

MEDICINAL PLANTS OF MEGHALAYA, INDIA

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Introduction

Medicinal plant sector has traditionally occupied an important position in the socio cultural, spiritual and medicinal arena of rural and tribal lives of India. For the rural poor of hill regions, like the state of Meghalaya, medicinal plants are as important as the food they eat everyday and that they cannot survive without herbal medicines which are consumed both as preventive as well as curative for specific ailments. More than 200 forest plants are used by the people of Meghalaya for food, medicine, dye and for ornamental and constructional purposes (Tiwari and Tynsong, 2004). Ethnomedicines and medicinal plants of Meghalaya have received some attention of researchers (Rao 1981, Dolui et al, 2004). However, most of these studies are restricted to documentation of uses of plants by tribal people. This paper reports the distribution of medicinal plants in various agro-ecological regions of Meghalaya, analyses the status of medicinal plant sector in the state and suggests the strategies for equitable utilization and management of this vital resource.



Nepenthes khasiana



Rhododendron arboreum

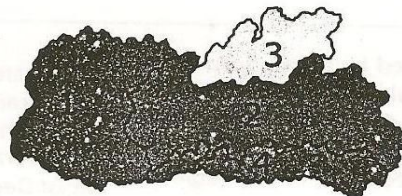


Cinchona sp.

Study Area and Methods

Meghalaya, popularly known as the 'abode of clouds' became a new state of India by virtue of the North East Areas (Reorganisation) Act, 1971 with effect from 21st January, 1972. It is located between 25° 47' N to 26° 10' N latitude and 89° 45' E to 92° 47' E longitude extending over an area of 22,429 sq. km. Its recorded forest area is 9496 sq. km. which accounts to about 42.34% of the state's geographical area (FSI, 2001). The state is predominantly inhabited by tribal people who account for 89% of the population of 23,06,069 persons. The two main communities found in the state are: (i) the Hynniewtrep people consisting of the four ethnic groups Khasi, Jaintia, Bhoi and War, and inhabiting the eastern region of the states covering the four districts of East Khasi Hills, Jaintia Hills, West Khasi Hills and the Ri Bhoi (ii) Garo community inhabits the three districts of West Garo Hills, East Garo Hills and South Garo Hills.

The state experiences a monsoonal type of climate and is endowed with rich natural vegetation which varies greatly according to the altitudes of different areas as classified into agro-ecological regions. The richness and variety of vegetation ranging from sub-tropical to tropical is due to diverse topography and variation in rainfall, soil and temperature. Meghalaya is well known for the existence of large variety of plant species, many of which have medicinal properties (Haridasan and Rao, 1985, 1987).



Various Agro-ecological regions of Meghalaya

The study was conducted through household survey in selected villages using a questionnaire and through group discussions with villagers and

interviews with the people involved in the collection and trade of medicinal plants and in dispensation of herbal medicines using tools and methods outlined by Mukherjee (1993). The State of Meghalaya is divided into four broad Agro-Ecological Regions. These are: 1. Western Region, 2. Central and Upland Region 3. Northern Undulating Hill Region and 4. South Precipititious Region (Map).

Results and Discussion

Diversity and Distribution

Western Region

The Western Region includes Garo Hills, Baghmara and some adjoining areas of the West Khasi Hills constituting an area of 8,164 sq. km. The altitude of the area ranges from 400-1,260 m with an annual rainfall varying from 1,600 to 4,000 mm. The soil type includes Laterite and Red Loamy in the hills and Alluvial in the plains bordering Bangladesh. The region has a rich and unique flora and fauna. The *Tropical Moist Deciduous Forest*, *Sub-Tropical*

Box 1. Medicinal Plants of Western Region

Abroma augusta, Acanthus leucostachys, Achyranthus aspera, Antidesma, Boerhaavia, diffusa, Bombax ceiba, Butea monosperma, Calotropis gigantea, Canscora andrographioides, Capparis assamica, Cassia fistula, Chonemorpha fragrans, Clematis montana, Deeringia amaranthoides, Desmodium laxiflorum, Disporum calcaratum, Dracaena ensifolia, Emblica officinalis, Fagopyrum cymosum, Globba clarkei, Hedychium gracile, Hedyotis scandens, Holarrhena antidysenterica, Homalomena aromatica, Ixora acuminata, Jasminum lanceolaria, Justicia gendarussa, Lasia spinosa, Litsea citrata, Melia composita, Molineria recurvata, Mycetia longifolia, Nastiatum herpeticum, Oenanthe Javanica, Oldenlandia diffusa, Oldenlandia nudicaulis, Ophiopogon japonicus, Paedaria scandens, Pogostemon parviflorus, Phlogacanthus tubiflorus, Pilea lancifolia, Plumbago zeylanica, Polygonum chinensis, Pothos kunstleri, Pouzolzia indica, Rhaphidophora hookeri, Rubus moluccanus, Smilax prolifera, Spatholobus roxburghii, Spilanthus acmella, Elephantopus scaber, Symlocos racemosus, Tacca laevis, Terminalia chebula, Thunbergia coccinea and Valeriana hardwickii.

Forest and Sal Forest constitute the important forest types of the region.

The people of this region consume MPs both for preventive as well as for treatment of specific ailments. This is evident from the fact that a total number of 58 wild and

Box 2. Medicinal Plants of Central and Upland Region

Adenostemma lavenia, Ajuga macrosperma, Albizia chinensis, Allium hookerii, Alysicarpus monilifer, Ambrosia artemisiifolia, Anaphalis adnata, Anemone rivularis, Astilbe rivularis, Baccaurea sapida, Bauhinia variegata, Begonia josephii, Begonia palmata, Begonia rubrovenia, Berberis wallichiana, Betula alnoides, Brassica campestris, Brugmansia suaveolens, Calamus latifolius, Callicarpa sp., Cannabis sativa, Capsicum annum, Cinnamomum glanduliferum, Cinnamomum pauciflorum, Clerodendrom colebrookianum, Colocasia esculenta, Conyza bonariensis, Crassocephalum crepidioides, Curcuma angustifolia, Curcuma longa, Cyanodon dactylon., Daphne papyracea, Delphinium altissimum, Dendrobium moschatum, Desmodium gangeticum, Dichrocephalus bicolor, Drymeria cordata, Eluesine indica, Elsholtzia blanda, Emblica officinalis, Engelhardia spicata, Entada purseatha, Erigeron karvinskianus, Eriobotrya angustissima, Eriosema chinense, Erythrina arborescens, Eucalyptus sp., Ficus pomifera, Ficus virens, Galingsoga ciliata, Garuga pinnata, Geranium nepalense, Glochidion khasianum, Gmelina arborea, Hedera nepalensis, Helicia erratica, Hodgsonia macrocarpa, Hydrocarpum kurzii, Hypochaeris radicata, Indigofera tinctoria, Ipomea uniflora, Leucas linifolia, Linderia pulcherrima, Litsea citrata, Mahonia nepalensis, Mallotus philippensis, Melia azadirach, Melothria heterophylla, Musa sapientum, Measa indica, Osbeckia crinita, Pandanus tectorius, Panicum maximum, Parochete communis, Phyrnium pubinerve, Piper griffithii, Pithecellobium bigeminum, Plantago major, Polygonum sp, Pouzolzia hirta, Pseudognaphalium luteoalbum, Psidium guajava, Rorippa indica, Rorippa nasturtium-aquaticum, Rubia cordifolia, Rubus ellipticus, Saurauia sp., Schefflera hypoleuca, Schima khasiana, Schima wallichii, Schisandra neglecta, Sida rhombifolia, Inula cappa, Tainia varidafusca, Magnolia phellocarpa, Thysonolaena maxima, Toodalia asiatica, Torenia violacea and Vitex negundo.

domesticated medicinal plants are used by them. Some of the commonly used medicinal plants include: *Achyranthus aspera, Bombax ceiba, Calotropis gigantea, Emblica officinalis, Phlogacanthus tubiflorus, Terminalia chebula, etc.* The medicinal plants recorded in this region are given in Box 1.

Central and Upland Region:

The East Khasi Hills, parts of West Khasi Hills, Ri Bhoi and Jaintia Hills districts make up the Central and Upland Region. The altitude ranges from 400-1961 m and the average

annual rainfall varies from 1,600-4,000 mm. The highest point (1905m) of the State 'Lum Shillong' is located in this area. The main soil types include Red loamy, Laterite Soil and Red and Yellow soils. The important forest types of this area are the Tropical Semi-evergreen Forest, Sub-Tropical Evergreen Forest and Sub-Tropical Pine Forest.

Some of the important plants, which are commonly used include: *Calamus khasianus, Clerodendrum colebrookianum, Entada purseatha, Mahonia nepalensis* and *Litsea citrata*. One hundred three medicinal plants were

recorded during this survey (Box 2).

Northern Undulating Hill Region:

This region includes most parts of the Ri Bhoi District and some parts of the West Khasi Hills. They are characterized by

the undulating hills gradually sloping down towards the Brahmaputra valley. The altitude of the area ranges from 800-1,200 m. The important soil type is Laterite but in the northern most part, the alluvial soil is found. This area receives about 1,600 mm annual rainfall with Tropical Moist Deciduous Forest as the important vegetation type of the region. A total of 52 medicinal plants are used in this region (Box 3). Some important medicinal plants of this region are: *Acorus calamus, Adiantum philippense, Averrhoa carambola, Hedychium sp., Panax pseudoginseng* and *Zanthoxylum khasianum*.

South Precipitous Region:

This region is characterized by steep slopes; and is popularly known as the War Area. The area includes most of the southern part of West and East Khasi Hills, part of the Jaintia Hills and a small area of South Garo Hills district. The altitude ranges from below 400-1200 m and the important soil types found in this

region are Red, Yellow and Alluvial soil. The area receives very heavy rainfall; annual rainfall ranging from 6,000-10,000 mm. Cherrapunjee-Mawsynram Plateau which receives highest rainfall in the world is located in this region. Tropical Moist Deciduous type of forest is the dominant forest type of the region. Some important plants of medicinal value include: *Aristolochia cathartii, Citrus medica, Clerodendrum viscosum, C. colebrookianum, Gaultheria fragrantissima, Smilax sp. and Trichosanthes lepiniana*. A total of about 85 medicinal plants are found to be widely used by the people in this region (Box 4)

Box 3. Medicinal Plants of Northern Undulating Hill Region

Accrus calamus, Adiantum philippense, Aegle marmelos, Ageratum conyzoides, Allium tuberosum, Amomum sabulatum, Antidesma bunius, Arisaemia sp., Aristolochia cathcartii, Aristolochia saccata, Asparagus filicinus, Averrhoa carambola, Azadirachta indica, Biophytum sensitivum, Cassia tora, Centella asiatica, Chromolaena odorata, Cinnamomum camphorum, Curcuma domestica, Emblica officinalis, Fagopyrum cymosum, Flemingia vestita, Gaultheria fragrantissima, Gomphostemma parviflora, Hedyochium sp., Hedyotis verticillata, Holmskioldia sanguinea, Houltuynia cordata, Kaempferia sp., Oxalis corniculata, Paederia sp., Panax pseudoginseng, Peliosanthes teta, Pholidota imbricata, Polygonum nepalensis, Rhododendron sp., Rhus Javanica, Solanum sp, Solanum khasianum, Solanum xanthocarpum, Sonchus asper, Swertia chirayita, Taxus wallichiana, Tinospora cordifolia, Viburnum foetidum, Vitis capreolata, Zanthoxylum acanthopodium, Zanthoxylum khasianum, Zingiber officinalis, Zingiber rubens, Zingiber zerumbet and Zizyphus mauritiana.

Health practices

In Meghalaya local health traditions are widespread and

popular. Each major tribe has traditional dependence on medicinal plants for treatment of ailments. Medicinal plants are generally used at the household level in a self-help mode. The health practitioners use medicinal plants in preventive/promotive and curative applications. Every village of the state has at least one or more herbal practitioners. These health practitioners often set up a stall in weekly markets. The people of the state have renewed their interest in traditional medicine and generally express their desire in preserving and revitalizing these traditions. There is no data available on the number of herbal practitioners in the state; however, estimates suggest that the number may be in thousands.

Collection and Processing

The levels of collection of wild edible and medicinal plants are very high in all agro-ecological regions of the state. It was noticed that in most cases the harvesting is not sustainable as it is aimed at short-term benefit. The rising commercial demand for herbal drugs, dependence on materials harvested from the wild, and their unsustainable harvesting has led to the rapid depletion of a number of medicinal plant species especially those, which are in great demand. The most collected medicinal plant species in Meghalaya are *Taxus wallichiana*, *Panax pseudoginseng*, *Rauvolfia serpentina*, *Lycopodium* spp. and *Nepenthes khasiana*. Some important medicar al plant species, which have become rare particularly in the South Precipititious Region of the state are *Gaultheria fragrantissima*, *Tinospora cordifolia*, *Calamus khasianus*, *Entada purseatha*, and *Hodgsonia hiteroclita*. The main reason for resource depletion is over harvesting and destruction of their natural habitats.

Modern processing and value addition facilities for medicinal

plants do not exist in the state. Study revealed that some practitioners themselves make powders, extract oils and dispense medicines. But there is no community level support for such processing.

Marketing

The medicinal plant collectors gather the products and sell them to the local agents of wholesalers. This further goes to the big merchants and suppliers within the state who sell it to industries. Majority of the medicinal plants to be traded outside

the state are brought to Shillong. The regional traders are involved if the products are to be traded outside the state.

Box 4. Medicinal Plants of South Precipititious Region

Acorus calamus, Ampelocissus latifolia, Aristolochia saccata, Aristolochia tagala, Averrhoa carambola, Acacia pennata, Adenosterna lavenia, Adiantum philippense, Albizia chinensis, Amorphophallus bulbifer, Alchornea tilliaefolia, Artemisia vulgaris, Baccaurea sapida, Brassica campestris, Begonia josephii, B. palmata, B. picta, Camellia kissi, Cannabis sativa, Capsicum annum, Caryota urens, Cassia tora, Centella asiatica, Chromolaena odorata, Cinnamomum camphorum C. tamala, Cissus repens, Clematis buchaniana, Citrus latipes, Citrus medica, Clerodendrum serratum, C. colebrookianum, Colocasia esculenta, Costus speciosus, Curcuma aromatica, Curcuma angustifolia, C. longa, Clerodendrum wallichii, Davallia trichomanoides, Dendrobium moschatum, Drymeria cordata, C. stillaria, Elephantopus scaber, Embelia ribes, Embelia subcoriaceae, Engelhardia spicata, Entada purseatha, Erigeron karvinskianus, Gonatanthus pumilus, Hedyochium coccineum, Hedyochium gracile, Hedyotis uncinella, Ipomea involucreta, Ixora acuminata, Lindernia ruelloides, Macropanax dispermus, Mimosa pudica, Mussaenda frondosa, Mussaenda glabra, Mussaenda roxburghii, Nepenthes khasiana, Murraya paniculata, Pilea umbrosa, Houltuynia cordata, Hydnocarpus kurzii, Litsea citrata, Piper griffithii Piper peepuloides, Polygonum nepalensis, Polygonum sp, Psidium guajava, Rorippa indica, Rubus ellipticus, Saurauia sp., Schima khasiana, Schima wallichii, Schisandra neglecta, Smilax sp., Solanum sp, Solanum xanthocarpum, Tainia viridifusca, Magnolia phellocarpa, Terminalia chebula, Thysanolaena maxima, Tinospora cordifolia, , Viburnum foetidum, Zanthoxylum acanthopodium, Zanthoxylum alatum, Zanthoxylum khasianum, Zingiber officinalis, Zingiber rubens, Zingiber zerumbet and Zizyphus mauritiana.

Such traders come from Guwahati and sometimes from Cachar district in Assam. Some Medicinal plants of Meghalaya viz. *Piper peepuloides* and *Cinnamomum tamala* have a good national and international market.

The issue of exercising strong control of contractors and middleman over the collectors of medicinal plants deserves particular attention. As there are no open trading facilities for medicinal plants, the market is controlled by a handful of traders in the wholesale centers. The collectors and producers also suffer from the fact that reliable information on demand and prices is not available.

Contribution to Livelihood

Medicinal plants play an important role in the livelihood of the people of rural Meghalaya as they provide a source of cash income. Collection, processing and marketing of medicinal plants forms a major economic activity for tribal

communities living in the vicinity of forests. The processing and marketing of this forest produce also creates opportunities for setting up of small-scale industries at the local and regional level. However, lack of knowledge, concerning the marketing of these products outside the local region, has inhibited growth of its production. According to the Meghalaya Khadi and Village Industries Board, Shillong, sixteen medicinal plant units having 32 numbers of employees generated a production value of Rs 14.10 lakh in the year 1999-2000. (Pocket Statistical Handbook of Meghalaya, 2003)

In Meghalaya the women do collect medicinal plants in both Garo and Khasi hills. Mishra and Dutta, (2003) have found that 43.75 % of the interviewees in Tura (Meghalaya) were of the opinion that the women's role in local health traditions is of collection of the plant materials, while 31.5% said that it is of preparation of formulations and 18.7% said that women's role is also of the diagnosis of patients and 25% said that women also administer the medicine.

Developments

Meghalaya has been identified as one of the seven states in the country where intensive research on medicinal plants will be taken up by the United Nations Development Programme (JNDP) in association with the Meghalaya government with a sole aim to conserve medicinal plants (The Telegraph, 2003). A Bangalore-based agency, the Foundation of Revitalization of Local Health Traditions (FRLHT) has supported in generating baseline data and conservation of medicinal plants. In the Nongstoin village, *Myrthong Herbal Research Complex and Ayurvedic Healthcare Society* has set up herbal gardens where a number of medicinal plants have been cultivated. In the Central and Upland Zone, a famous Khasi herbal practitioner, Mr. John Kharshing, has cultivated about 130 medicinal plants over about 7 acres of lands in Thangsning village. In Jaintia Hills, the *Jaintia Indigenous Medicine Association (JIMA)*, Jowai is working to network the local health practitioners,

strengthen traditional medicine and promote conservation and cultivation of medicinal plants.

In the South Precipitous Zone, the Traditional Healers have their own society known as the "*Meghalaya Traditional Health Medicinal Plants Conservation Society*, Pynursla which looks after the collection and preservation of medicinal plants especially the threatened ones.

Conservation

Non-sustainable harvesting, shift from local use of medicinal plants to commercial sale, decline in the use of traditional knowledge and medicinal plants by the local communities and improper market regulation are making a number of medicinal plant species rare in their natural habitat. Some species like *Cinchona ledgeriana*, *Rauvolfia serpentina*, *Solanum khasianum*, *Swertia chirayita* and *Taxus wallichiana* are being promoted by the State government for cultivation (Anonymous 2004).

As on date a large number of agencies viz., forest, agriculture, horticulture, rural development and industry departments of Meghalaya Government, North-Eastern Council, Shillong, Indian Council of Agricultural Research, Barapani, National Bureau of Plant Genetic Resources, Barapani, North-Eastern Hill University, Shillong, Botanical Survey of India and National Medicinal Plant Board of Government of India and Non-Government Organization viz. Bosco-Reach Out, North-East Network, Dalmariang and Bethany Society are engaged in research and development of medicinal plant sector of Meghalaya. There is a need to network all these organizations and share the work according to expertise in order to achieve better results.

Conclusion

Sustainable management of medicinal plants can lead to sustainable economic development, affordable health care and conservation of vital biodiversity. For meeting the future needs cultivation of medicinal plant has to be

encouraged. Introduction of appropriate, simple and low-cost technologies needs to be encouraged for sustainable utilization of medicinal plant biodiversity through local production centres and for preservation of traditional knowledge. The state government should list the important medicinal plant species and frame guidelines on the collection and uses of these species. Setting up of more botanical and medicinal plant gardens will help in protecting the endangered species. Research attention is particularly required on rural poor partially or fully dependent on the medicinal plants for their health care and those living in the forest fringes to diversify their livelihood opportunities through sustainable production and trade of medicinal plants.

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