



Diversity of Endemic and Threatened Ethnomedicinal Plant Species in Meghalaya, North-East India

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Abstract

Plants play a vital role in the healthcare of the local tribal people in Meghalaya. A number of species are used for curing a wide range of ailments. Traditional remedies are part of the cultural and spiritual life of these people. The objective of the study was to evaluate the diversity and role of endemic and threatened plant species in ethnomedicine. A total of 131 species, including 36 endemic and 113 species under different threat categories were found. This includes 73 and 46 species that falls under different degrees of threats at regional and global levels respectively. The life form of these plants can be arranged in the order of trees>herbs>shrubs>climbers>epiphytes. It was also found that the indigenous community holds substantial knowledge on ethnomedicinal plants that plays an important role in assisting the primary healthcare needs of the people. These plants would be of much benefit, if evaluated and introduced in the modern scientific health care system. However, the decline in population due to overharvesting and habitat destruction of these plants calls for necessary measures for their effective conservation.

Keywords: Indigenous knowledge, herbal remedy, endemic, threatened, rare, northeast India.

Introduction

Throughout the world, conventional medicine has remained as the most important, reasonable and easily available source of primary treatment in the healthcare systems. Despite the development in science and technology, still about 80% of the population in developing countries are dependent on the conventional medicines¹, mainly obtained from plants in the wild^{2,3}. This also holds true in case of Meghalaya, a state in northeast India which is a part of Indo Burma hotspot⁴. A total of 3,128 flowering plant species have been reported from the state, of which 1,236 species are endemic⁵ and 834 (27%) are of medicinal importance⁶. The state is dominated by the tribal people (Khasi, Jaintia and Garo), who are dependent on the forests for their day to day life. The use of wild plants as a source of medicine is a part of the custom and ethnicity of these people. Their deep-rooted culture of using medicinal plants have acquainted them with knowledge of medicinal properties of several plants, which are now used to treat human and livestock ailments, and this knowledge is being transferred from generation to generation. Medicinal plants have played an immense role in supporting the primary healthcare system of the state⁷. About 95% of traditional medicine preparations are mentioned to be of plant origin⁸, and 90% of the rural people depend on this system⁹. The collection and processing of these medicinal plants contributes a main part to the economy of the state^{6,10}.

Although the tribal's of Meghalaya have cultural heritage of *in-situ* conservation for these plants¹¹, but these plants are

increasingly falling under various threat categories due to destruction of their natural habitats^{12,13}. The pressure on the wild population of medicinal plants has increased due to exploitation of forest resources for commercial purposes. Also habitat destruction has rendered many of the common species as rare and threatened in the state and is unavailable to the indigenous people who have relied on them for millennia. The conservation and management of endemic and threatened species have become an important issue in the present scenario. Although a number of studies are available on the medicinal plants from different parts of the state^{6,7,14,15}, but meager information is available on endemic and threatened medicinal plants. Therefore, the objective of the present review was to evaluate the diversity and role of endemic and threatened plant species of the state in ethnomedicine. The study also aims to provide an opening for policy makers, natural resource managers, stake holders and traditional practitioners to take necessary conservation measures, for these medicinally important plants.

Material and Methods

A database on diversity, status and traditional uses of medicinal plants of Meghalaya was compiled using all available literature on medicinal plants published in scientific journals, books, reports from national, regional and international organizations, theses, and conference papers. Three sets of data were used for the present analysis viz, rare, endemic and threatened plant species. Under rare category, only those species that are considered as rare to the state of Meghalaya were included¹⁶⁻¹⁹. Species, whose distributions are restricted to Meghalaya or to

the North-eastern region including Indo-Burma hotspot, were considered as endemic. Threatened category includes plants classified as per the Red Data Book of Indian plants by Nayar and Sastry¹⁸, Walter and Gillett¹⁹, Ved *et al.*²⁰ and the recent IUCN Red List²¹. In order to have the rational information on the diseases treated, all the ailments were classified into ten broad ailment categories, with different sub-categories (table-1).

Results and Discussion

Species diversity: A total of 131 plant species were recorded that were either rare, endemic or threatened and being widely used in traditional health care. These plants were distributed among 74 families and 120 genera. Trees with 53 species (40.5%) were the dominant component followed by 40 (30.5%) herb, 20 (15.3%) shrub, 13 (9.9%) climber and 5 (3.8%)

epiphytes (figure-1; appendix-1). Fabaceae with 16 species was dominant (21.6%) followed by Rutaceae, Orchidaceae, Moraceae and Apocynaceae (5 species each). Five families (Apiaceae, Araceae, Euphorbiaceae, Juglandaceae and Liliaceae) were represented by 3 (4.1%) species each. There were sixteen families (Aquifoliaceae, Araliaceae, Arecaceae, Aristolochiaceae, Flacourtiaceae, Gesneriaceae, Lauraceae, Melastomaceae, Meliaceae, Piperaceae, Polygonaceae, Rubiaceae, Scrophulariaceae, Simaroubaceae, Theaceae and Verbenaceae) that were represented by two species each whereas, 48 families were monospecific. Out of total number of plants most of them grow in wild (119 species, 90.8%), followed by plants that grows in the wild as well as cultivated (9 species, 6.9%), while only 3 (2.3%) species are exclusively under cultivation (figure-1; appendix-1).

Table-1
Classification of the ailments treated

| Ailment category | Ailment sub-category |
|--|---|
| Circulatory system problems | Heart trouble, hematoma, high blood pressure and anemia. |
| External injuries, bites and dermatological problems | Scabies, ringworms, leprosy, rashes, pimples, acne, itching, dandruff, burns, insect bites, snake bites, caterpillar stings, poison consuming, cuts and wounds. |
| Head, thermoregulatory and nervous system problems | Malaria, hypertension, measles, cold, stress and tension, insomnia, anxiety, restlessness and fever. |
| Digestive system and gastrointestinal problems | Indigestion, vomiting, nausea, spasms, constipation, intestinal worms, gastric ulcers, stomach pain, liver problems, spleen problems, dysentery and diarrhea. |
| Cancer and musculoskeletal problems | Cancer, paralysis, muscular sprain and pain, bone dislocation, inflammation, rheumatism, obesity and weakness. |
| Ophthalmological and odological problems | Eye injury, conjunctivitis, eye sight problems, ear pain and eye redness. |
| Oro-dental and respiratory problems | Bleeding gums and nose, toothache, mouth sores, tongue blisters, nasal congestion, dental caries, influenza, bronchitis, pneumonia, cough, pulmonary infections, asthma and tuberculosis. |
| Urogenital, gynecological and venereal problems | Hydrocoel, diabetes, polyurea, gonorrhea, kidney stone, amenorrhea, and pregnancy related problems |

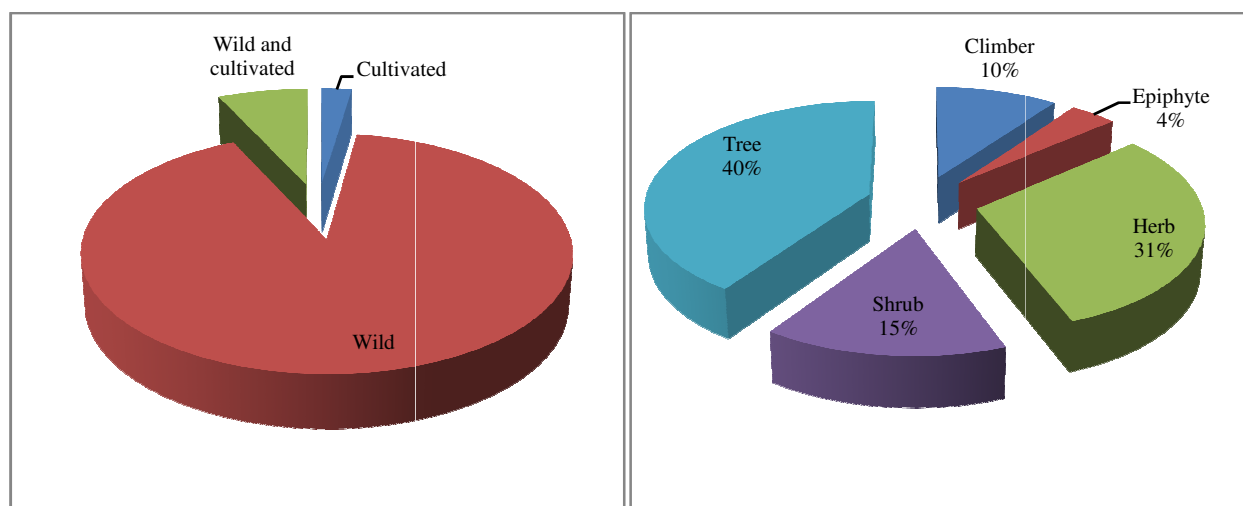


Figure-1
Proportion of endemic and threatened medicinal plant species by occurrence and habit

Part used: The herbal remedies for different ailments were prepared by using the whole plant either singly or in combination. Plant parts which were used singly include leaves, bark, bulbs, fruits, rhizomes, roots, seeds, stem, and fronds, and in combination different proportions of the above parts were used. Among the single parts used were that of leaves (17.6%), followed by bark (12.2%), while the use of other parts was <10% (figure-2). For combined parts used leaf/root accounted for 11.5%, followed by leaf/stem, leaf/bark and leaf/flower (3.1% each), root/seed, and root/bark combination (2.3% each) whereas, other combinations accounted for < 2%. The use of whole plant was mainly for herbaceous species that contributed to 15.3% of the total species (figure-2). The remedies from these plants were often utilized in the form of extracts, juice, paste and powder. Pastes made from leaves, fruits, bark, seeds and stem were applied on cuts, wounds, boils and skin diseases. Other preparations included chewing the raw plant and inhaling smoke or vapor generated by burning. Some plants were boiled, while others were applied directly in fresh form or topically.

Ailments treated: A wide range of ailments were treated using these plants. The majority of the species (87%) had multiple

therapeutic uses, while only few (13%) were used for single disease. Among the ailment categories, the gastro-intestinal and digestive system disorders were treated with the highest number of plant species (55), followed by external injuries, bites and dermatological problems (45), head, thermoregulatory and nervous system problems (36), cancer and musculoskeletal problems (32), while the least number of species were used to treat ophthalmological and odological problems (8) (figure-3).

Endemism and threat status: Out of the total 131 plants, 36 (27.4%) species were endemic (Appendix 1). These endemic medicinal plants were distributed in 27 families and 35 genera. The family Rutaceae with 3 species exhibited the highest number of endemics followed by Verbenaceae, Theaceae, Melastomaceae, Lauraceae, Fabaceae and Aquifoliaceae (2 species each), while others were having less than 2 species. Most of the endemic species recorded were trees (13 species), followed by herbs and shrubs (10 species each), climbers (2 species) and epiphytes (1 species). Of the total endemic species most of them are found in the wild (34) while both cultivated and wild as well as cultivated only comprised of 1 species each.

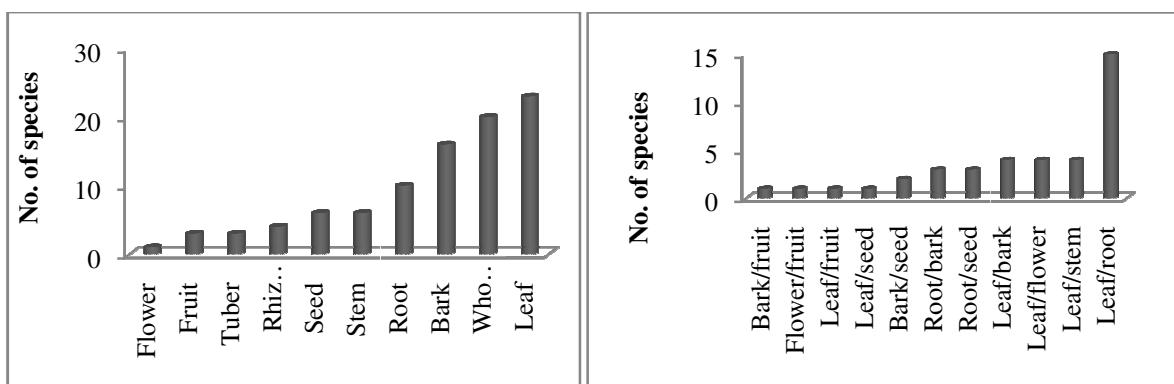


Figure-2
 Proportion of plant parts used singly and in combinations

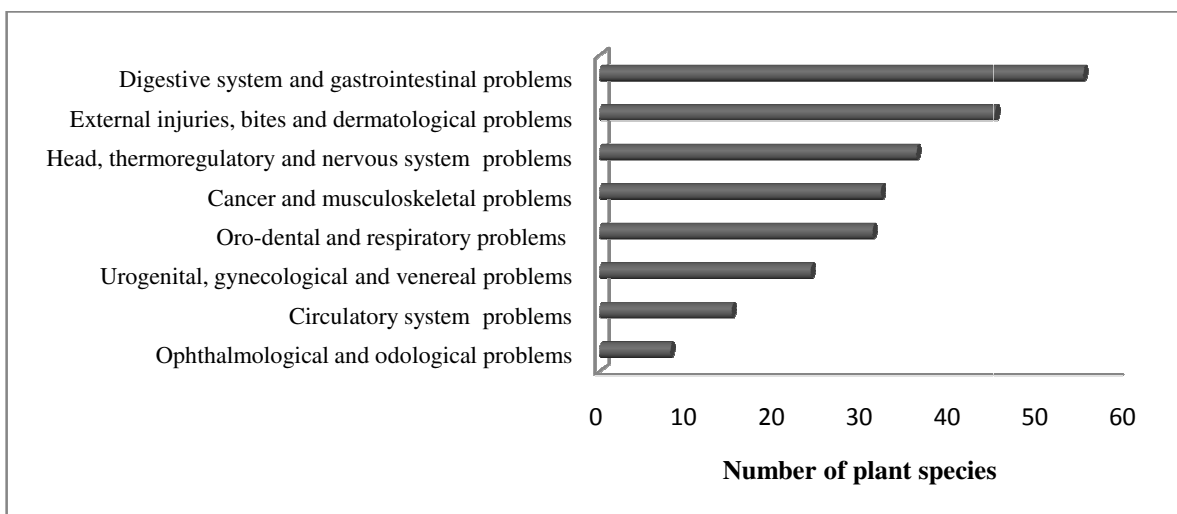


Figure-3
 Major ailments treated by endemic and threatened medicinal plants in Meghalaya

In the present study, out of total 131 medicinal plant species, 113 (86.2%) species were found to be under various threat categories. Majority of the threatened species were trees (42.5%) followed by herbs (31%), shrubs (13.3%), climbers (9.7%) and epiphytes (3.5%). Most of them grow in wild (89.4%) while only 8% species fall under both wild as well as cultivated and only 2.7% were cultivated. Of these, 46 species belonging to 31 families and 45 genera fall under different threat categories at global level. This includes critically endangered (1 species), endangered (2 species), vulnerable (4 species), near threatened (2 species), least concern (36 species), and data deficient (1 species) (appendix-1; figure-4). Eighteen species that were endemic were also threatened and majority of them were trees (8 species), followed by shrubs and herbs (5 each). There were 62 species that are considered as rare to the state of Meghalaya.

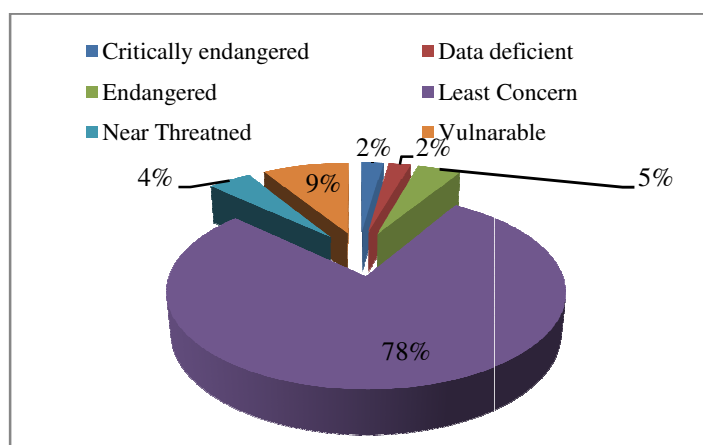


Figure-4

Proportion of medicinal plant species under different IUCN threat categories

Discussion: The state of Meghalaya in northeast India is rich in medicinal plant diversity. The present analysis clearly reveals that majority of these species are either endemic to the region or falls under various threat categories. The dominance of Fabaceae, Rutaceae, Orchidaceae, Moraceae and Apocynaceae could be attributed to their wider distribution in the flora of the state¹⁷. Furthermore, the broad utilization of species from these families might be attributed to the occurrence of effectual bioactive ingredients against different ailments²². Of the different life forms, the dominance of trees under the threatened category indicates that many plants might have become endangered due to logging as well as shifting cultivation²³. The dominance of trees and herbs as medicinal plants in the area could be attributed to their easy accessibility^{24,25}. Holding of substantial herbal knowledge and dependence on it could be attributed to poor health facilities and the cultural and religious taboos of the local people. These tribes traditionally use specific medicinal plants for curing a number of diseases, while hospitals are used only in case of emergency²⁶. The use of multiple therapies based on combining plants in conventional medicine has revealed the increased effectiveness of the herbal

medicine²⁷, due to additive or synergistic effects that they could have during disorder handling^{28,29}. High number of plants used in the treatment of gastro-intestinal disorders, principally diarrhea and dysentery as well as respiratory diseases may imply the prevalence of the disease in the region³⁰. The study strengthens the belief that traditional indigenous knowledge could be exploited for future options. Hence, some of these species can be targeted for phytochemical and pharmacological studies with the aim of identifying active ingredients contained and to get unique therapeutic uses.

Wild habitats were found to be major pools of medicinal plants, but the collection of plant material through destructive harvesting makes them prone to threat and extinction. Also these habitats are subjected to anthropogenic influences and are consequently shrinking in size due to an ever-increasing population pressure and over exploitation. Extreme anthropogenic pressures seem to be the major cause of population decline and availability of the medicinal plants^{31,32}, as evident by the presence of 46 species that falls under various threat categories²¹. In addition the use of entire plant and particularly root and bark parts for medicinal preparations could pose a long-term threat on the survival of plants and such plants often tend to be the most threatened³³. The species that are endemic and at the same time threatened are thus important species from conservation point of view. Therefore, strict and priority measures are necessary for their effective conservation. In order to meet the growing demand, cultivation of commercially viable species is necessary. Unfortunately, only a few medicinal plants are presently under cultivation (e.g. *Cinnamomum tamala*, *Citrus latipes*, *Solanum khasianum*, *Paphiopedilum insigne*, *Myrica nagi*, *Piper betel* etc.). Consequently, the large-scale cultivation of endemic and threatened species is necessary for their conservation. Such efforts would also lessen the pressure on these species in the natural habitats. Therefore, mass awareness creation among local communities, their active involvement in plant resource management as well as raising their own ethnomedicinal- or herbal- gardens in their vicinity could help conserve many of these plants in the wild. Such efforts would also help to improve the livelihood options of the local people, provide long-term security of the traditional healthcare system and develop state's economy.

Conclusion

Medicinal plants play a significant role in curing many human ailments in the state of Meghalaya. This traditional knowledge needs to be properly documented and active principles present in these plants need scientific analysis for their effective utilization for medicinal purposes. Due to overexploitation and the destruction of natural habitats many of these plants have become threatened. Therefore, *ex-situ* and *in-situ* conservation measures should be taken to protect the medicinal plants of the state from further depletion with special focus to endemic and threatened species.

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Appendix-1

List of endemic and threatened medicinal plants and their uses in Meghalaya (species are arranged alphabetically in order of family)

| Name | Family | Life form | Occurrence | Part used | Uses | Distribution | Meghalaya | IUCN |
|--|-------------|-----------|------------|-----------|--|--|-----------|------|
| <i>Thunbergia coccinea</i> Wall. | Acanthaceae | Cl | W | L/R | For bone fracture, leaves and roots are pounded and applied as poultice. | Indo Burma & throughout Himalayas | R | |
| <i>Acer laevigatum</i> Wall. | Aceraceae | T | W | L | Leaf paste is used externally in case of sprain. | Indo-Malaya, Himalayas & NEI | R | |
| <i>Goniothalamus simonosii</i> Hk.f. & Th. | Annonaceae | T | W | FR | Fruit taken to relieve throat irritation. | Meghalaya | EN | EN |
| <i>Hydrocotyle javanica</i> Thunb | Apiaceae | H | W | L | Used for cold, cough and fever along with leaves of <i>Oenanthera</i> sp. | NE I & SE Asia | | LC |
| <i>Trachyspermum khasianum</i> H. Wolff. | Apiaceae | H | W | L/ST | The mashed leaves and stem applied on septic wounds. | Meghalaya | | |
| <i>Centella asiatica</i> L. | Apiaceae | H | W | WP | Plant mashed and applied to boils and tumors. Extract taken for dysentery, diarrhea and cough along with ginger. | India & SE Asia | | LC |
| <i>Ichnocarpus frutescens</i> (L) R. Br. | Apocynaceae | Cl | W | L/R | Used to alleviate inflammations and to prevent dental caries. | Indo-Malaya, Australia & throughout India | R | |
| <i>Rauvolfia serpentina</i> (L.) Benth. ex Kurz. | Apocynaceae | H | WC | R | During fever the root juice is taken raw or boiled to bring down the body temperature. | East Asia (from India to Indonesia) | EN | |
| <i>Alstonia scholaris</i> (L.) R.Br | Apocynaceae | T | W | B | Juice used for cold, cough and gastrointestinal problems. | Indo-Malaya, throughout India, Malesia and Austral | | LC |

| Name | Family | Life form | Occurrence | Part used | Uses | Distribution | Meghalaya | IUCN |
|---|------------------|-----------|------------|-----------|---|--|-----------|------|
| | | | | | | asia | | |
| <i>Wrightia coccinea</i> (Roxb. ex Hornem.) Sims. | Apocynaceae | T | W | B | Paste used to keep blood pressure under control. | Indo-Malaya, confined to NEI | R | |
| <i>Holarrhena antidysenterica</i> (Roth.) A. DC. | Apocynaceae | T | W | R/B | The powdered bark to cure dysentery and the root used as an antidote for snake bite. | South Africa, Indian Subcontinent & Indo-China | | LC |
| <i>Ilex khasiana</i> Purk. | Aquifoliaceae | T | W | R/B | Decoction used in cold, cough and tuberculosis | Meghalaya | CR | CR |
| <i>Ilex embeloides</i> Hook.f. | Aquifoliaceae | T | W | R/B | Decoction used in cold, cough and tuberculosis. | Meghalaya | R | |
| <i>Zantedeschia aethiopica</i> (L.) Spreng | Araceae | H | W | L | Leaf juice applied to cuts, injuries and to relieve uterine contraction. | Southern Africa & NEI | | LC |
| <i>Acorus calamus</i> L. | Araceae | H | W | L/R | Leaf juice is used to treat paralysis, epilepsy and stomach problem. Root juice taken for malaria and snake bites. | Tropics and subtropics, especially in India & Sri Lanka | | LC |
| <i>Lasia spinosa</i> (L.) Thw. | Araceae | H | W | RH | The decoction of rhizomes mixed with sugar is consumed orally for poisoning | Bangladesh, Bhutan, Cambodia, China, India, Indonesia, Myanmar & Nepal | | LC |
| <i>Hedera helix</i> CL. | Araliaceae | Cl | W | WP | Used for skin diseases and as an antiseptic. | Himalayas | R | |
| <i>Panax pseudo-ginseng</i> Wall. | Araliaceae | H | W | L/R | Used to stop or slow down bleeding. Sometimes taken by people who vomit up or cough up blood, or find blood in their urine or faeces. Also used to relieve pain and to reduce swelling. | Eastern Himalaya, Tibet, Burma & China | VU | |
| <i>Calamus floribundus</i> Griff. | Arecaceae | Cl | W | R | Extract taken for indigestion, stomach ache and malaria. | NEI | | |
| <i>Calamus erectus</i> Roxb. | Arecaceae | SH | W | R/S | Used in indigestion, stomach problems, eczema, wounds and diabetes. | Himalayas & NEI | R | |
| <i>Aristolochia cathcartii</i> Hk.f. | Aristolochiaceae | Cl | W | RH | Stomach pain and in hydrocoel it is rubbed on testes | Eastern Himalayas | R | |
| <i>Aristolochia saccata</i> Wall. | Aristolochiaceae | Cl | W | TU | Tubers boiled with salt are taken during stomach ailments. In spleen, hematoma and urinary troubles, the tubers are | Central and Eastern Himalayas | R | |

| Name | Family | Life form | Occurrence | Part used | Uses | Distribution | Meghalaya | IUCN |
|--|-----------------|-----------|------------|-----------|--|--|-----------|------|
| | | | | | boiled with alum and taken. | | | |
| <i>Sphaeranthus indicus</i> L. | Asteraceae | H | W | R/S | Seed and roots are considered to be antihelminthic. Powdered roots are administered for stomachache and piles. | Throughout India | | LC |
| <i>Impatiens tripetala</i> Roxb. ex DC. | Balsaminaceae | H | W | R | Used to promote appetite and as digestive enzyme. | NEI | R | |
| <i>Begonia rubro-venia</i> Cl. | Begoniaceae | H | W | WP | Whole plant is taken to cure diarrhea and dysentery. | Himalayas & NEI | R | |
| <i>Coldenia procumbens</i> L. | Boraginaceae | H | W | L | Antihelmenthic and antibacterial. | Africa, tropical Asia & Australia | R | |
| <i>Cardamine impatiens</i> L. | Brassicaceae | H | W | L | Rheumatism and as diuretic. | Europe & India | R | |
| <i>Crateava nurvala</i> Buch. Ham | Capparaceae | T | W | B | Urinary ailments. | SE Asia & NEI | R | |
| <i>Viburnum simonsii</i> Hk.f.&Th. | Caprifoliaceae | T | W | FR | Used as tonic and to prevent spasms. | Meghalaya | | |
| <i>Euonymus lawsonii</i> Cl. & Pr. | Celastraceae | SH | W | B/S | Bark used in syphilis, indigestion and liver disorder. Seed oil used for removing lice. | Meghalaya | | |
| <i>Cephalotaxus mannii</i> Hk. f. | Cephalotaxaceae | T | W | WP | Used in inflammations and leukemia. | Southern China, NEI, Laos, Thailand, Myanmar & Vietnam | | VU |
| <i>Garcinia pedunculata</i> G.Don | Clusiaceae | T | W | FR | Dysentery and urinary troubles. | Indo-Burma, confined to NEI | | |
| <i>Commelina benghalensis</i> L. | Commelinaceae | H | W | R | Paste used to treat burns and treat indigestion. | Tropical Asia & Africa | | LC |
| <i>Ipomoea uniflora</i> (Burm. f.) Roem. | Convolvulaceae | Cl | W | WP | For cholera, dysentery and vomiting aqueous extract is consumed orally. | NEI, Bangladesh, Malaysia, Thailand & Vietnam | | LC |
| <i>Thuja occidentalis</i> L. | Cupressaceae | T | C | L | For skin diseases | Northeastern USA, Europe & cultivated elsewhere | | LC |
| <i>Cycas pectinata</i> Buch. Ham | Cycadaceae | T | WC | ST | Oil used for hair dandruff. | NEI, Nepal, Bhutan, Burma, Southern China & Bangladesh | R | VU |
| <i>Cyperus rotundus</i> L. | Cyperaceae | H | W | WP | Taken for delirium, dysentery and jaundice. | Africa, Southern and Central Europe & Southern Asia | | LC |

| Name | Family | Life form | Occurrence | Part used | Uses | Distribution | Meghalaya | IUCN |
|---|------------------|-----------|------------|-----------|---|--|-----------|------|
| <i>Daphniphyllum himalayense</i> (Benth.) Muell.-Arg. | Daphniphyllaceae | T | W | ST | A paste of the wood is applied as a poultice to boils. | NEI | R | |
| <i>Dipsacus asper</i> Wall. ex. DC. | Dipsacaceae | H | W | L | For skin diseases | Meghalaya | | |
| <i>Shorea robusta</i> Gaertn. | Dipterocarpaceae | T | W | FL | Used as antimicrobial and anti-inflammatory | Himalaya, Myanmar, Nepal, India & Bangladesh | | LC |
| <i>Drosera peltata</i> Sm. | Droseraceae | H | W | L | As tonic and carminative. | Himalayas, Indo-Malaya, Nilgiris & Australia | R | LC |
| <i>Diospyros pilosula</i> (DC.) Hiern | Ebenaceae | T | W | WP | Stomach disorder, piles, kidney stone, diarrhea and dysentery. | Burma, NEI & Andaman | R | |
| <i>Equisetum ramosissimum</i> Desf. | Equisetaceae | H | W | ST | Used to treat the stomach pain. | SE Africa, Central Europe & throughout Asia | | LC |
| <i>Erythroxylum kunthianum</i> Wall. Ex Kurz | Erythroxylaceae | T | W | B | Bark chewed with betel leaf as a stimulant. | Indo-Burma confined to NEI | | |
| <i>Boehmeria macrophylla</i> D. Don | Euphorbiaceae | H | W | L/ST | Dysentery and diarrhea. | Subtropical Himalayas | | |
| <i>Croton tiglium</i> L. | Euphorbiaceae | SH | W | B/S | The solution of the bark or seed in water is used as a laxative for stomach ailments. | Sino-Malaya, NEI | R | |
| <i>Beliospermum micranthum</i> Muell.-Arg | Euphorbiaceae | SH | W | L/R | Juice and paste taken to cure asthma and body ache. | Meghalaya | R | |
| <i>Saraca asoca</i> (Roxb.) de Wilde. | Fabaceae | T | W | B | As antibacterial, for fever and cold. | Indo-Malaya & throughout India | R | VU |
| <i>Bauhinia variegata</i> L. | Fabaceae | T | W | L/FL | Piles and dysentery. | South Asia & SE Asia | | LC |
| <i>Bauhinia purpurea</i> L. | Fabaceae | T | W | ST | Antipyretic and antinflammatory. | South China & SE Asia | | LC |
| <i>Spatholobus roxburghii</i> Benth. | Fabaceae | Cl | W | B | Chewed for toothache and gum troubles | India, Burma & Bangladesh | | LC |
| <i>Acacia pennata</i> (L.) Willd. | Fabaceae | Cl | W | L | Leaf juice mixed with milk, used for treatment of indigestion in infants, scalding of urine and for curing bleeding gums. | South & SE Asia | | LC |
| <i>Sophora acuminata</i> Baker. | Fabaceae | SH | W | B | Purification of blood after pregnancy. | Bangladesh, Burma & Eastern Himalayas | R | |

| Name | Family | Life form | Occurrence | Part used | Uses | Distribution | Meghalaya | IUCN |
|--|----------------|-----------|------------|-----------|--|---|-----------|------|
| <i>Apios cornea</i> Benth. | Fabaceae | SH | W | L | Along banana leaf paste applied to cure joint pain. | Meghalaya | R | |
| <i>Dalhouisia bracteata</i> (Garh ex Roxb) Wt. | Fabaceae | SH | W | L | Paste applied to cure cuts and wounds. | India-Burma & Bangladesh | R | |
| <i>Mucuna bracteata</i> DC. ex Kurz | Fabaceae | SH | W | S | Seeds eaten raw to increase potency. | Indo-Malaya & NEI | | LC |
| <i>Pongamia pinnata</i> L. | Fabaceae | T | W | S | Paste applied to treat scabies. | Australia, Florida, Hawaii, India, Malaysia & Oceania | | LC |
| <i>Butea monospora</i> (Lamk.) Kuntze | Fabaceae | T | W | S | Mixed with <i>Cyperus rotundus</i> and used for delirium. | Indo-Malaya | R | |
| <i>Cassia mimosoides</i> L. | Fabaceae | T | W | WP | Extract used to cure skin diseases. | India, Southern China, southward Malaya to Australia | | LC |
| <i>Mimosa pudica</i> L. | Fabaceae | H | W | R | Maggots in sheep and cattle are got rid off by feeding the infected animals. | South America, Central America, Tanzania, South & SE Asia | | LC |
| <i>Parkia roxburghii</i> G.Don | Fabaceae | T | WC | R/S | Infections, stomach disorders and menstruation disorder. | Indo-Malaya & NEI | R | |
| <i>Xylia xylocarpa</i> (Roxb.) Taub. | Fabaceae | T | W | WP | Stem bark used as antidiarrheal. Leaf and root decoction, used to cure fevers. | Indo-Malaya | R | |
| <i>Uraria picta</i> (Jacq.) DC | Fabaceae | H | W | R | Decoction taken to treat cough, chills and fevers. | India & Bangladesh | | LC |
| <i>Xylosma longifolium</i> Clos. | Flacourtiaceae | T | W | L/B | Paste is externally used for skin diseases. Juice used for stomach ache. | Himalayas | R | |
| <i>Hydnocarpus kurzii</i> (King.) Ward. | Flacourtiaceae | T | W | S | Seeds oil used in leprosy and other skin diseases. | India & Myanmar | | DD |
| <i>Aeschynanthes superba</i> Wall. ex DC. | Gesneriaceae | EP | W | B | Paste used externally for bone fracture and muscular sprain. | Meghalaya | | |
| <i>Chirita hamosa</i> R.Br. | Gesneriaceae | H | W | L | Decoction taken to treat respiratory disorders. | Indo-Malaya, Meghalaya & western Ghats | R | |
| <i>Corylopsis himalayana</i> Griff. | Hemamelidaceae | SH | WC | L/FL | Dysentery, diarrhea and other gastrointestinal disorders. | South China & NEI | | |
| <i>Engelhardtia spicata</i> Leschen. ex | Juglandaceae | T | W | L/FL | A fine paste made from inflorescence and young leaves is applied on scabies | Indo Malaya & NEI | | LC |

| Name | Family | Life form | Occurrence | Part used | Uses | Distribution | Meghalaya | IUCN |
|---|----------------|-----------|------------|-----------|---|--|-----------|------|
| Bl. | | | | | and other skin diseases. | | | |
| <i>Engelhardtia roxburghiana</i> Wall. | Juglandaceae | T | W | R | Crushed and the paste applied on forehead to heal the wounds. | Indo-Malaya | R | |
| <i>Juglans regia</i> L. | Juglandaceae | T | WC | WP | Anticancer and as tonic. | Himalayas & southwest China. | | NT |
| <i>Lindera latifolia</i> Hk.f. | Lauraceae | T | W | L/ST | Paste applied topically to treat skin diseases. | Meghalaya | | |
| <i>Cinnamomum pauciflorum</i> Nees. | Lauraceae | T | W | WP | Bronchitis, asthma, diarrhea and nausea. | NEI | R | |
| <i>Paris polyphylla</i> Smith. | Liliaceae | H | WC | L/R | Fevers, burns and for detoxification. | NEI & Bhutan | R | |
| <i>Gloriosa superba</i> L. | Liliaceae | H | W | L/S | Extract used to treat pimples and skin diseases. | NEI | R | |
| <i>Disporum calcaratum</i> (D. Don) Baker | Liliaceae | H | W | TU | Used as eye drops and for venereal disease urinary problems. | Bhutan, India, Myanmar, Nepal, Sikkim, Thailand, & Vietnam | | LC |
| <i>Lygodium microphyllum</i> R.Br | Lygodiaceae | Cl | W | L | Syrup taken to cure dysentery. | Africa, South East Asia, Melanesia & Australia | | LC |
| <i>Rotala rotundifolia</i> (Roxb.) Koehne. | Lythraceae | H | W | L | Paste is applied for boils. | India, China, Formosa, Thailand, Laos & Vietnam | | LC |
| <i>Ophiorrhiza subcapitata</i> Wall. ex. Hk. f. | Melastomaceae | H | W | L/R | Decoction of roots and leaves mixed with honey taken orally for fever, sore throat, tonsils. Decoction alone mixed with water is used as wash for facial blemishes. | Meghalaya | EN | |
| <i>Osbeckia capitata</i> Benth. | Melastomaceae | H | W | WP | Antidote against snake bite and swelling of muscles. | Meghalaya | | |
| <i>Toona ciliata</i> M. Roem. | Meliaceae | H | W | L/B | Infusion prepared from outer bark is used to expel worms. Infusion of leaves applied locally to cure fever and skin eruptions. | South Asia & Australia | | LC |
| <i>Munronia pinnata</i> (Wall.) Harms. | Meliaceae | SH | W | R | Used to reduce stomach ache, vomiting and diarrhea | | R | |
| <i>Cocculus mollis</i> Hk.f. & Th. | Menispermaceae | SH | W | L | Used to cure asthma. | Nepal & Meghalaya | | |
| <i>Monotropa uniflora</i> L. | Monotropaceae | H | W | L/R | Pain killer and nervine. | Asia, North America & | R | |

| Name | Family | Life form | Occurrence | Part used | Uses | Distribution | Meghalaya | IUCN |
|--|--------------|-----------|------------|-----------|--|--|-----------|------|
| | | | | | | northern South America | | |
| <i>Ficus subincisa</i> Buch.-Ham. | Moraceae | SH | W | L | To treat digestive system disorders. | Himalayas to Burma | R | |
| <i>Ficus microcarpa</i> L. | Moraceae | T | W | B | Diabetes, ulcers and burning sensations. | Indo-Malaya South & NEI | R | |
| <i>Ficus oligodon</i> Miq. | Moraceae | T | W | B/F | Diarrhea and dysentery. | Indo-Malaya confined to NEI | R | |
| <i>Streblus asper</i> Lour. | Moraceae | T | W | L | Paste and powder applied on swellings and wounds. | Indo-Malaya, throughout drier parts of India | R | |
| <i>Artocarpus gomezianus</i> Wall ex Trewl. | Moraceae | T | W | WP | Digestive disorders and pain reliever. | Tropical Himalayas to Burma | R | |
| <i>Myrica nagi</i> Thunb. | Myricaceae | T | W | B | Decoction used in asthma, fever, chronic bronchitis and toothache. | India, Nepal & China | | NT |
| <i>Ardisia odontophylla</i> DC. | Myrsinaceae | SH | W | L/R | Used in dysentery, headache and malaria | Indo-Burma & NEI | R | |
| <i>Nepenthes khasiana</i> Hk.f. | Nepenthaceae | H | W | L/FL | Juice of young flowers mixed with rice beer and taken to cure stomachache, eye sores or urinary troubles. Pitcher pounded to paste and mixed with water to treat cholera. Water stored in pitcher is used as ear drop in ear pain. | Meghalaya | EN | |
| <i>Fraxinus floribundus</i> Wall. | Oleaceae | T | W | L | Pain killer, fracture and dislocation. | Temperate Himalayas & Sub Himalayas | R | |
| <i>Dendrobium densiflorum</i> Wall. | Orchidaceae | EP | W | FL | Used as the tonic to nourish the stomach, to prevent the development of cataract, relieve throat inflammation and fatigue. | NEI, Bhutan, Nepal, Burma & Thailand | R | |
| <i>Pleione maculata</i> (Lindl.) Lindl. & Paxton | Orchidaceae | EP | W | L | To relieve swellings. | NEI, Sikkim, Bhutan, Nepal & Thailand | R | |
| <i>Dendrobium nobile</i> Lindl. | Orchidaceae | EP | W | ST | To treat complaints associated with dry mouth, dry cough, and severe thirst. | NEI, Bhutan, Burma, China & Thailand | EN | |
| <i>Flickingeria fugax</i> (Rchb. f.) Seidenf. | Orchidaceae | H | W | RH | Healing wound. | Himalaya & Indo-China | EN | |
| <i>Paphiopedilum insigne</i> | Orchidaceae | H | C | WP | Stomach troubles, dysentery and rheumatism. | Meghalaya | R | |

| Name | Family | Life form | Occurrence | Part used | Uses | Distribution | Meghalaya | IUCN |
|---|--------------|-----------|------------|-----------|--|---|-----------|------|
| (Wall. ex Lindl.) Pfitzer. | | | | | | | | |
| <i>Pinus kesiya</i> Royle ex Gord. | Pinaceae | T | W | ST | Cough in children. | NEI, China, Burma & Thailand | | LC |
| <i>Piper peepuloides</i> Roxb. | Piperaceae | Cl | WC | S | Mixed with honey and egg yolk for the treatment of severe cough. | Tropical Himalayas, Nepal, Bangladesh & NEI | VU | |
| <i>Piper griffithii</i> C. DC. | Piperaceae | Cl | W | WP | Dried seeds are powdered and mixed with honey and the yolk of egg and taken for severe cough. Whole plant paste is used for boils and skin diseases. | NEI | | |
| <i>Eleusine indica</i> (L.) Gaertn. | Poaceae | H | W | R | Root juice is used for jaundice. | Tropics, Sub-tropics and Temperate regions of the world | | LC |
| <i>Polygonum hydropiper</i> L. | Polygonaceae | H | W | L/R | Paste applied as a balm for skin diseases. | Australia, New Zealand, temperate Asia, Europe, & North America | | LC |
| <i>Polygonum bistorta</i> L. | Polygonaceae | H | W | RH | Diarrhea, enteritis, bleeding and gingivitis. | Meghalaya | | |
| <i>Helecia excelsa</i> Bl. | Proteaceae | T | W | B | Bark is used to relieve the severe pain in abdomen. | Indo-Burma, confined to NEI | R | |
| <i>Pteris vittata</i> L. | Pteridaceae | H | W | L | For cough and flu. | Asia, tropical Africa & Australia | | LC |
| <i>Gardenia campanulata</i> Roxb. | Rubiaceae | T | W | B | Prevention of dental caries. | Indo-Malaya, confined to NEI | R | |
| <i>Morinda umbellata</i> L. | Rubiaceae | T | W | L/R | Leaves used as decoction for diarrhea and dysentery. Decoction of leaves and roots used as vermifuge for children. | Burma, Bangladesh & Himalaya | R | |
| <i>Luvunga scandens</i> Ham. | Rutaceae | SH | W | L/R | Used as wormicidal and appetizer. | NEI, Burma & Malacca | R | |
| <i>Paramigyna micrantha</i> Kurz | Rutaceae | SH | W | R | Decoction of the roots is drunk to assuage abdominal, discomfort, and as diuretic. | Meghalaya | | |
| <i>Zanthoxylum khasianum</i> Hk.f. | Rutaceae | SH | W | WP | Alimentary canal disorders, stomachic, anthelmintic. | Meghalaya | | |
| <i>Citrus latipes</i> (Swingle) Tanaka. | Rutaceae | T | WC | L/FR | Fruit juice is taken as an appetizer; paste of leaves is applied on joints suffering from gout and rheumatism. Juice of fruit is rubbed on | Meghalaya | R | |

| Name | Family | Life form | Occurrence | Part used | Uses | Distribution | Meghalaya | IUCN |
|--|------------------|-----------|------------|-----------|---|---|-----------|------|
| | | | | | rashes and ringworm. | | | |
| <i>Citrus aurantium</i> L. | Rutaceae | T | WC | WP | Skin diseases. | Eastern Himalaya & NEI | R | |
| <i>Salix tetrasperma</i> Roxb. | Salicaceae | SH | W | L/B | Bark juice used to reduce fever, dried and powdered leaves is mixed with sugar and used in rheumatism, epilepsy, piles, swellings, and stones in bladder. | Indo-Malaya and throughout India | R | |
| <i>Schleichera trijuga</i> Willd. | Sapindaceae | T | W | WP | Analgesic, antibiotic and against dysentery. | SE Asia & throughout India | R | |
| <i>Mimusops elengii</i> Roxb. | Sapotaceae | T | W | B | Juice used to cure mouth ulcers, and pyorrhea. | Indo-Malaya | R | |
| <i>Lindernia anagallis</i> Burm.f. | Scrophulariaceae | H | W | L | The leaf paste is applied on the forehead to relieve throbbing headaches. | Australia, Bangladesh, Bhutan, Cambodia & India | | LC |
| <i>Bonnaya reptans</i> (Roxb.) Spreng. | Scrophulariaceae | H | W | L/R | Paste used as antidote for snake bite. The juice of leaves taken with milk for urinary ailments. | NEI & Karnataka | | LC |
| <i>Picrasma javanica</i> Bl. | Simaroubaceae | T | W | L/B | Bark used as febrifuge while leaves applied to sores. | Tropical SE Asia, Philippines, NEI & Andaman | R | |
| <i>Brucea mollis</i> Wall. ex Kurz | Simaroubaceae | SH | W | L | Used for treatment of malaria. | Sikkim, Bhutan, NEI, SE Asia, & Andaman | R | |
| <i>Stemona tuberosa</i> Lour. | Stemonaceae | Cl | W | TU | Root is used to stop chronic and acute coughs, asthma, and is used externally for lice. | SE Asia, throughout India | R | |
| <i>Pterygota alata</i> (Roxb.) R. Br. | Sterculiaceae | T | W | S | Stress reliever | India, Bangladesh, Burma & Indo-Malaya | R | |
| <i>Taxus wallichiana</i> Zucc. | Taxaceae | T | C | L/ST | Used for the treatment of bronchitis, asthma, epilepsy, snake bites, scorpion stings, lung diseases and diabetes. | Himalayas | | EN |
| <i>Schima khasiana</i> Dyer. | Theaceae | T | W | B | Skin irritations, anthelmintic and rubefacient | Meghalaya | R | |
| <i>Camellia caduca</i> Cl. ex Brandis. | Theaceae | T | W | L | Juice taken for digestive and urinary problems. | Meghalaya | | |
| <i>Aquilaria malaccensis</i> Lam. | Thymelaeaceae | T | WC | WP | Used in asthma, digestive, and for fragrance. | Indo-Malaya & NEI | EN | VU |
| <i>Holoptelea integrifolia</i> (Roxb.) Planch. | Ulmaceae | T | W | B | Diabetes, leprosy and skin diseases. | Sino-India, throughout India | R | |

| Name | Family | Life form | Occurrence | Part used | Uses | Distribution | Meghalaya | IUCN |
|---|---------------|-----------|------------|-----------|---|------------------------|-----------|------|
| <i>Agapetes variegata</i> (Roxb.) G. Don. | Vacciniaceae | EP | W | B | Paste applied to cure fracture and dislocation of bones. | Indo-Malaya & NEI | R | |
| <i>Callicarpa psilocalyx</i> Cl. | Verbenaceae | SH | W | L/R | Paste along with <i>Vitis lanceolaria</i> used to cure fever. | Indo-Burma & NEI | | |
| <i>Clerodendrum hastatum</i> (Roxb.) Lindl. | Verbenaceae | SH | W | WP | Leaves and stem boiled and the water is taken to reduce high blood pressure. Leaves warmed over fire and then applied externally in rheumatism. | Bangladesh & Meghalaya | R | |
| <i>Hedychium coronarium</i> Koenig. | Zingiberaceae | H | W | L/R | Paste used to cure rheumatism. | Himalayas | EN | |

Legend: Cl= Climber, T= Tree, EP= Epiphyte, H= Herb, SH= Shrub, C= Cultivated, W= Wild, WC= Wild and Cultivated, B= Bark, Fl= Flower, Fr= Fruit, L= Leaf, R= Root, RH= Rhizome, S= Seed, ST= Stem, TU= Tuber, WP= Whole plant, CR= Critically Endangered, EN= Endangered, VU= Vulnerable, DD= Data Deficient, LC= Least Concern, NT= Near Threatened, R= Rare, NEI= northeast India, SE= South east