Jalynniar	Asteraceae	A	Lf	Anti-diabetes
77.	*Spilanthes acmella* (L.)	Hooin	Asteraceae	C	Fl	Toothache
78.	*Swertia chirata* (Roxb.)	Batwieh	Gentianaceae	A	Lf	Vermicide
79.	*Taxus baccata* (L.)	'She Blai	Taxaceae	R	Bk	Anti-carcinogenic properties and tonic
80.	*Thunbergia grandifolia* (Roxb.)	Chermew lemah	Acanthaceae	F	St	Eye diseases
81.	*Thysanolaena maxima* (Roxb.)	Synsar	Poaceae	C	St	Eye diseases
82.	*Tinospora cordifolia* (Wall.) Miers	Jyrmibteng	Menispermaceae	F	Oil	Fractures and dislocated bones
83.	*Triumfetta rhomboidea* (Jacq.)	Sli sko	Tiliaceae	F	St	Stomachache
84.	*Urena lobata* (L.)	Sli skha	Malvaceae	F	Lf	Diarrhoea
85.	*Viburnum foetidum* (Wall.)	Sohlang	Caprifoliaceae	F	Fr	Skin diseases
86.	*Zanthoxylum acanthopodium* (DC.)	Jaiur	Rutaceae	F	Fr	Fever, cough and cold
87.	*Zingiber officinale* (Roscoe)	Ingbah	Zingiberaceae	A	Rh	Fever, cough and cold
88.	*Zingiber rubens* (Roxb.)	Ingmakhir	Zingiberaceae	A	Rhi	Fever, cough and cold
89.	*Zingiber zerumbet* (L.) Sm	Ing-Blei	Zingiberaceae	F	Rh	Fever, cough and cold

Abbreviations Used: A- Abundant; C- Common; F- Frequent; R – Rare; Lf-leaf; Bu-bulb; Bk-bark; Wp-whole plant; Rt-root; Rh- rhizome; Fr-fruit; Fl- flowerl; St-stem; Sh- shoot; Ju-juice; Inf-infloresecence; Be – berries; Sd- Seed; La-latex; Tu-tuber; Pit-pitcher; Pu-pulp.

Table 17.3: Medicinal Plants used by the Garo tribe

Sl. No.	Botanical Name	Local Name	Family	Trend of Occurrence	Parts used	Used as Medicine
1.	*Abroma angusta* (L.)	Bon khopai	Sterculiaceae	F	Oil	Fever, ring worm and scabies
2.	*Acanthus leucostachysis* (Wall.)	Sam sikal	Acanthaceae	F	Lf	Swelling, fever and toothache
3.	*Achyranthus aspera* (L.)	Minamkachi	Amaranthaceae	F	Rt	Leprosy
4.	*Acorus calamus* (L.)	Betse	Araceae	C	Rt	Cough and cold

Sl. No.	*Botanical Name*	*Local Name*	*Family*	*Trend of Occurrence*	*Parts used*	*Used as Medicine*
5.	*Aegle marmelos* (L.) Corr.	Belethi	Rutaceae	C	Lf, Rt, Bk	Melancholia, fevers, palpitation of the heart, ophthalmic and ulcers
6.	*Anthocephalus chinensis* (Lam.)	Mi-bol	Rubiaceae	F	Lf, Bk	Astringent, febrifugal and anti-diuretic properties
7.	*Antidesma burnius* (L.)	Bol-aborak	Euphorbiaceae	F	Lf	Syphilitic ulcers
8.	*Arisaema jacquemontii* (Bl.)	Jinjok	Araceae	C	Tu	Ringworm and skin diseases
9.	*Aristolochia cathcartii* (Hk.f and T)	Baro-warkhut	Aristolochiaceae	R	Rt	Stomach ailments
10.	*Artemisia vulgaris* (L.)	Sak-sak	Asteraceae	A	Lf	Headache and severe bleeding
11.	*Asparagus filicinus* (L)	Riching	Asparagaceae	A	Tu	Gripe in infants
12.	*Asparagus racemosus* (Willd.)	Som riching	Asparagaceae	A	Rt	Fever
13.	*Boerhavia diffusa* (L.)	Samdelma	Nyctaginaceae	C	Lf	Rheumatic
14.	*Bombax ceiba* (L.) SW.	Bolchu	Bombaceae	C	Fl, Bk	Astringent and coetaneous troubles Demulcent, emetic, tonic and blood dysentery
15.	*Bonnaya reptans* (Spreng.)	Sam-reng chick	Scrophulariaceae	F	Lf	Snakebite
16.	*Butea monosperma* (Lam.)		Papilionaceae	F	Sd	Delirium
17.	*Calotropis ontanan* (Br.)	Akom-aring	Asclepiadaceae	F	Lf	Malaria
18.	*Canscora andrographioides* (Griff.)	Sak sre	Gentianaceae	F	Rt	Cuts, wounds and skin diseases
19.	*Capparis assamica* (Hk.f and T.)	Mantori	Capparaceae	F	Lf	Headache and bodyache
20.	*Cassia fistula* (L.)	Soneru	Caesalpiniaceae	A	Rt, Bk, Pu	Purgative, tonic and febrifuge
21.	*Centella asiatica* (L.) Urb.		Apiaceae	A	Wp	Dysentery and diarrhoea.
22.	*Chonemorpha fragrans* (Moon.)	Kotchibeta	Apocynaceae	F	Rt, St	Stomach disorders, chest pain, and rheumatism
23.	*Citrus latipes* (Swingle.)	Tanaka	Rutaceae	C	Fr	Gouty and rheumatic joints
24.	*Clematis ontana* (Buch Ham.ex DC)		Ranunculaceae	F	Rt	Cough and cold

Sl. No.	Botanical Name	Local Name	Family	Trend of Occurrence	Parts used	Used as Medicine
25.	*Costus speciosus* (J.Konig ex Retz) Smith	Karami	Zingiberaceae	F	Rt	Bronchitis, inflammation, anemia and rheumatism
26.	*Crepis fuscipappa* (Benth)	Pon bihar	Asteraceae	C	Lf	Earache
27.	*Curcuma aromatica* (Salisb)	Tikegopl	Zingiberaceae	C	Lf	Gastric troubles, asthma, tuberculosis and blood impurity
28.	*Deeringia amaranthoides* (Lamk)	Sanum	Amaranthaceae	F	Lf	Fever, headache, nose bleeding and dysentery
29.	*Desmodium laxiflorum* (DC)	Bhutu hom	Papilionaceae	C	Rt, Lf	Stomach disorder
30.	*Disporum calcaratum* (D.Don)	Tike jakriting	Liliaceae	F	Tu	Eye diseases
31.	*Dracaena ensifolia* (Wall.)	Milam	Liliaceae	F	Lf	Cold, malaria and rheumatism
32.	*Drymaria cordata* (L.) willd.ex Roem and Schult.)		Caryophyllaceae	A	Lf	Snakebites
33.	*Elephantopus scaber* (L.)	Achaksn	Asteraceae	F	Rt	Heart and liver problems
34.	*Emblica officinalis* (Gaertn.)	Amalaki	Euphorbiaceae	A	Fr	Skin diseases and blood pressure
35.	*Fagopyrum cymosum* (Trev.)		Polygonaceae	A	Lf	Tonic
36.	*Garcinia cowa* (Roxb.ex DC)	Tekra rengron	Clusiaceae	C	Bk	Mosquito repellent
37.	*Geodorum purpureum* (Br.)	Matea bas	Zingiberaceae	F	Lf, Tu	Malaria and whooping cough
38.	*Globba clarkei* (Baker.)	Dike holdiram	Zingiberaceae	F	Lf, Rt	Dysentery
39.	*Hedyotis scandens* (Roxb.)	Sam rating	Rubiaceae	F	Lf	Cough and cold.
40.	*Holarrhena antidysenterica* (L.) Wall	Bol-matra	Apocynaceae	A	Bk	Amoebic dysentery
41.	*Homalomena aromatica* (Schott.)	Roathi	Araceae	A	Rh	Swelling, pimples and skin sores
42.	*Houttuynia cordata* (Thunb.)		Saururaceae	A	Wp	Anti-diabetes
43.	*Hydrocotyle javanica* (Thunb.)	Mana-muni	Apiaceae	C	Lf	Cough, cold and fever
44.	*Itea chinensis* (Hk and Arn.)	Myllone	Saxifragaceae	F	Lf	Skin diseases
45.	*Ixora acuminate* (Roxb.)	Saoltua	Rubiaceae	F	Lf, Fl	Blood purification
46.	*Jasminum lanceolaria* (Roxb)	Pipli	Oleaceae	F	Lf, Rt	Ringworm
47.	*Justicia gendarussa* (L.f.)	Dochenpok	Acanthaceae	C	Lf	Bone fractures and dislocation of bones

Sl. No.	Botanical Name	Local Name	Family	Trend of Occurrence	Parts used	Used as Medicine
48.	*Lasia spinosa* (Thw.)	Timulona	Araceae	F	Rh	Intestinal worm
49.	*Litsea khasiana* (Meissn)		Lauraceae	A	Oil	Deodorants, blisters and boils.
50.	*Melia composite* (Willd.)	Sural	Meliaceae	C	Lf	Gastric ulcers.
51.	*Milletia pachycarpa* (Benth)	Khariu	Papilionaceae	C	Lf	Vermifuge
52.	*Molineria crassifolia* (Baker.)	Rekosi	Poaceae	F	Lf	Diarrhoea
53.	*Mycetia longifolia* (Wall) O. Ktz	Janthro	Rubiaceae	F	Lf	High fever or blood pressure
54.	*Natsiatum herpeticum* (Buch Ham ex Arm)		Icacinaceae	F	Wp	Influenza
55.	*Nepenthes khasiana* (Hk.f.)	Mimankuchi	Nepenthaceae	R	Lf	Indigestion and kidney problem
56.	*Oenanthe stolonifera* (Wall.)	Bopo goli ting	Apiaceae	F	Lf	Stomachache and constipation
57.	*Oldenlendia diffusa* (Roxb.)	Chenong	Rubiaceae	F	Lf	Sore eyes and other eye diseases
58.	*Oldenlendia nudicaulis* (Roxb.)	Chenogn-ri	Rubiaceae	F	Lf	General debility
59.	*Ophiopogon intermedius* (D. Don)	Ticea ohik	Liliaceae	A	Lf	Cuts and wounds
60.	*Ophiorrhiza subcapitata* (Wall.)	Samachik	Rubiaceae	A	Rt, Lf	Fever, sore throat, tonsils and facial blemishes
61.	*Paedaria foetida* (L.)	Gandharadal	Rubiaceae	C	Lf	Dysentery or indigestion
62.	*Parabaena sagittaria* (Miers)	Chiongbombuelu	Menispermaceae	F	Rt	Skin diseases
63.	*Phlogacanthus tubiflorus* (Nees)	Som rongtek	Acanthaceae	F	Lf	High fever
64.	*Pilea lancifolia* (HK. F)	Sam-rongtek	Urticaceae	F	Lf	Fever and antidandruff
65.	*Plumbago zeylanica* (L.)	Agea	Plumbaginaceae	C	Rt	Piles
66.	*Pogostemon parviflorus* (Benth.)	Sam-sanum	Lamiaceae	C	Lf	Headache
67.	*Polygonum chinensis* (L.)	Samichang	Polygonaceae	C	Rt, Lf	Urinary disorders
68.	*Polygonum nepalensis* (Meissn.)	Samichang	Polygonaceae	A	Wp	Blood pressure
69.	*Pothos kunstleri* (Hk.f)	Garore	Araceae	F	Lf, St	Toxicity
70.	*Pouzolzia indica* (Gaud.)	Fakruom	Urticaceae	C	Lf, Rt	Urinary and spleen disorders
71.	*Rhaphidophora hookeri* (DC.)	Dhukentri	Araceae	C	Lf	Snake and dog bite
72.	*Rhus semialata* (Murr.)	Khitma	Anacardiaceae	F	Fr	Diarrhoea and dysentery

Sl. No.	Botanical Name	Local Name	Family	Trend of Occurrence	Parts used	Used as Medicine
73.	*Rubus moluccanus* (L.)	Thekhi-sembok	Rosaceae	F	Rt	Blood clotting and to prevent swelling.
74.	*Smilax prolifera* (Roxb.)	Marangwa	Smilacaceae	F	Lf, Rt	Ulcer and skin diseases
75.	*Spatholobus roxburghii* (Benth.)	Maribata	Papilionaceae	F	Bk	Toothache and gum troubles
76.	*Spilanthus acmella* (L.)	Sam atching	Asteraceae	F	Lf	Fever
77.	*Strobilanthes scaber* (Nees.)	Sam siphra, bimchat	Acanthaceae	C	Lf	Itching and skin diseases
78.	*Swertia chirata* (Roxb.) Karst	Chirata	Gentianaceae	A	Lf, St	Anthelminthes and low blood pressure
79.	*Symplocos racemosa* (Roxb.)	Boligpok	Symplocaceae	C	Bk	Indigestion and impaired blood circulation
80.	*Tacca laevis* (Roxb.)	Colbere	Taccaceae	F	Tu	Diarrhoea and blood dysentery
80.	*Terminalia chebula* (Retz.)	Artak, salukal	Combretaceae	C	Fr	Diarrhoea, stomach pain and spleen disorders
81.	*Thunbergia coccinea* (Wall.)	Kakku budu	Acanthaceae	F	Lf, Rt	Bone fracture
82.	*Valeriana hardwickii* (Wall.)		Valerianaceae	F	Wp	Insect stings
83.	*Zanthoxylum rhetsa* (Roxb.) DC	Sumitchory	Rutaceae	A	Lf, Sd	Fever, cough and cold
84.	*Zingiber officinale* (Rosc.)	Ada	Zingiberaceae	A	Rh	Fever, cough and cold
85.	*Zingiber rubens* (Roxb.)		Zingiberaceae	A	Rh	Fever, cough and cold

Abbreviations Used: A- Abundant; C- Common; F- Frequent; R – Rare; Lf-leaf; Bu-bulb; Bk-bark; Wp-whole plant; Rt-root; Rh- rhizome; Fr-fruit; Fl- flowerl; St-stem; Sh- shoot; Ju-juice; Inf- inflorescence; Be – berries; Sd- Seed; La-latex; Tu-tuber; Pit-pitcher; Pu-pulp.

It has been shown through numerous examples that the tribals widely use a large variety of medicinal plants available to them. On one hand such activities have contributed to our knowledge of various uses of biodiversity and on the other hand, they have resulted in the rapid depletion of natural resources. Their demand in the local market has increased, causing a threat to these wild species. Such plants too, may become the medicines of the future. Although these medicinal plants are presently under-utilised, however, to calci to future needs, this invaluable treasure of native diversity needs care, more research and focus on its collection, conservation and usage.

A large number of these species can be cultivated in different districts of the state, as the agroclimatic conditions are suitable for their growth. According to the Planning Commission and National Medicinal Plant Board, among the prioritised species of medicinal plants, more than 10 species are found either

wild or in a cultivated condition in Meghalaya (Table 17.4). A few more species, which could be considered for cultivation and development in the states on a commercial basis through Community Forest Management, Self Help Groups and other suitable modes where benefits directly go to the cultivators, have been identified as priority species for conservation and have a high demand in the local and regional market and also for export outside the state. Examples of these plants are *Acorus calamus, Aristolochia* spp., *Centella asiatica, Cinnamomum* spp., *Clerodendrum colebrookianum, Costus speciosus, Curcuma* spp., *Fagopyrum* spp., *Flemingia vestita, Gaultheria fragrantissima, Gynocardia odorata, Houttuynia cordata, Kaempferia* spp. *Litsea* spp., *Lycopodium* spp., *Melia composita, Nepenthes khasiana, Piper longum, Potentilla fulgens, Sarcandra glabra, Smilax glabra, Solanum* spp., *Spilanthes* spp., *Taxus bacata, Terminalia* spp., *Zanthoxylum* spp., *Zingiber* spp. These prioritised species can be grown in a variety of land conditions available, like field margins, existing tree plantations, community forests, protected areas, sacred groves, wastelands, jhum fallows, etc. The productivity of Jhum fallows can thus be increased and can aid in jhum rehabilitation. Further, the rural folk can generate subsistence income through the cultivation of medicinal plants and conserve the genetic resources, while improving the local health status and economy.

Table 17.4: List of medicinal plants prioritised by the Medicinal Plant Board and Planning Commission, Government of India

Aconitum heterophylum Wall.	*Glycirrhiza glabra* L.
Aconitum ferox Wall.	*Gymnema sylvestre* R. Br.
**Aegle marmelos* L. Corr.	*Nardostachys jatamansi* DC.
Andrographis paniculata L.	**Ocimum sanctum* L.
**Asparagus racemosus* Willd.	*Picrorrhiza kurroa* Benth.
Bacopa monnieri (L.), Pennell.	**Piper longum* L.
Berberis aristata DC.	*Phyllanthus amarus* Schum and Thonn.
Cassia angustifolia Vahl.	*Plantago ovata* Forsk.
Chlorophytum arundinaceum Baker	**Rauwolfia serpentina* (L.) Benth.Ex Kurz.
Commiphora wightii (Arn.) Bhandari.	*Santalum album* L.
Coleus barbatus Benth.	*Saraca asoca* (Roxb.) de Wilde.
Convolvulus pluricaulis Choisy.	*Saussurea costus* C. B. Clark.
**Emblica officinalis* Gaertn.	**Solanum nigrum L.*
Embelia ribes Burm. F.	**Swertia chirata* Buch Ham.
Garcinia indica L.	**Tinospora cordifolia* Miers.
**Gloriosa* superba L.	*Withania somnifera* (L.) Dunal.

* The species of Medicinal Plants found in Meghalaya.

CONSERVATION MEASURES

In order to protect the diversity of medicinal plants of the state, the following have been suggested:

The data on medicinal plants will serve as a useful tool to prepare development and action plans for the herbal drug industry, so as to improve

and uplift the life and economy of the state. While planning for the development of the local community, along with conservation and protection of all kinds of plants traditionally used by these tribals, what is urgently needed is the integration of all aspects of the diversity of medicinal plants.

There is need to develop a strategy to explore the vast wealth of there medicinal plants, find effective methods of propagation, encourage sustainable harvesting of plants from forests, involve small farmers and communities in their cultivation and conduct studies on the commercially exploitable species. An effective way of giving protection to ethnomedicinal plants is to provide a legal cover to the habitat or the species, so as to enable enforcement agencies to have the authority to control/regulate their enactment.

The demands for medicinal plants are increasing day by day, within and outside the country, and while the bulk of the trade is still from wild harvested sources on forest land, only a very small number of species are cultivated. The expanding trade in medicinal plants has serious implications on the survival of several plant species, with many under serious threating of becoming extinct. A holistic management action plan is necessary to be formulated for the assessment and management of resource base, best harvesting and processing practices, trade issues and aspects dealing with the intellectual property rights on the traditional medicines used by the tribal people. In the medicinal plants industry, the various actions needed include: setting up of a national level authority, responsive marketing cooperatives, organisation of a formal market, disseminating of market information, and creation of international market opportunities, etc.

The active participation and co-operation of the local people should be taken into account while implementating legislation measures, as well as other conservation practices. Ideally, the inclusion of a rare species in the endangered plant programme collection will only be the first step towards its recovery as naturally reproducing wild populations on protected land. At present the emphasis is less on the long-term maintenance of the species in cultivation and more on developing the technology to enhance wild populations and to introduce new populations in protected sites.

To avoid pressure from wild populations, mass propagation of potential species needs to be popularised among the inhabitants, to ensure that adequate quantities are available for future generations. Research priority should be given to develop appropriate technology for propagation, cultivation, processing, chemical characterisation and marketing of medicinal plants, and useful and endangered species. Local people should be trained to propagate, preserve and collect the medicinal plants as a part of extension. They should be educated and provided with the proper guidelines, so that there is a continuous regeneration of wild flora. It is again important that we should not disturb the local forest flora, which is generally susceptible to environmental changes, which may lead to the extinction of natural species.

Protection of medicinal plants based on statistical data on the user list from the ethnomedical practitioners.

In situ and *ex situ* conservation of endangered or likely to be endangered (Rare) species should be immediately started in the appropriate districts of the

state. It is extremely important to take urgent steps for their *in situ* conservation, by banning their collection from the wild. Use of spontaneous and wild collected plants must be limited as far as possible and they should be replaced, step by step, by being cultivated. Rural folk should be encouraged to raise their own ethno-medicinal gardens or herb gardens in their vicinity, to ensure conservation of the depleting biodiversity of medicinal plants.

With the erosion of tribal culture, the traditional healers have become a threatened category. Also, the genetic diversity in medicinal plants has diminished due to shifting cultivation and large-scale destruction of their natural location. The over-exploitation of medicinal resources in an unscientific manner, by unskilled labour, and poor natural or artificial regeneration has resulted in the virtual extinction of certain vital species. An understanding of the many aspects of human influences on biodiversity and their underlying driving forces is of crucial importance for setting priorities and directing efforts towards conservation and sustainable use. Therefore, there is an urgent need for a local inventory of medicinal plants, to identify all the species that merit priority and to formulate strategies for the *in situ* conservation and cultivation of these species.

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