Diversity and Distribution of Endemic Plant Species of Meghalaya, India

N.J. Lakadong and *S.K. Barik*

ABSTRACT

The state of Meghalaya in north-east India is rich in endemic plant species. The diversity, habitat, habit and ecological distribution of endemic plant species have been studied in this paper. The medicinal and ethnobotanical importances of these species have also been enumerated. The distribution of 239 endemic plant species in different ecological zones of Meghalaya has been described and based on GPS readings, 15 centres of endemism have been identified and mapped. Considering the restricted distributional range of the endemics and their importance in conservation biology, these identified centres of endemism have been recommended for conservation.

Key words: *Diversity, distribution, endemic species, centre of endemism.*

Introduction

The concept of endemism is useful in qualifying the biological uniqueness of an area (Peterson and Watson, 1998). Endemism is a term applied to species restricted to a particular geographic region or ecological unit. Plants can be endemic to geographic areas, such as mountain peaks, mountain ranges, river basins and watersheds or to political boundaries, such as parks, reserves, states and countries. Plants are also endemic to specific habitats, such as soils and rock types. Because of their unique status in a given flora, endemic species have now become an important concept in conservation biology (Shevock, 1996).

Of the 17,000 plant species found in India, about 5725 species are considered as endemics. These represent 33.5% of the country's

flora. Due to high level of exploitation and faulty harvesting techniques, many of the endemic species have been rendered rare (Haridasan *et al.*, 1995). The growth of human population, loss of traditional values, and change in culture and plant use patterns are some of the main reasons for pushing many of these species into the verge of extinction (Maikhuri and Gangwar, 1993). The Red Data Book of India (Jain and Shastry, 1984; Nayar and Shastry, 1987–90) has listed 623 threatened categories of species, of which 550 are endemic.

The endemism among the plants continues to be a neglected area of research world-wide (UNEP, 1997). In Meghalaya, very few studies are available on endemic plant species. The family Orchidaceae comprises the largest number of endemic species in the Khasi Hills of Meghalaya (Hooker, 1854). Of the approximately 1000 orchid species found in India, 625 species are found in northeast India. Of these, 85 are endemic to the region and 18 are endemic to Meghalaya (Das and Deori, 1983). Kumar (1988–89) recorded 111 rare plants from Balphakram Wildlife Sanctuary, of which 55 were endemic. Rao and Haridasan (1982) provided the information on 70 rare, endangered and endemic plants of the state. Khan *et al.* (1997) provided a list of 96 species endemic to Meghalaya.

Study Sites and Methodology

The study covers the entire state of Meghalaya. The state of Meghalaya lies between 25°47′ and 20°10′ N latitudes and 89°45′ and 92°47′ E longitudes covering an area of 22,549 km^2. Repeated field visits were undertaken in all the seven districts viz., East Khasi Hills, West Khasi Hills, Ri-Bhoi, Jaintia Hills, East Garo Hills, West Garo Hills and South Garo Hills, during the years 2003, 2004 and 2005.

Two hundred and thirty nine endemic plant species were short-listed for detailed study. The endemic status of these species was confirmed following the available flora and other literature (Kanjilal *et al.*, 1934–40; Haridasan and Rao, 1985–87; Balakrishnan, 1981–83; Nayar and Shastry, 1988–90). Through field observations, their habits and distribution pattern at different elevations of Meghalaya were studied. The uses of these species were documented based on the interactions with the villagers and also referring to the available literature.

Mapping

A grid map of the state was used for mapping the distribution of all the 239 species based on the GPS readings. Finally, based on the availability of endemic species in different areas, areas of concentration of endemics were identified and were shown on the map.

Results

Habit of the endemic plant species

The geographical ranges and altitudinal distribution of 239 endemic plant species are given in Table 1. The habit-wise distribution of these endemic plant species reveals that maximum numbers of endemics are herbs (36%), followed by trees (27%) and shrubs (25%). Only 8% of the species are lianas and climbers, and 4% are under-shrubs (Fig. 1).

Taxonomic diversity of the endemics

The endemic plant species covered under the study belonged to 178 genera and 79 families with Poaceae (22 genera and 33 species) having the highest number of endemics followed by Orchidaceae (14 genera and 17 species) and Rubiaceae (11 genera and 13 species) (Fig. 2).

Ecological distribution of the endemics

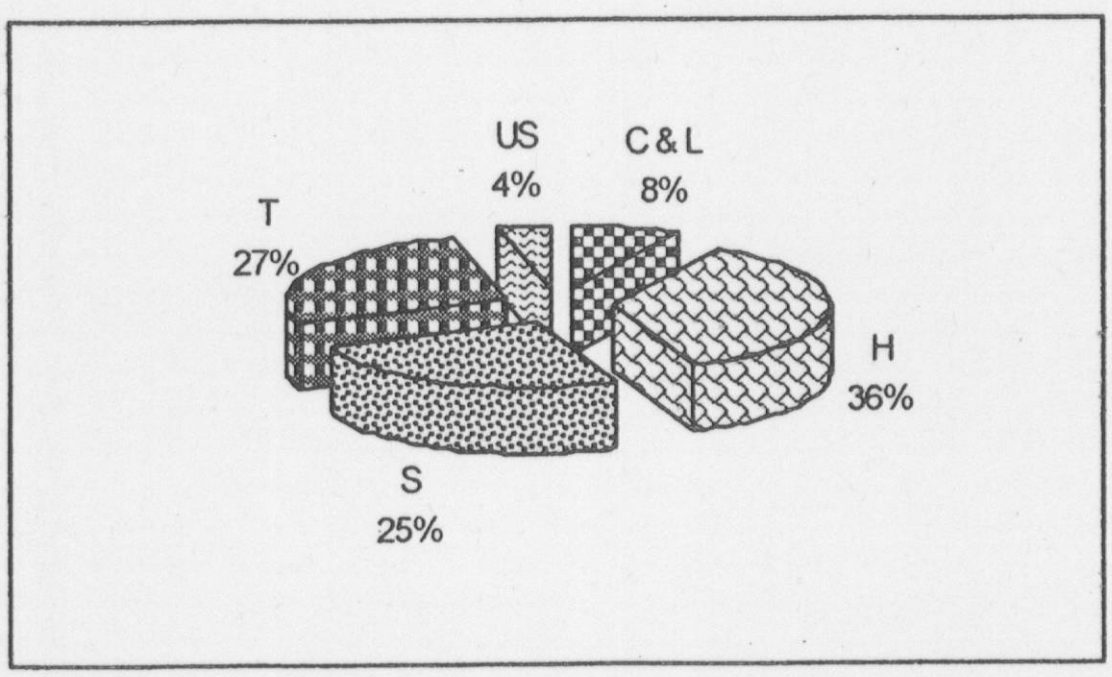

Fig. 1. Habit-wise distribution of endemic plant species of Meghalaya. T: Trees, S: Shrubs, H: Herbs, C & L: Climbers and Lianas, US: Under-shrubs.

Table 1. Distribution of the endemic plant species at different altitudinal zones of the state

Species	Family	Habit	Distribution	
			Worldwide	Meghalaya
Tropical region (0–900 m a.s.l.)				
Aeschynanthus sikkimensis Stapf.	Gesneriaceae	Ep	Temperate & Sub Himalayas, NE India, Meghalaya	Ialong, Raliang, Jarain, Shillong, Nokrek
Aeschynanthus superba Cl.	Gesneriaceae	US	NE India	Jowai, Raliang, Laskein, Mynso, Sohkha, Nokrek
Aeschynanthus manii Kurz.	Gesneriaceae	H	NE India	Balphakram
Aeschynanthus parasitica Cl.	Gesneriaceae	US	Eastern Himalayas, Meghalaya	Mawsmai, Nokrek, Jarain, Jowai, Shangpung, Ialong, Balphakram
Agapetes obovata Hk. f.	Vacciniaceae	S	Meghalaya	Mawsmai, Dawki
Anacolosa ilicoides Mast.	Olacaceae	T	Meghalaya	Jengjal, Umsaw
Ardisia griffithii Cl.	Myrsinaceae	T	Meghalaya	Ialong, Raliang, Jowai, Shillong, Mynso, Nokrek
Areca nagensis Griff.	Arecaceae	T	NE India	Balphakram
Argostemma khasiana Cl.	Rubiaceae	H	Meghalaya	Balphakram, Dawki, Syndai
Argostemma rostratum Wall.	Rubiaceae	H	Meghalaya	Balphakram
Arisaema album N.E. Br.	Araceae	H	NE India	Balphakram
Artabotrys caudatus Wall. ex. Hk.f. & Th.	Annonaceae	L	Meghalaya	Rongrengiri
Arundinella intricata Hughes.	Poaceae	H	NE India	Pongtung, Mawphlang, Shillong, Upper Shillong, Pynursla, Laitlyngkot
Aspidopteris elliptica A. Juss.	Malphigiaceae	L	NE India	Balphakram, Maheskola, Tura
Aspidopteris oxyphylla A. Juss.	Malphigiaceae	C	Meghalaya	Mahadeo, Tharia
Bambusa mastersii Munro.	Poaceae	T	NE India	Balphakram
Begonia rubrovenia Hk.	Begoniaceae	H	Sikkim, Bhutan, India	Dawki, Jarain, Syndai-Muktapur

contd....

Table 1 ... *contd.*

Species	Family	Habit	Distribution	
			Worldwide	Meghalaya
Boehmeria macrophylla D. Don.	Urticaceae	T	Subtropical Himalayas, Meghalaya	Nokrek, Jowai, Syndai-Muktapur
Calamus erectus Roxb.	Arecaceae	S	Sikkim, NE India	Lailad, Trongpleng, Syndai, Sohkha-Dawki
Calamus floribundus Griff.	Arecaceae	C	NE India	Syndai, Rytiang, Sohkha-Dawki
Calliandra griffithii Benth.	Mimosaceae	S	Meghalaya	Syndai, Umtapoh
Cardiopteris lobata Wall. ex R.Br	Cardiopteri-daceae	H	NE India	Balphakram
Chirita hamosa R.Br.	Gesneriaceae	H	Indo-Malaya, Western Ghats, NE India	Mahadeo-Maheskola
Citrus aurantium L.	Rutaceae	T	Dehradun, Garhwal, Kumaon, Sikkim, Khasi and Garo Hills, Manipur, Montane forests of peninsular India	Nokrek
Citrus latipes Tanaka.	Rutaceae	T	Meghalaya	Nokrek, Umjaisaw-Mynsyngat, Ialong, Raliang
Citrus medica L.	Rutaceae	S	Kumaon, Pachmarhi, Sikkim, Khasi and Garo Hills, Chittagong, Upper YanYanzalin Valley, Satpura hills, Western Ghats	Nokrek, Umjaisaw-Mynsyngat
Coelogyne purpurea Joseph. & Yog.	Orchidaceae	Ep	India, Malaya, Thailand	Barapani, Cherrapunjee, Jowai, Umsera

Coffea jenkinsii Hk.f.	Rubiaceae	S	Meghalaya (Khasi Hills)	Mawsmai
Cymbidium aloifolium Sw.	Orchidaceae	Ep	Burma, Bhutan, Nepal, Thailand, Sri-Lanka, India	Umsning, Nongpoh, Burnihat
Cymbidium mastersii Lindl.	Orchidaceae	Ep	NE India, Sikkim, Bhutan, Thailand	Balphakram, Pongtung, Shillong
Cymbopogon khasianus Stapf.	Poaceae	H	NE India	Balphakram, Dawki, Ioksi-Nongryngkoh, Jowai-Garampani, Nartiang
Cynanchum wallichii Wt.	Asclepiadiaceae	H	Meghalaya	Pongtung, Dawki
Didymocarpus razii Kurz.	Gesneriaceae	S	Meghalaya	Balphakram
Diplomeris pulchella D.Don.	Orchidaceae	Ep	India (Arunachal Pradesh, Meghalaya), Burma	Dawki, Cherrapunjee, Mawmluh, Dympep, Sohra-rim
Dipsacus asper DC.	Rubiaceae	H	Meghalaya	Dawki, Jowai-Jarain, Mawryngkneng, Thadlaskein
Docynia hookeriana Decne.	Rosaceae	T	Meghalaya	Balphakram
Elaeagnus conferta Roxb.	Elaeagnaceae	S	Indo-Malaya, Himalayas, South India	Nokrek, Tura, Balphakram, Shillong
Elaeocarpus lucidus Roxb.	Elaeocarpaceae	T	India (E, NE, W, S), West Bengal, Assam, Meghalaya, Andhra Pradesh	Umling
Elaeocarpus prunifolius Mast.	Elaeocarpaceae	T	Meghalaya, Manipur	Pdengskab, Jarain-Syndai
Eragrostiella leioptera Bor.	Poaceae	H	NE India	Balphakram, Jowai-Jarain, Khliehriat, Sutnga
Eria tomentosa Hk.f.	Orchidaceae	Ep	Meghalaya, Bangladesh, Burma	Balphakram
Eriobotrya angustissima Hk.f.	Rosaceae	S	Meghalaya	Garampani, Kopli riverbank
Eriocaulon cristatum Mast.	Eriocaulaceae	H	NE India	Balphakram, Jowai-Jarain
Eriocaulon echinulatum Mart.	Eriocaulaceae	H	Meghalaya, Burma, China	Balphakram

contd....

Table 1 ... *contd.*

Species	Family	Habit	Distribution	
			Worldwide	Meghalaya
Fissistigma verrucosum Merr.	Annonaceae	S	NE India, Meghalaya	Ialong, Raliang, Shangdain, Nokrek
Garcinia cowa Roxb.ex.DC.	Clusiaceae	T	Indo-Malaya, NE India	Nokrek, Bagmara
Garcinia pedunculata G.Don.	Clusiaceae	T	Indo-Burma, NE India	Sohkha
Gastrodia exilis Hk.f.	Orchidaceae	Te	Meghalaya	Nongkhyllem, Amwee.
Glochidion acuminatum Muell.-Arg.	Euphorbiaceae	T	Eastern Himalayas, NE India	Balphakram, Shillong, Ioksi, Raliang
Glochidion thomsonii Hk.f.	Euphorbiaceae	T	Bangladesh, NE India, Meghalaya	Nokrek, Syndai, Jowai, Mairang
Goldfussia glabrata Balak.	Acanthaceae	S	Meghalaya	Nongthala, Ialong
Gomphostemma lucidum Wall. ex. Benth.	Lamiaceae	US	Meghalaya	Jarain-Dawki, Jowai
Goniothalamus simonsii Hk.f.& Th.	Annonaceae	T	Meghalaya	Nongkhyllem, Borlong, Mawsmai, Nokrek, Balphakram
Grewia hirsuta Vahl.	Tiliaceae	US	India, Sri-Lanka, Bangladesh, Burma	Balphakram
Gymnosporia acuminata Laws.	Celastraceae	T	Indo-Malaya, NE India	Syndai, Tura.
Gymnostachyum venustum T. And.	Acanthaceae	H	Meghalaya	Dawki, Sohkha
Habenaria khasiana Hk.f.	Orchidaceae	Ep	Thailand, India (Meghalaya & Manipur)	Jarain, Khliehriat, Rytiang, Cherrapunjee, Jowai, Pongtung, Laitlyngkot
Hiptage acuminata Wall. ex. Hk.f.	Malphigiaceae	S	NE India	Balphakram, Jarain
Hymenanchne assamica Hitchc.	Poaceae	H	NE India	Burnihat, Jaintiapur
Hymenodictyon excelsum Wall.	Rubiaceae	T	Indo-Malaya	Nongpoh
Ilex embeloides Hk.f.	Aquifoliaceae	T	Meghalaya	Raliang, Dawki

Impatiens acuminata Hk.f. & Th.	Balsaminaceae	S	Meghalaya	Jowai, Sohkha-Nongthala
Impatiens juripa Hk.f. & Th.	Balsaminaceae	H	NE India	Balphakram, Nongthala
Impatiens laevigata Hk.f.	Balsaminaceae	H	Meghalaya	Raliang, Nokrek, Khliehriat, Mynso, Sohkha-Nongthala, Syndai
Impatiens tripetala DC.	Balsaminaceae	H	NE India	Balphakram, Dawki
Isachne clarkei Hk.f.	Poaceae	H	NE India	Balphakram.
Ischaemum hirtum Hack.	Poaceae	H	Bengal, Bihar, Khasi Hills, Sri-Lanka, Nilgiri, Chota Nagpur, Central India	Cherrapunjee, Dympep, Laitlyngkot, Mawmluh, Shillong, Pynursla, Mawphlang, Shillong, Shillong Peak, Upper Shillong, Sohra-rim
Ixonanthes khasiana Hk.f.	Ixonanthaceae	T	Indo-Malaya	Dawki
Jasminum listeri Gage.	Oleaceae	S	NE India	Balphakram, Dawki
Lasianthus hookeri Cl. ex. Hk.f.	Rubiaceae	S	Meghalaya	Nokrek, Jowai-Jarain
Lasianthus tubiferus Hk.f.	Rubiaceae	S	India, Meghalaya	Dawki, Jarain, Shangpung, Sutnga, Mawsmai
Lasiobema scandens de. Wit.	Caesalpinaceae	L	Indo-Malaya, Western Ghats, NE India	Balphakram, Maheskola, Daveband
Luisia inconspicua King. & Pantl.	Orchidaceae	Ep	Arunachal Pradesh, Sikkim, Meghalaya	Ialong, Jowai, Nartiang, Nongpoh
Michelia punduana Hk.f. & Th.	Magnoliaceae	T	Meghalaya	Jowai, Jarain, Shangpung
Millettia caudata Baker.	Fabaceae	S	NE India, Bangladesh	Nokrek, Lailad, Dawki.
Munronia pinnata Harms.	Meliaceae	US	Eastern Himalayas, NE India, Nilgiris	Balphakram, Maheskola, Tura, Raliang
Ochna sqarrosa L.	Ochnaceae	T	Burma, Andamans, Khasi Hills	Rongrengiri
Osbeckia capitata Benth.	Melastoma-taceae	H	Meghalaya	Jarain, Amlarem, Sutnga, Mihmyntdoo, Pynursla, Jowai, Ummulong, Pongtung, Bapung, Sohra-rim, Khliehriat, Mawphlang, Swer, Shillong, Nongkrem, Mawsmai
Panicum khasianum Munro. ex. Hk.	Poaceae	H	East and NE India	Nongkhlaw, Shella

contd....

Table 1 ... *contd.*

Species	Family	Habit	Distribution	
			Worldwide	Meghalaya
Pavetta sub- capitata Hk.f.	Rubiaceae	S	NE India	Nokrek, Lailad
Peristylis manii Mukh.	Orchidaceae	Te	NE India (Meghalaya & Manipur)	Balphakram, Cherrapunjee, Laitlyngkot, Mawphlang, Shillong
Phanera khasiana Thoth.	Caesalpinaceae	L	Meghalaya	Balphakram, Umtapoh
Phlogacanthus guttatus Nees.	Acanthaceae	US	Eastern & Sub Himalayas, NE India	Lailad, Balphakram, Khliehriat, Lumshnong
Phlogacanthus wallichii Cl.	Acanthaceae	S	Meghalaya	Syndai
Photinia integrifolia Lindl.	Rosaceae	T	Himalayas	Upper Shillong, Jarain-Sohkha, Shangpung
Phyllanthus longiflorus Heyne.ex.Hk.f.	Euphorbiaceae	H	NE & South India	Balphakram.
Phyllomphax obcordata Sch.	Orchidaceae	Te	NE India	Balphakram, Cherrapunjee, Laitlyngkot, Shillong, Nongkrem, Nongstoin, Upper Shillong
Piper griffithii C.DC.	Piperaceae	C	NE India, Meghalaya	Raliang, Ialong, Nokrek, Sohkha, Mawsmai, Nongkhyllem
Piper peepuloides Roxb.	Piperaceae	C	Tropical Himalayas, NE India, Bangladesh, Nepal	Raliang, Nokrek, Nongkhyllem
Pogostemon strigosus Bentham.	Lamiaceae	H	Meghalaya	Sutnga, Jarain, Mihmyntdoo, Khliehriat, Bapung, Ummulong, Jowai, Mawsmai, Mawphlang, Pynursla, Pongtung, Dawki, Shillong, Nongkrem, Ialong.
Polygonum bistorta L.	Polgonaceae	H	Meghalaya	Sutnga, Jarain, Mihmyntdoo, Bapung, Ummulong, Jowai, Mawsmai, Mawphlang, Pongtung, Shillong, Amlarem, Sohra-rim, Swer
Porana racemosa Roxb.	Convolvulaceae	C	Subtropical Himalayas-Burma	Jarain, Jowai, Mynso.

Pseudaechnanthera glutinosa Bremek.	Acanthaceae	US	Sub Himalayas, NE India	Balphakram
Pteracanthus denticulatus Bremek.	Acanthaceae	S	NE India	Balphakram
Rubus khasianus Cardot.	Rosaceae	S	Meghalaya	Ialong, Raliang, Nokrek, Umtapoh, Lailad, Jowai.
Schizostachyum dullooa Majumdar.	Poaceae	H	NE India	Markasa, Nongkhyllem
Schizostachyum pallidum Majumdar.	Poaceae	H	NE India	Cherrapunjee, Pynursla, Jarain, Amlarem, Dawki
Schizostachyum polymorphum Majumdar.	Poaceae	H	NE India	Jowai, Sutnga, Syndai
Sophora acuminata Baker.	Fabaceae	S	Eastern Himalayas, Bangladesh, Burma.	Mawsmai, Sutnga
Swida macrophylla Sojak.	Celastraceae	T	Indo-Malaya, Himalayas.	Nongryngkoh
Tarphochlamys affinis Bremek.	Acanthaceae	US	Meghalaya	Nartiang, Rytiang
Thelasis pygmaea Lindl.	Orchidaceae	Ep	Eastern Himalayas, NE India	Balphakram
Trivalvaria kanjilalii D. Das.	Annonaceae	S	Meghalaya	Syndai
Tupidanthus calyptratus Hk.f. & Th.	Araliaceae	T	Meghalaya	Ialomg, Raliang, Jarain, Laskein, Balphakram
Tylophora belostemma Benth.	Asclepiadiaceae	H	Meghalaya (Khasi Hills), Nepal.	Cherrapunjee
Uvaria lucida Hk.f. & Th.	Annonaceae	L	Meghalaya	Maheskola.
Xylia dolabriformis Taub.	Mimosaceae	T	Indo-Malaya.	Umling, Nongkhyllem
Subtropical region (900–1800 m a.s.l.)				
Acer cappadocicum Gleditsch	Aceraceae	T	SE Asia-Malaya, Himalayas, Meghalaya	Tura, Nokrek
Acer laevigatum Wall.	Aceraceae	T	Temperate Himalayas, Sikkim, Meghalaya	Jowai, Pudiem Sirkep, Shillong, Ialong, Raliang

contd....

Table 1 ... *contd.*

Species	Family	Habit	Distribution	
			Worldwide	Meghalaya
Adinandra griffithii Dyer.	Theaceae	T	Meghalaya	Shangpung
Aechmanthera leiosperma Cl.	Acanthaceae	S	Meghalaya	Jowai
Aeschynanthus sikkimensis Stapf.	Gesneriaceae	Ep	Temperate & Sub Himalayas, NE India, Meghalaya	Ialong, Raliang, Jarain, Shillong, Nokrek
Aeschynanthus superba Cl.	Gesneriaceae	US	NE India	Jowai, Raliang, Laskein, Mynso, Sohkha, Nokrek
Aeschynanthus parasitica Cl.	Gesneriaceae	US	Eastern Himalayas, Meghalaya	Mawsmai, Nokrek, Jarain, Jowai, Shangpung, Ialong, Balphakram
Agapetes obovata Hk.f.	Vacciniaceae	S	Meghalaya	Mawsmai, Dawki
Agrostis filipes Hk.	Poaceae	H	Himalayas	Cherrapunjee, Laitlyngkot, Mawkdok, Shillong Peak.
Agrostis griffithiana Bor.	Poaceae	H	NE India	Dympep, Shillong Peak, Upper Shillong
Agrostis myriantha Hk.	Poaceae	H	India	Barapani, Mairang, Shillong Peak, Shillong, Upper Shillong
Alseodaphne khasiana Kosterm.	Lauraceae	T	Meghalaya	Pynursla.
Anacolosa ilicoides Mast.	Olacaceae	T	Meghalaya	Jengjal, Umsaw
Aphyllorichis vaginata Hk.f.	Orchidaceae	Te	Meghalaya (Khasi Hills)	Mawmluh.
Apios carnea Benth.	Fabaceae	C	Meghalaya	Shillong, Nokrek
Aralia thomsonii Seem.	Araliaceae	T	Eastern Himalayas, Meghalaya	Rongjeng, Jowai, Sohkha, Ialong
Ardisia griffithii Cl.	Myrsinaceae	T	Meghalaya	Ialong, Raliang, Jowai, Shillong, Mynso, Nokrek
Argostemma khasiana Cl.	Rubiaceae	H	Meghalaya	Balphakram, Dawki, Syndai
Arundinaria hirsuta Munro.	Poaceae	S	NE India	Mairang, Mawphlang, Shillong, Upper Shillong
Arundinaria mannii Gamble.	Poaceae	S	Meghalaya	Barapani, Umtrew

Arundinella intricata Hughes.	Poaceae	H	NE India	Pongtung, Mawphlang, Shillong, Upper Shillong, Pynursla, Laitlyngkot
Aspidiopteris elliptica A.Juss.	Malphigiaceae	L	NE India	Balphakram, Maheskola, Tura
Baliospermum micranthum Muell.-Arg.	Euphorbiaceae	T	Meghalaya	Mawsmai, Nokrek, Jowai
Begonia rubrovenia Hk.	Begoniaceae	H	Sikkim, Bhutan, India	Dawki, Jarain, Syndai-Muktapur
Berchemia floribunda Brongn.	Rhamnaceae	S	Tropical & Sub Himalayas	Shillong, Jarain
Boehmeria macrophylla D.Don.	Urticaceae	T	Subtropical Himalayas, Meghalaya	Nokrek, Jowai, Syndai-Muktapur
Boehmeria sidaefolia Wedd.	Urticaceae	T	Himalayas (Nepal-Bhutan), Assam, North Burma, Indo-China, West China, Malaysia	Ialong, Raliang, Mynsyngat-Nartiang, Nokrek
Bulbophyllum griffithi Reich.	Orchidaceae	Ep	Sikkim, NE India	Ialong, Nokrek, Jowai
Calamus erectus Roxb.	Arecaceae	S	Sikkim, NE India	Lailad, Trongpleng, Syndai, Sohkha-Dawki
Calamus floribundus Griff.	Arecaceae	C	NE India	Syndai, Rytiang, Sohkha-Dawki
Calliandra griffithii Benth.	Mimosaceae	S	Meghalaya	Syndai, Umtapoh
Callicarpa psilocalyx Cl.	Verbenaceae	S	Meghalaya	Jowai-Jarain, Ialong
Camellia caduca Brandis.	Theaceae	T	Meghalaya	Jowai, Mawsynram, Ialong, Mawsmai, Mawphlang
Capparis acutifolia Sw.	Capparaceae	S	NE India	Raliang, Nokrek
Carex repanda Cl.	Commelinaceae	H	Meghalaya	Cherrapunjee, Shillong
Carpinus viminea Wall. Ex. Lindl.	Corylaceae	T	Temperate Himalayas & Burma	Mawphlang
Ceropegia angustifolia Wt.	Asclepiadiaceae	S	Meghalaya	Jarain, Garampani, Balphakram, Nokrek
Ceropegia longifolia Wall.	Asclepiadiaceae	C	Meghalaya	Jarain, Nokrek
Chimonobambusa callosa Nakai.	Poaceae	S	NE India	Mairang, Mawphlang, Shillong, Shillong Peak, Upper Shillong

contd....

Table 1 ... *contd.*

Species	Family	Habit	Distribution	
			Worldwide	Meghalaya
Chimonobambusa griffithiana Nakai.	Poaceae	S	NE India	Mairang, Mawphlang, Cherrapunjee, Langkyrdem, Mawmluh, Shillong, Pynursla, Sohra, Nongkhlaw
Chimonobambusa khasiana Nakai	Poaceae	H	Meghalaya	Jowai, Mairang, Nongstoin, Myntdoo, Mawphlang, Pynursla, Shillong, Upper Shillong
Chimonobambusa polystachya Nakai	Poaceae	S	Meghalaya	Rang-umtia
Cinnamomum pauciflorum Nees.	Lauraceae	T	NE India, Meghalaya	Raliang, Shillong, Jowai, Nartiang
Citrus latipes Tanaka.	Rutaceae	T	Meghalaya	Nokrek, Umjaisaw-Mynsyngat, Ialong, Raliang
Citrus medica L.	Rutaceae	S	Kumaon, Pachmarhi, Sikkim, Khasi & Garo Hills, Chittagong, Upper YanYanzalin Valley, Satpura hills, Western Ghats	Nokrek, Umjaisaw-Mynsyngat
Clematis apiculata Hk.f. & Th.	Ranunculaceae	C	Meghalaya	Nongkhlaw, Cherrapunjee, Mawmluh, Mawsmai
Cleyera grandiflora Hk.f. & Th.	Theaceae	T	India (E & NE), West Bengal, Khasi Hills	Rangbyneng
Cocculus mollis Hk.f. & Th.	Menispermaceae	S	Nepal, Meghalaya	Cherrapunjee, Jowai, Shillong, Jarain
Codonopsis viridis Wall.	Campanulaceae	H	Meghalaya (Khasi Hills)	Nongkrem
Coelogyne purpurea Joseph. & Yog	Orchidaceae	Ep	India, Malaya, Thailand	Barapani, Cherrapunjee, Jowai, Umsera
Coelogyne viscosa Rchb.f.	Orchidaceae	Ep	Meghalaya (Khasi Hills)	Jowai
Coffea jenkinsii Hk.f.	Rubiaceae	S	Meghalaya (Khasi Hills)	Mawsmai

Corybas purpureus Joseph. et. Yog.	Orchidaceae	Te	Meghalaya (Khasi Hills)	Elephant falls
Curcuma montana Roxb.	Zingiberaceae	H	NE India, Konkan	Nartiang
Cymbidium eburneum Lindl.	Orchidaceae	Ep	Eastern Himalayas and NE India	Jowai
Cymbidium mastersii Lindl.	Orchidaceae	Ep	NE India, Sikkim, Bhutan, Thailand	Balphakram, Pongtung, Shillong
Cymbopogon khasianus Stapf.	Poaceae	H	NE India	Balphakram, Dawki, Ioksi-Nongryngkoh, Jowai-Garampani, Nartiang
Cynanchum deltoideum Hk.f.	Asclepiadiaceae	H	Meghalaya (Khasi Hills)	Mawphlang
Calamagrostis elatior A. Camus.	Poaceae	H	India	Upper Shillong
Dalbergia volubilis Roxb.	Fabaceae	L	Burma, Bangladesh, Sri-Lanka, India	Mynso
Daphne shillong Benerji.	Thymelaeaceae	S	Meghalaya	Mynso
Daphniphyllum himalayense Muell.	Daphniphyll-aceae	T	Temperate Himalayas-Burma	Ummulong, Thadlaskein, Jowai, Shillong
Delphinium altissimum Wall.	Ranunculaceae	H	Eastern Himalayas (Nepal-Sikkim), Meghalaya	Mawphlang, Sohiong
Dendrocalamus sikkimensis Gamble. ex. Hk.	Poaceae	T	NE India	Tura
Dicentra torulosa Hk.f. & Th.	Fumariaceae	H	Meghalaya	Jowai.
Digitaria compacta Veldk.	Poaceae	H	India	Barapani, Cherrapunjee, Dympep, Nartiang, Shillong
Diplomeris pulchella D.Don.	Orchidaceae	Ep	India (Arunachal Pradesh, Meghalaya), Burma	Dawki, Cherrapunjee, Mawmluh, Dympep, Sohra-rim
Dipsacus asper DC.	Rubiaceae	H	Meghalaya	Dawki, Jowai-Jarain, Mawryngkneng, Thadlaskein

contd....

Table 1 ... *contd.*

Species	Family	Habit	Distribution	
			Worldwide	Meghalaya
Drimycarpus racemosus Hk.f.	Anacardiaceae	T	Eastern Himalayas, Bangladesh	Ialong, Raliang, Nokrek, Tura
Elaeagnus conferta Roxb.	Elaeagnaceae	S	Indo-Malaya, Himalayas, South India	Nokrek, Tura, Balphakram, Shillong
Elaeocarpus acuminatus Wall. ex. Mast.	Elaeocarpaceae	T	Bangladesh, Meghalaya	Nokrek, Mawsmai
Elaeocarpus prunifolius Mast.	Elaeocarpaceae	T	Meghalaya, Manipur	Pdengskab, Jarain-Syndai.
Eragrostiella leioptera Bor.	Poaceae	H	NE India	Balphakram, Jowai-Jarain, Khliehriat, Sutnga
Eria ferrugienea Lindl.	Orchidaceae	Ep	India (Arunachal Pradesh, Meghalaya)	Cherrapunjee, Jarain
Ericybe punguensis Prain.	Convolvulaceae	T	Indo-Burma, Andamans, NE India	Mawsmai
Eriobotrya angustissima Hk.f.	Rosaceae	S	Meghalaya	Garampani, Kopli riverbank
Eriocaulon cristatum Mast.	Eriocaulaceae	H	NE India	Balphakram, Jowai-Jarain
Erythroxylum kunthianum Wall. ex. Kurz.	Erythroxylaceae	T	Indo-Burma, NE India, Meghalaya	Ialong, Raliang, Swer, Nokrek, Mawphlang, Jarain, Jowai
Eulalia speciosa O. Ktze.	Poaceae	H	Meghalaya	Cherrapunjee
Euonymus grandiflorus Wall.	Celastraceae	T	Temperate Himalayas	Elephant falls
Euonymus lawsonii Cl. & Prain.	Celastraceae	T	Meghalaya	Nokrek, Raliang, Shillong
Fimbristylis stolonifera Cl.	Cyperaceae	H	NE India (Manipur, Meghalaya)	Mawphlang
Fissistigma verrucosum Merr.	Annonaceae	S	NE India, Meghalaya	Ialong, Raliang, Shangdain, Nokrek
Garcinia cowa Roxb.ex.DC.	Clusiaceae	T	Indo-Malaya, NE India	Nokrek, Bagmara
Garcinia pedunculata G.Don.	Clusiaceae	T	Indo-Burma, NE India	Sohkha.
Gastrodia exilis Hk.f.	Orchidaceae	Te	Meghalaya	Nongkhyllem, Amwee

Glochidion acuminatum Muell.-Arg.	Euphorbiaceae	T	Eastern Himalayas, NE India	Balphakram, Shillong, Ioksi, Raliang
Glochidion thomsonii Hk.f.	Euphorbiaceae	T	Bangladesh, NE India, Meghalaya	Nokrek, Syndai, Jowai, Mairang
Goldfussia glabrata Balak.	Acanthaceae	S	Meghalaya	Nongthala, Ialong.
Gomphostemma lucidum Wall. ex. Benth.	Lamiaceae	US	Meghalaya	Jarain-Dawki, Jowai.
Goniothalamus simonsii Hk.f.& Th.	Annonaceae	T	Meghalaya	Nongkhyllem, Borlong, Mawsmai, Nokrek, Balphakram.
Gymnosporia acuminata Laws.	Celastraceae	T	Indo-Malaya, NE India	Syndai, Tura.
Gymnostachyum venustum T.And.	Acanthaceae	H	Meghalaya	Dawki, Sohkha.
Habenaria khasiana Hk.f.	Orchidaceae	Ep	Thailand, India (Meghalaya & Manipur)	Jarain, Khliehriat, Rytiang, Cherrapunjee, Jowai, Pongtung, Laitlyngkot
Hedera helix Cl.	Araliaceae	C	Himalayas, Meghalaya	Ialong, Raliang, Swer, Nongkrem, Shillong, Sohra-rim, Jowai
Hedychium dekianum Rao. & Verma.	Zingiberaceae	H	Meghalaya (Jaintia Hills)	Jowai-Jarain, Garampani-Raliang, Ummulong
Helwingia himalaica Hk.f. & Th.	Cornaceae	S	Eastern Himalayas, Sikkim	Mawphlang, Shillong
Hierochloe khasiana Cl. ex. Hk.	Poaceae	H	Meghalaya	Laitlyngkot, Shillong
Hiptage acuminata Wall.ex. Hk.f.	Malphigiaceae	S	NE India	Balphakram, Jarain.
Hymenanchne assamica Hitchc.	Poaceae	H	NE India	Burnihat, Jaintiapur
Hymenopogon parasiticus Wall.	Rubiaceae	C	Indo-Burma, Temperate Himalayas	Shillong
Ilex embeloides Hk.f.	Aquifoliaceae	T	Meghalaya	Raliang, Dawki
Ilex excelsa Hk.f.	Aquifoliaceae	T	Subtropical Himalayas, NE India	Mawsmai

contd....

Table 1 ... *contd.*

Species	Family	Habit	Distribution	
			Worldwide	Meghalaya
Ilex khasiana Purk.	Aquifoliaceae	T	NE India (Manipur, Meghalaya)	Elephant falls
Ilex triflora Bl.	Aquifoliaceae	S	Indo-Malaya, NE India	Mawsmai
Ilex venulosa Hk.f.	Aquifoliaceae	T	Meghalaya	Jowai-Jarain, Sohra-rim
Impatiens acuminata Hk.f. & Th.	Balsaminaceae	S	Meghalaya	Jowai, Sohkha-Nongthala
Impatiens juripa Hk.f. & Th.	Balsaminaceae	H	NE India	Balphakram, Nongthala
Impatiens khasiana Hk.f.	Balsaminaceae	H	Meghalaya	Ialong, Raliang, Jowai
Impatiens laevigata Hk.f.	Balsaminaceae	H	Meghalaya	Raliang, Nokrek, Khliehriat, Mynso, Sohkha-Nongthala, Syndai
Impatiens porecta Hk.f. & Th.	Balsaminaceae	H	Meghalaya	Nokrek, Jowai-Jarain
Indigofera pulchella Roxb.	Fabaceae	S	Himalayas, India	Rongrengiri
Indopolysolenia wallichi Bennet.	Rubiaceae	H	NE India	Jowai
Ischaemum hirtum Hack.	Poaceae	H	Bengal, Bihar, Khasi Hills, Sri-Lanka, Nilgiri, Chota Nagpur, Central India	Cherrapunjee, Dympep, Laitlyngkot, Mawmluh, Shillong, Pynursla, Mawphlang, Shillong, Shillong Peak, Upper Shillong, Sohra-rim
Ischaemum hubbardii Bor.	Poaceae	H	Meghalaya	Cherrapunjee
Ixora sub-sessilis G.Don.	Rubiaceae	T	NE India	Ialong, Raliang, Jarain, Sutnga
Lasianthus hookeri Cl. ex. Hk.f.	Rubiaceae	S	Meghalaya	Nokrek, Jowai-Jarain
Lasianthus tubiferus Hk.f.	Rubiaceae	S	India, Meghalaya	Dawki, Jarain, Shangpung, Sutnga, Mawsmai
Lindera latifolia Hk.f.	Lauraceae	T	Meghalaya	Raliang, Ialong, Nokrek, Shillong
Liparis acuminata Hk.f.	Orchidaceae	Ep	Meghalaya	Jowai, Jarain
Litsea elongata Hk.f.	Lauraceae	T	Temperate & Sub Tropical Himalayas	Nokrek, Mawphlang, Shillong
Litsea laeta Wall. ex. Nees.	Lauraceae	T	Bangladesh & Eastern Himalayas	Nokrek, Mawsynram, Mawsmai, Jarain, Khliehriat, Syndai

Livistonia jenkinsiana Griff.	Arecaceae	S	NE India (Arunachal Pradesh, Meghalaya)	Nokrek
Luisia inconspicua King. & Pantl.	Orchidaceae	Ep	Arunachal Pradesh, Sikkim, Meghalaya	Ialong, Jowai, Nartiang, Nongpoh
Mahonia pycnophylla Takeda.	Berberidaceae	T	Indo-Burma, Eastern Himalayas, Nilgiris	Ialong, Jarain, Sohra-rim, Elephant falls
Mastixia arborea Cl.	Cornaceae	T	NE & South India, Sri-Lanka	Rongrengiri
Medinilla erythrophylla Lindl.	Melastomataceae	S	Indo-Malaya, Eastern Himalayas	Mawsmai, Jarain-Syndai
Michelia punduana Hk.f. & Th.	Magnoliaceae	T	Meghalaya	Jowai, Jarain, Shangpung
Microstegium borianum Sur.	Poaceae	H	Meghalaya	Mawphlang
Milletia caudata Baker.	Fabaceae	S	NE India, Bangladesh	Nokrek, Lailad, Dawki
Mitrasacme nudicaulis R.Br.	Loganiaceae	H	China, Malaya, Khasi & Jaintia Hills	Jarain, Shella-Nongkhla
Munronia pinnata Harms.	Meliaceae	US	Eastern Himalayas, NE India, Nilgiris	Balphakram, Maheskola, Tura, Raliang
Neanotis oxyphylla W.H. Lewis	Rubiaceae	US	Meghalaya	Mawsmai
Neillia thyrsifolia D.Don.	Rosaceae	S	Indo-Malaya, Himalayas, Meghalaya	Ialong, Raliang, Jowai-Jarain, Khliehriat, Elephant falls
Nepenthes khasiana Hk.f.	Nepenthaceae	H	Meghalaya	Lawbah, Pongtung, Pynursla, Mynkre, Nonghulew, Amlarem, Longrein, Domiasiat, Jarain, Sutnga, Maheskola, Tura, Bagmara
Ophiorhiza sub- capitata Wall.	Rubiaceae	H	Meghalaya (Jaintia Hills)	Jowai
Osbeckia capitata Benth.	Melastomataceae	H	Meghalaya	Jarain, Amlarem, Sutnga, Mihmyntdoo, Pynursla, Jowai, Ummulong, Pongtung, Bapung, Sohra-rim, Khliehriat, Mawphlang, Swer, Shillong, Nongkrem, Mawsmai

contd....

Table 1 ... *contd.*

Species	Family	Habit	Distribution	
			Worldwide	Meghalaya
Panicum khasianum Munro. ex. Hk.	Poaceae	H	East and NE India	Nongkhlaw, Shella
Paramignya micrantha Kurz.	Rutaceae	L	Meghalaya	Nokrek, Raliang
Pavetta sub- capitata Hk.f.	Rubiaceae	S	NE India	Nokrek, Lailad
Peristylis manii Mukh.	Orchidaceae	Te	NE India (Meghalaya & Manipur)	Balphakram, Cherrapunjee, Laitlyngkot, Mawphlang, Shillong
Persea parviflora Haridasan. et. Rao	Lauraceae	T	Meghalaya	Raliang, Ialong, Tura
Phaius flavus Lindl.	Orchidaceae	H	Arunachal Pradesh, Sikkim, Nagaland, Meghalaya	Nokrek, Cherrapunjee
Phanera khasiana Thoth.	Caesalpinaceae	L	Meghalaya	Balphakram, Umtapoh.
Phlogacanthus guttatus Nees.	Acanthaceae	US	Eastern & Sub Himalayas, NE India	Lailad, Balphakram, Khliehriat, Lumshnong
Phlogacanthus wallichii Cl.	Acanthaceae	S	Meghalaya	Syndai
Photinia cuspidata Balak.	Rosaceae	T	Meghalaya	Jarain, Shangpung
Photinia integrifolia Lindl.	Rosaceae	T	Himalayas	Upper Shillong, Jarain-Sohkha, Shangpung
Photinia polycarpa Balak.	Rosaceae	T	Meghalaya	Jarain, Shangpung.
Phyllomphax obcordata Sch.	Orchidaceae	Te	NE India	Balphakram, Cherrapunjee, Laitlyngkot, Shillong, Nongkrem, Nongstoin, Upper Shillong
Phyllostachys mannii Gamble.	Poaceae	H	NE India	Shillong, Shillong Peak, Upper Shillong, Sohra-rim, Sohra, Mylliem
Picrasma quassioides Lindl.	Simaroubaceae	S	Tropical SE Asia & Sub Himalayas	Raliang

Piper griffithii C.DC.	Piperaceae	C	NE India, Meghalaya	Raliang, Ialong, Nokrek, Sohkha, Mawsmai, Nongkhyllem
Piper peepuloides Roxb.	Piperaceae	C	Tropical Himalayas, NE India, Bangladesh, Nepal	Raliang, Nokrek, Nongkhyllem
Pittosporum humile Hk.f. & Th.	Pittosporaceae	S	Meghalaya	Barapani, Shillong
Poa khasiana Stapf.	Poaceae	H	India	Shillong, Shillong Peak, Upper Shillong, Mawphlang
Pogonatherum rufo-barbatum Griff.	Poaceae	H	Meghalaya	Khliehriat, Nartiang.
Pogostemon strigosus Bentham.	Lamiaceae	H	Meghalaya	Sutnga, Jarain, Mihmyntdoo, Khliehriat, Bapung, Ummulong, Jowai, Mawsmai, Mawphlang, Pynursla, Pongtung, Dawki, Shillong, Nongkrem, Ialong
Polygala tricolopha Chodat.	Polygalaceae	S	Meghalaya (Khasi Hills)	Mawsmai.
Polygonum bistorta L.	Polgonaceae	H	Meghalaya	Sutnga, Jarain, Mihmyntdoo, Bapung, Ummulong, Jowai, Mawsmai, Mawphlang, Pongtung, Shillong, Amlarem, Sohra-rim, Swer
Porana racemosa Roxb.	Convolvulaceae	C	Subtropical Himalayas-Burma	Jarain, Jowai, Mynso
Prunus jenkinsii Hk.f.	Rosaceae	T	NE India, Meghalaya	Ialong, Raliang, Laskein, Nokrek, Jowai
Pteracanthus nobilis Bremek.	Acanthaceae	S	Meghalaya (Jaintia Hills)	Jarain.
Pteracanthus rubescens Bremek.	Acanthaceae	S	Meghalaya	Jowai, Jarain
Pteracanthus urophyllus Bremek.	Acanthaceae	S	Meghalaya	Jarain
Quercus glauca Thunb.	Fagaceae	T	Subtropical Himalayas-Japan	Jarain, Jowai
Rhaphidophora calophyllum Schott.	Araceae	Ep	Sikkim Himalayas, Khasi Hills	Ialong, Raliang, Nokrek, Jowai-Dawki

contd....

Table 1 ... *contd.*

Species	Family	Habit	Distribution	
			Worldwide	Meghalaya
Rhaphidophora decursiva Schott.	Araceae	Ep	Sikkim Himalayas, Khasi Hills	Ialong, Raliang, Nokrek, Jowai-Jarain
Rhododendron formosum Wall.	Ericaceae	S	NE India	Jowai, Myntang valley, Jakrem, Mynso
Rubus assamensis Focke.	Rosaceae	S	Burma, NE India	Ialong, Raliang, Elephant falls, Jowai
Rubus biflorus Buch.-Ham.	Rosaceae	S	Temperate Himalayas, Sirmore-Sikkim, Bhutan	Laitkor
Rubus calycinus Buch.-Ham.	Rosaceae	H	Central & Temperate Himalayas, Sikkim, Nepal, Bhutan	Cherrapunjee, Sohra-rim
Rubus khasianus Cardot.	Rosaceae	S	Meghalaya	Ialong, Raliang, Nokrek, Umtapoh, Lailad, Jowai
Sabia purpurea Hk.f. & Th.	Sabiaceae	S	Meghalaya	Elephant falls
Salix psilostigma An.	Salicaceae	S	Meghalaya	Jakrem, Jowai
Schima khasiana Dyer.	Theaceae	T	Meghalaya	Shillong, Jowai, Sohra-rim, Pongtung, Mawphlang, Raliang
Schizostachyum dullooa Majumdar	Poaceae	H	NE India	Markasa, Nongkhyllem
Schizostachyum helferi Majumdar	Poaceae	H	Meghalaya	Rongrengiri
Schizostachyum pallidum Majumdar	Poaceae	H	NE India	Cherrapunjee, Pynursla, Jarain, Amlarem, Dawki
Schizostachyum polymorphum Majumdar	Poaceae	H	NE India	Jowai, Sutnga, Syndai
Senecio jowaiensis Balak.	Asteraceae	S	Meghalaya	Jowai
Smilax myrtillus DC.	Smilacaceae	S	Meghalaya, Nagaland	Ialomg, Raliang

Sonerila khasiana Cl.	Melastomataceae	H	Meghalaya	Ialomg, Jowai, Jarain, Mawsmai
Sophora acuminata Baker.	Fabaceae	S	Eastern Himalayas, Bangladesh, Burma	Mawsmai, Sutnga
Sympagis maculata Bremek.	Acanthaceae	S	Meghalaya	Jowai-Jarain
Sympagis monadelpha Bremek.	Acanthaceae	S	Meghalaya	Jowai-Jarain, Ialong
Symplocos floribunda Wall.	Symplocaceae	T	Bhutan, Khasi Hills	Shillong
Tarphochlamys affinis Bremek.	Acanthaceae	US	Meghalaya	Nartiang, Rytiang
Tetrastigma obovatum Gagnep.	Vitaceae	L	NE India, Meghalaya	Raliang-Khongshnong
Thamnocalamus prainii E.G. Camus	Poaceae	S	NE India	Sohrarim, Umiam
Trachelospermum auritum Sch.	Apocyanaceae	C	NE India	Tura
Trachyspermum Khasianum Wolff.	Apiaceae	H	Meghalaya	Jarain
Trivalvaria kanjilalii D. Das.	Annonaceae	S	Meghalaya	Syndai
Tupidanthus calyptratus Hk.f. & Th.	Araliaceae	T	Meghalaya	Ialomg, Raliang, Jarain, Laskein, Balphakram
Turpinia nepalensis W. & A.	Staphylaceae	T	Indo-Malaya.	Jowai-Jarain, Nokrek.
Tylophora belostemma Benth.	Asclepiadiaceae	H	Meghalaya (Khasi Hills), Nepal	Cherrapunjee
Vaccinium vacciniaceum Sleum.	Vacciniaceae	Ep	NE India, Bangladesh, Nepal	Ialong, Mawsmai, Jowai, Shangdain, Shangpung
Viburnum carylifolium Hk.f. & Th.	Caprifoliaceae	S	Meghalaya	Laitkor
Viburnum odoratissimum Ker.	Caprifoliaceae	S	NE India, Burma, China	Mawsmai
Viburnum simonsii Hk.f. & Th.	Caprifoliaceae	T	Meghalaya	Ialong, Mawsynram, Jowai, Jarain
Vigna vexillata Benth.	Fabaceae	H	Himalayas, Shimla-Kumaon, West Peninsular India, Sri-Lanka	Nongstoin, Umran

contd....

Table 1 ... *contd.*

Species	Family	Habit	Distribution	
			Worldwide	Meghalaya
Xylosma controversum Clos.	Flacourtiaceae	T	Meghalaya	Jowai
Zanthozylum khasianum Hk.f.	Rubiaceae	S	Meghalaya (Khasi Hills)	Shillong
Temperate region (1800-2000 m a.s.l.)				
Acer laevigatum Wall.	Aceraceae	T	Temperate Himalayas, Sikkim, Meghalaya	Jowai, Pudiem Sirkep, Shillong, Ialong, Raliang
Aeschynanthus sikkimensis Stapf.	Gesneriaceae	Ep	Temperate & Sub Himalayas, NE India, Meghalaya	Ialong, Raliang, Jarain, Shillong, Nokrek
Agapetes rugosus Hk.f.	Vacciniaceae	S	Meghalaya	Shillong
Agrostis filipes Hk.	Poaceae	H	Himalayas	Cherrapunjee, Laitlyngkot, Mawkdok, Shillong Peak
Agrostis griffithiana Bor.	Poaceae	H	NE India	Dympep, Shillong Peak, Upper Shillong
Agrostis myriantha Hk.	Poaceae	H	India	Barapani, Mairang, Shillong Peak, Shillong, Upper Shillong
Arundinaria hirsuta Munro.	Poaceae	S	NE India	Mairang, Mawphlang, Shillong, Upper Shillong
Arundinella intricata Hughes.	Poaceae	H	NE India	Pongtung, Mawphlang, Shillong, Upper Shillong, Pynursla, Laitlyngkot
Chimonobambusa callosa Nakai.	Poaceae	S	NE India	Mairang, Mawphlang, Shillong, Shillong Peak, Upper Shillong
Corybas purpureus Joseph. et. Yog.	Orchidaceae	Te	Meghalaya (Khasi Hills)	Elephant falls.
Erythroxylum kunthianum Wall. ex. Kurz.	Erythroxylaceae	T	Indo-Burma, NE India, Meghalaya	Ialong, Raliang, Swer, Nokrek, Mawphlang, Jarain, Jowai
Hierochloe khasiana Cl. ex. Hk.	Poaceae	H	Meghalaya	Laitlyngkot, Shillong

Hymenopogon parasiticus Wall.	Rubiaceae	C	Indo-Burma, Temperate Himalayas	Shillong
Ilex khasiana Purk.	Aquifoliaceae	T	NE India (Manipur, Meghalaya)	Elephant falls
Ischaemum hirtum Hack.	Poaceae	H	Bengal, Bihar, Khasi Hills, Sri-Lanka, Nilgiri, Chota Nagpur, Central India	Cherrapunjee, Dympep, Laitlyngkot, Mawmluh, Shillong, Pynursla, Mawphlang, Shillong, Shillong Peak, Upper Shillong, Sohra-rim.
Persea kingii Kosterm	Lauraceae	T	Meghalaya	Shillong
Phyllostachys mannii Gamble.	Poaceae	H	NE India	Shillong, Shillong Peak, Upper Shillong, Sohra-rim, Sohra, Mylliem
Poa khasiana Stapf.	Poaceae	H	India	Shillong, Shillong Peak, Upper Shillong, Mawphlang
Smilax myrtillus DC.	Smilacaceae	S	Meghalaya, Nagaland	Ialomg, Raliang
Symplocos floribunda Wall.	Symplocaceae	T	Bhutan, Khasi Hills	Shillong
Thamnocalamus prainii E.G. Camus.	Poaceae	S	NE India	Sohrarim, Umiam

The distribution of the endemic plant species at different elevations of the state shows that a maximum number of 203 species are found in the Subtropical (900–1800m a.s.l.) region, followed by the tropical (upto 900m a.s.l.) region with 106 species, and a minimum number of 21 species are found in the temperate (1800–2100m a.s.l.) region (Fig. 3 and Table 1).

Endemic medicinal plant species

Of the total 239 endemic plant species studied, 36 species were found to be pharmaceutically important or were being locally employed in health care (Table 2). These belonged to 31 genera and 27 families. The habit-wise distribution of these medicinal plant species reveals that 37% are trees, 22% are shrubs, 19% are herbs, 14% are lianas and climbers and 8% are under-shrubs (Fig. 4).

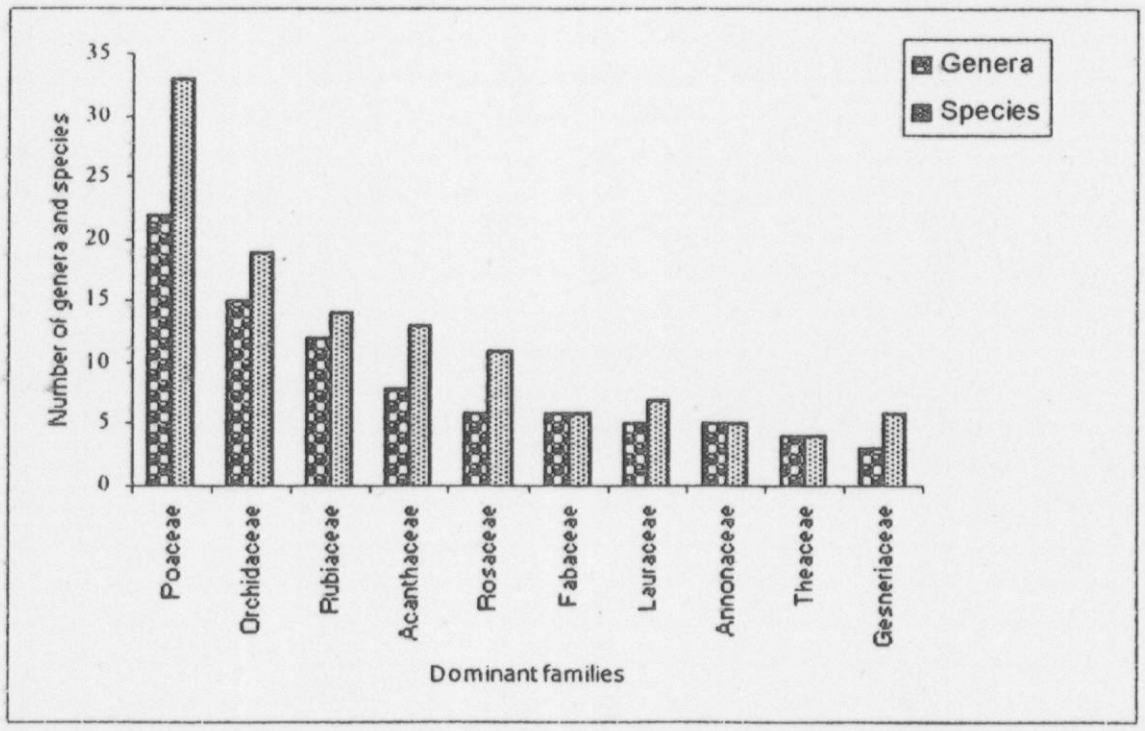

Fig. 2. Dominant families showing high degree of endemism in Meghalaya.

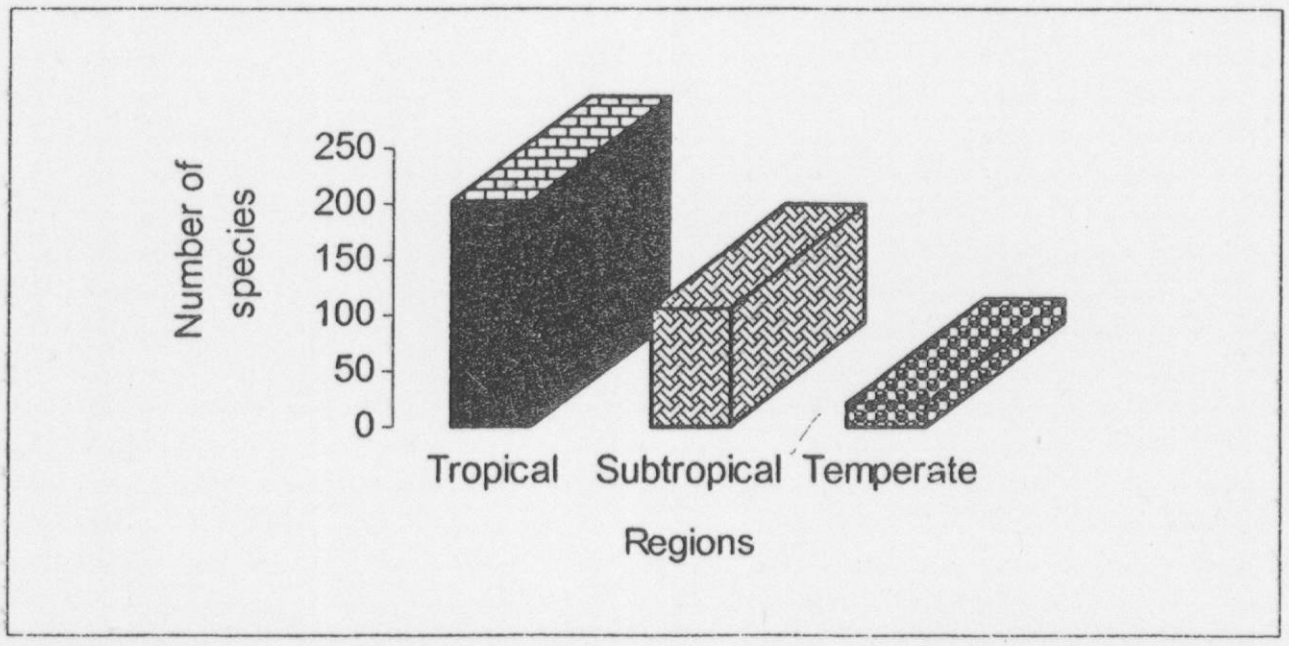

Fig. 3. Distribution of endemic plant species in Meghalaya.

Table 2. A list of endemic medicinal plant species found in the state along with their uses

Species	Family	Common name	Habit used	Parts	Ailments
Aeschynanthus superba Cl.	Gesneriaceae	Thylli Masi [K]	US	B	Fracture, muscular sprain
Apios carnea Benth.	Fabaceae	X	S		
Boehmeria macrophylla D. Don.	Urticaceae	Dieng Sohkhasim [K]	T	R	Eczema, wounds
Calamus erectus Roxb.	Arecaceae	Soh Thri [K]	S	Se	Indigestion, stomachache
Calamus floribundus Griff.	Arecaceae	Soh Thri [K]	C		
Camellia caduca Cl. ex Brandis.	Theaceae	Dieng Tyrnem [K]	T	R	Skin diseases
Chirita hamosa R. Br.	Gesneriaceae	X	H		
Citrus aurantium L.	Rutaceae	Soh Niamtra [K]	T	L, B, Fl	Headache; sunstroke; laxative; urinary tract infections
Citrus latipes Tanaka.	Rutaceae	Soh Heh [J]	T	Fr, L	Bodyache, vomitting, cold, fever
Citrus medica L.	Rutaceae	Soh Manong [K]; Dieng Soh Sarman [J]	S	R, Fr	Laxative, colic, flatulence, strangury, renal & vesical calculi, tumours, amenorrhagia, dysmenorrhagia
Cocculus mollis Hk.f.& Th.	Menispermaceae	Jyrmi Mailum [K]	S	R, S	Anodyne, antiphlogistic, carminative, depurative, diuretic, vermifuge, rheumatic arthritis, oedema, oliguria, antibacterial, anti-amoebic activity, asthma, bronchitis, paralysis
Curcuma montana Roxb.	Zingiberaceae	Sying Syrmit [J]	H	Rh	Jaundice, increases lactation, body swellings
Cymbidium aloifolium Sw.	Orchidaceae	X	Ep	Bu	Blood coagulant for large bleeding wounds

contd....

Table 2 ... *contd.*

Species	Family	Common name	Habit used	Parts	Ailments
Daphniphyllum himalayense Muell.–Arg.	Daphniphyllaceae	Dieng Synrangthuli [K]	T	S	Boils
Delphinium altisimum Wall.	Ranunculaceae	X	H		
Elaeagnus conferta Roxb.	Elaeagnaceae	Soh Shang [K]; Dieng Snlangi [J]; Chhokhua [G]	S	Fl, Fr	Sores, ulcers
Garcinia cowa Roxb. ex DC.	Clusiaceae	Rengran [G]	T	Fr	Dysentery
Garcinia pedunculata G. Don.	Clusiaceae	Dieng Sohdanei [K]	T	Fr	Urinary troubles
Goniothalamus simonosii Hk.f.& Th.	Anonaceae	X	T		
Grewia hirsuta Vahl.	Tiliaceae	Soh Synting [K]	S	Fr, R	Diarrhoea, dysentery, wounds
Hedera helix Cl.	Araliaceae	Pew Shrieh [K]	C	Wp	Antiseptic
Hymenodictyon excelsum Wall.	Rubiaceae	Dieng Dohlbongsyiar [K] Mibot [G]	T	B	Astringent, febrifuge
Impatiens tripetala Roxb.	Balsaminaceae	X	H	R	Haematic
Mahonia pycnophylla Takeda.	Berberidaceae	Dieng Niangmat [K]	T	L, B	Eye diseases
Munronia pinnata Harms.	Meliaceae	Samskar [G]	US	R	Stomachache, vomitting, loose motion
Nepenthes khasiana Hk.f.	Nepenthaceae	Tiew Rakot [K]	S	Pitcher	Urinary troubles, stomach disorders, night blindness, skin diseases leprosy
Ochna squarrosa Planet.	Ochnaceae	X	T	L, R, B	Snakebite, menstrual complaints, asthma, emollient
Ophiorhiza subcapitata Wall.	Rubiaceae	Samachik [G]	C	R, L	Fever, sore throat, tonsils, facial blemishes

Osbeckia capitata Benth.	Melastomataceae	Soh Pythem [K]	H	Wp	Snakebite, muscle swellings
Piper griffithi C.DC.	Piperaceae	Pathi bri [J]	C	L, S, Fr	Stomach troubles, diarrhoea, dysentery
Piper peepuloides Roxb.	Piperaceae	X	US	L	Fever
Polygonum bistorta L.	Polygonaceae	X	H	Rh	Diarrhoea, enteritis, bleeding hemorrhoids, gingivitis, febrifuge, diuretic
Rhaphidophora decursiva Schott.	Araceae	Dawai Rarbek [J]	C	Rh	Snakebite
Schima khasiana Dyer.	Theaceae	Dieng Ngan [K]	T	L, B	Stomachache, allergies
Sophora accuminata Baker.	Fabaceae	Palwang [G]	S	B	Pregnancy (purification of blood before & after delivery)
Xylosma longifólium Clos.	Flacourtiaceae	Dieng Kani [K]; Phulwal [G]	T	B	Stomachache

H = herb; Ep = epiphyte; T = tree; S = shrub; C = climber; US = under shrub.
B = bark; R = root; Se = seed; L = leaf; Fl = flower; Fr = fruit; Rh = rhizome; Bu = buds; Wp = whole plant.

Ethnobotany of endemic plant species

Apart from the medicinal uses, many endemic species are used for many other purposes such as planking, house construction, fodder, food, furniture and ornamental uses (Fig. 5 and Table 3). From the Fig. 5, it is seen that 23% of endemics are used as house construction materials, 14% as ornamentals, 25% as fodder and 29% as food items.

Concentration of endemics

Based on the GPS readings, the distributions of the endemic species were mapped. The concentration of endemic species was found in 19 locations in Meghalaya, which were identified as centers of endemism. Of these, Jowai had the highest number of 61 (25.5%) endemic species, followed by Jarain with 51 (21.3%)

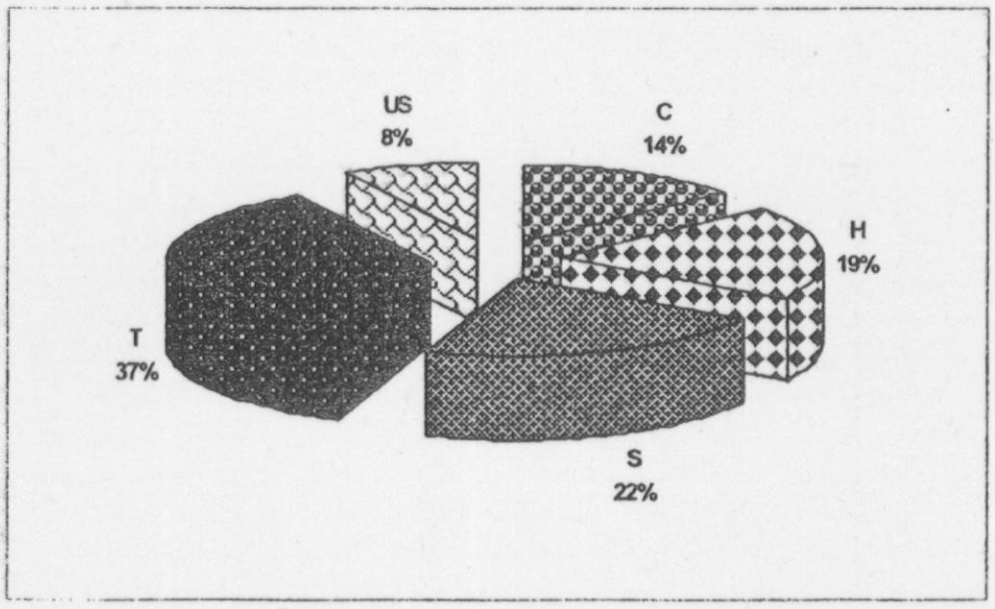

Fig. 4. Habit-wise distribution of endemic medicinal plant species.

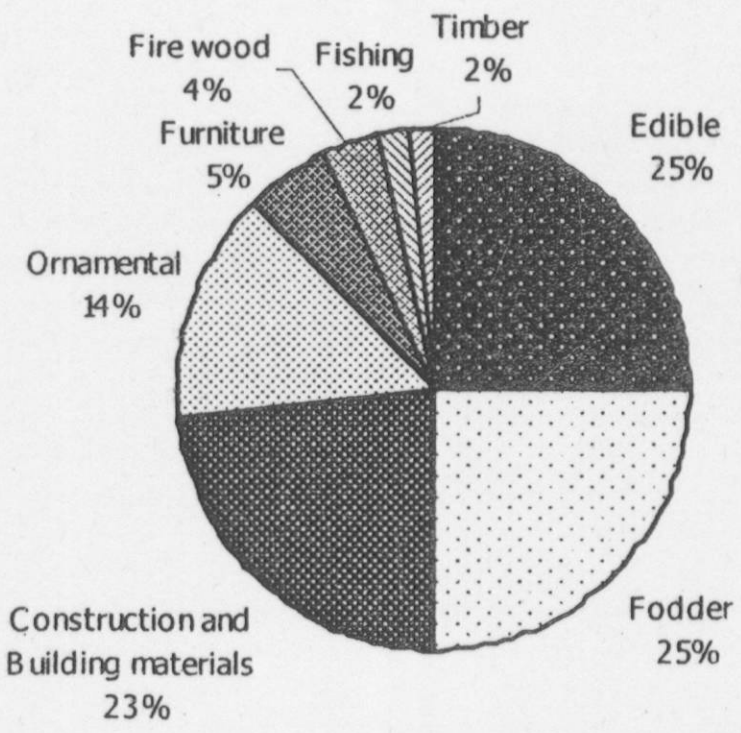

Fig. 5. Ethnobotanical use of endemic plants in Meghalaya.

Table 3. A list of endemic plant species with their ethnobotanical uses in Meghalaya

Sl. no.	Species	Family	Habit	Parts used	Uses
1.	*Acer cappadocicum* Gleditsch	Aceraceae	T	Bole	Planking and construction.
2.	*Acer laevigatum* Wall.	Aceraceae	T	Wood	Planking and scantling.
3.	*Agrostis myriantha* Hk.	Poaceae	H	Whole plant	Fodder.
4.	*Arundinaria hirsuta* Munro.	Poaceae	S	Culms, young leaves, young shoots	Walling of huts to hold mud plaster, roofing material, temporary partition walls, doors, nursery sheds, fences. Young leaves used by cattle and pony as fodder. Young shoots are edible.
5.	*Arundinaria mannii* Gamble.	Poaceae	S	Culms	Binding material in building huts.
6.	*Aspidopteris elliptica* A. Juss.	Malphigiaceae	L	Bark	Edible.
7.	*Bambusa mastersii* Munro.	Poaceae	T	Culms	Poles, walls.
8.	*Bulbophyllum griffithi* Reich.	Orchidaceae	Ep	Whole plant	Ornamental.
9.	*Calamus erectus* Roxb.	Arecaceae	S	Fruits, canes	Edible, reeds, furniture.
10.	*Calamus floribundus* Griff.	Arecaceae	C	Fruits, canes	Edible, reeds, furniture.
11.	*Chimonobambusa callosa* Nakai.	Poaceae	S	Culms and young shoots	Tying thatch of native houses, young shoots are edible.
12.	*Chimonobambusa griffithiana* Nakai.	Poaceae	S	Culms	Tying thatch of native houses.
13.	*Chimonobambusa khasiana* Nakai.	Poaceae	H	Culms	Making walls.
14.	*Chimonobambusa polystachya* Nakai.	Poaceae	S	Culms	Tying thatch of native houses.
15.	*Citrus aurantium* L.	Rutaceae	T	Fruits	Edible.
16.	*Citrus medica* L.	Rutaceae	S	Fruits, wood, branches	Edible, agricultural implements and walking sticks..

contd....

Table 3 ... *contd*.

Sl. no.	Species	Family	Habit	Parts used	Uses
17.	*Coelogyne purpurea* Joseph. & Yog.	Orchidaceae	Ep	Whole plant	Ornamental.
18.	*Coelogyne viscosa* Rchb.f.	Orchidaceae	Ep	Whole plant	Ornamental.
19.	*Digitaria compacta* Veldk.	Poaceae	H	Grains	Edible.
20.	*Drimycarpus racemosus* Hk.f.	Anacardiaceae	T	Bole	Planking, construction and flooring.
21.	*Elaeagnus conferta* Roxb.	Elaeagnaceae	S	Fruits	Edible.
22.	*Elaeocarpus prunifolius* Mast.	Elaeocarpaceae	T	Fruits	Edible.
23.	*Erythroxylum kunthianum* Wall. ex.Kurz.	Erythroxylaceae	T	Bark	Edible.
24.	*Garcinia pedunculata* G. Don.	Clusiaceae	T	Fruits	Edible.
25.	*Grewia hirsuta* Vahl.	Tiliaceae	US	Fruits	Edible.
26.	*Hedera helix* Cl.	Araliaceae	C	Whole plant	Ornamental.
27.	*Hymenodictyon excelsum* Wall.	Rubiaceae	T	Leaves	Fodder.
28.	*Ilex khasiana* Purk.	Aquifoliaceae	T	Bole	Timber.
29.	*Ilex umbellulata* Loes.	Aquifoliaceae	T	Bole	Fire wood.
30.	*Ilex venulosa* Hk.f.	Aquifoliaceae	T	Bole	Fire wood.
31.	*Ixonanthes khasiana* Hk.f.	Ixonanthaceae	T	Wood	Furniture.
32.	*Ixora sub-sessilis* G. Don.	Rubiaceae	T	Whole plant	Ornamental.
33.	*Michelia punduana* Hk.f. & Th.	Magnoliaceae	T	Bole, wood	Planking and furniture.
34.	*Nepenthes khasiana* Hk.f.	Nepenthaceae	H	Whole plant	Ornamental.
35.	*Polygonum bistorta*	Polgonaceae	H	Tubers	Vegetable.
36.	*Rhododendron formosum* Wall.	Ericaceae	S	Whole plant	Ornamental.
37.	*Trachelospermum auritum* Sch.	Apocyanaceae	C	Whole plant	Ornamental.
38.	*Viburnum carylifolium* Hk.f. & Th.	Caprifoliaceae	S	Fruits	Fishing.
39.	*Xylia dolabriformis* Taub.	Mimosaceae	T	Wood	Construction.

H = herb; Ep = epiphyte; T = tree; S = shrub; C = climber; US = under shrub.

Table 4. Locations along with the species present in each location

Locations	Species
Sohra-rim	*Ischaemum hirtum* Hack., *Rubus calycinus* Buch.-Ham., *Diplomeris pulchella* D. Don., *Mahonia pycnophylla* Takeda., *Hedera helix* Cl., *Osbeckia capitata* Benth., *Ilex venulosa* Hk.f., *Schima khasiana* Dyer., *Phyllostachys mannii* Gamble., *Polygonum bistorta* L.
Shillong	*Phyllomphax obcordata* Sch., *Peristylis manii* Mukh., *Cymbidium mastersii* Lindl., *Glochidion acuminatum* Muell.-Arg., *Digitaria compacta* Veldk., *Agrostis myriantha* Hk., *Pittosporum humile* Hk.f. and Th., *Ischaemum hirtum* Hack., *Cocculus mollis* Hk.f. & Th., *Aeschynanthus sikkimensis* Stapf., *Ardisia griffithii* Cl., *Hedera helix* Cl., *Osbeckia capitata* Benth., *Chimonobambusa khasiana* Nakai., *Acer laevigatum* Wall., *Hierochloe khasiana* Cl. ex. Hk., *Chimonobambusa griffithiana* Nakai., *Chimonobambusa callosa* Nakai., *Arundinaria hirsuta* Munro., *Helwingia himalaica* Hk.f. and Th., *Litsea elongata* Hk.f., *Euonymus lawsonii* Cl. & Prain., *Elaeagnus conferta* Roxb., *Arundinella intricata* Hughes., *Lindera latifolia* Hk.f., *Cinnamomum pauciflorum* Nees., *Berchemia floribunda* Brongn., *Schima khasiana* Dyer., *Apios carnea* Benth., *Poa khasiana* Stapf., *Phyllostachys mannii* Gamble., *Agapetes rugosus* Hk.f., *Hymenopogon parasiticus* Wall., *Persea kingii* Kosterm., *Symplocos floribunda* Wall., *Zanthozylum khasianum* Hk.f., *Polygonum bistorta L.*, *Pogostemon strigosus* Bentham., *Daphniphyllum himalayense* Muell., *Czlamagrostis elatior* A. Camus., *Agrostis griffithiana* Bor.
Umsaw	*Anacolosa ilicoides* Mast., *Osbeckia capitata* Benth.
Raliang	*Munronia pinnata* Harms., *Glochidion acuminatum* Muell.-Arg., *Tupidanthus calyptratus* Hk.f. & Th., *Smilax myrtillus* DC., *Rubus assamensis* Focke., *Aeschynanthus sikkimensis* Stapf., *Ixora sub-sessilis* G.Don., *Ardisia griffithii* Cl., *Impatiens khasiana* Hk.f., *Neillia thyrsifolia* D.Don., *Prunus jenkinsii* Hk.f., *Boehmeria sidaefolia* Wedd., *Rhaphidophora calophyllum* Schott., *Rhaphidophora decursiva* Schott., *Drimycarpus racemosus* Hk.f., *Rubus khasianus* Cardot., *Fissistigma verrucosum* Merr., *Erythroxylum kunthianum* Wall. ex Kurz., *Hedera helix* Cl., *Acer laevigatum* Wall., *Aeschynanthus superba* Cl., *Hedychium dekianum* Rao. and Verma., *Euonymus lawsonii* Cl. and Prain., *Paramignya micrantha* Kurz., *Citrus latipes* Tanaka., *Ilex embeloides* Hk.f., *Lindera latifolia* Hk.f., *Piper griffithii* C.DC., *Persea parviflora* Haridasan. et. Rao., *Impatiens laevigata* Hk.f., *Piper peepuloides* Roxb., *Capparis acutifolia* Sw., *Cinnamomum pauciflorum* Nees., *Picrasma quassioides* Lindl., *Tetrastigma obovatum* Gagnep., *Schima khasiana* Dyer.
Ialong	*Sonerila khasiana* Cl., *Tupidanthus calyptratus* Hk.f. and Th., *Smilax myrtillus* DC., *Mahonia pycnophylla* Takeda., *Luisia inconspicua* King. and Pantl., *Vaccinium vacciniaceum* Sleum., *Viburnum simonsii* Hk.f. and Th., *Bulbophyllum griffithi* Reich., *Rubus assamensis* Focke., *Aeschynanthus sikkimensis* Stapf., *Ixora sub-sessilis* G. Don., *Ardisia griffithii* Cl., *Impatiens khasiana* Hk.f.,

contd....

Table 4 ... *contd.*

Locations	Species
	Neillia thyrsifolia D. Don., *Prunus jenkinsii* Hk.f., *Boehmeria sidaefolia* Wedd., *Rhaphidophora calophyllum* Schott., *Rhaphidophora decursiva* Schott., *Drimycarpus racemosus* Hk.f., *Rubus khasianus* Cardot., *Fissistigma verrucosum* Merr., *Erythroxylum kunthianum* Wall. ex. Kurz., *Hedera helix* Cl., *Camellia caduca* Brandis., *Acer laevigatum* Wall., *Callicarpa psilocalyx* Cl., *Sympagis monadelpha* Bremek., *Aeschynanthus parasitica* Cl., *Citrus latipes* Tanaka., *Goldfussia glabrata* Balak., *Lindera latifolia* Hk.f., *Piper griffithii* C.DC., *Persea parviflora* Haridasan. et. Rao., *Aralia thomsonii* Seem., *Pogostemon strigosus* Bentham.
Mawphlang	*Peristylis manii* Mukh., *Ischaemum hirtum* Hack., *Erythroxylum kunthianum* Wall. ex. Kurz., *Osbeckia capitata* Benth., *Chimonobambusa khasiana* Nakai., *Camellia caduca* Brandis., *Chimonobambusa griffithiana* Nakai., *Chimonobambusa callosa* Nakai., *Arundinaria hirsuta* Munro., *Helwingia himalaica* Hk.f. & Th., *Delphinium altissimum* Wall., *Carpinus viminea* Wall. Ex. Lindl., *Cynanchum deltoideum* Hk.f., *Ischaemum hirtum* Hack., *Microstegium borianum* Sur., *Litsea elongata* Hk.f., *Arundinella intricata* Hughes., *Schima khasiana* Dyer., *Poa khasiana* Stapf., *Polygonum bistorta L., Pogostemon strigosus* Bentham.
Jowai	*Cymbopogon khasianus* Stapf., *Eragrostiella leioptera* Bor., *Eriocaulon cristatum* Mast., *Coelogyne purpurea* Joseph. and Yog., *Cocculus mollis* Hk.f. & Th., *Dipsacus asper* DC., *Sonerila khasiana* Cl., *Luisia inconspicua* King. and Pantl., *Vaccinium vacciniaceum* Sleum., *Viburnum simonsii* Hk.f. & Th., *Bulbophyllum griffithi* Reich., *Rubus assamensis* Focke., *Ardisia griffithii* Cl., *Impatiens khasiana* Hk.f., *Neillia thyrsifolia* D.Don., *Prunus jenkinsii* Hk.f., *Rhaphidophora calophyllum* Schott., *Rhaphidophora decursiva* Schott., *Rubus khasianus* Cardot., *Erythroxylum kunthianum* Wall. ex. Kurz., *Hedera helix* Cl., *Salix psilostigma* An., *Osbeckia capitata* Benth., *Porana racemosa* Roxb., *Quercus glauca* Thunb., *Habenaria khasiana* Hk.f., *Gomphostemma lucidum* Wall. ex. Benth., *Michelia punduana* Hk.f. & Th., *Liparis acuminata* Hk.f., *Pteracanthus rubescens* Bremek., *Chimonobambusa khasiana* Nakai., *Camellia caduca* Brandis., *Rhododendron formosum* Wall., *Acer laevigatum* Wall., *Aeschynanthes superba* Cl., *Impatiens acuminata* Hk.f. and Th., *Schizostachyum polymorphum* Majumdar., *Aechmanthera leiosperma* Cl., *Coelogyne viscosa* Rchb.f., *Dicentra torulosa* Hk.f. & Th., *Ophiorhiza sub-capitata* Wall., *Senecio jowaiensis* Balak., *Xylosma controversum* Clos., *Hedychium dekianum* Rao. and Verma., *Callicarpa psilocalyx* Cl., *Sympagis monadelpha* Bremek., *Aeschynanthus parasitica* Cl., *Baliospermum micranthum* Muell.-Arg., *Turpinia nepalensis* W. & A., *Boehmeria macrophylla* D.Don., *Impatiens porecta* Hk.f. & Th., *Lasianthus hookeri* Cl. ex. Hk.f., *Ilex venulosa* Hk.f., *Glochidion thomsonii* Hk.f., *Cinnamomum pauciflorum* Nees., *Aralia thomsonii* Seem., *Schima khasiana* Dyer., *Polygonum bistorta L., Pogostemon strigosus* Bentham., *Sympagis maculata* Bremek., *Daphniphyllum himalayense* Muell.

Locations	Species
Nokrek	*Bulbophyllum griffithi* Reich., *Aeschynanthus sikkimensis* Stapf., *Ardisia griffithii* Cl., *Prunus jenkinsii* Hk.f., *Boehmeria sidaefolia* Wedd., *Rhaphidophora calophyllum* Schott., *Rhaphidophora decursiva* Schott., *Drimycarpus racemosus* Hk.f., *Rubus khasianus* Cardot., *Fissistigma verrucosum* Merr., *Erythroxylum kunthianum* Wall. ex. Kurz., *Ceropegia angustifolia* Wt., *Ceropegia longifolia* Wall., *Aeschynanthus superba* Cl., *Turpinia nepalensis* W. & A., *Aeschynanthus parasitica* Cl., *Baliospermum micranthum* Muell.-Arg., *Garcinia cowa* Roxb. ex DC., *Phaius flavus* Lindl., *Boehmeria macrophylla* D.Don., *Impatiens porecta* Hk.f. and Th., *Lasianthus hookeri* Cl. ex. Hk.f., *Milletia caudata* Baker., *Pavetta sub- capitata* Hk.f., *Litsea elongata* Hk.f., *Elaeocarpus acuminatus* Wall. ex. Mast., *Litsea laeta* Wall. ex. Nees., *Euonymus lawsonii* Cl. and Prain., *Paramignya micrantha* Kurz., *Glochidion thomsonii* Hk.f., *Elaeagnus conferta* Roxb., *Citrus latipes* Tanaka., *Citrus medica* L., *Citrus aurantium* L., *Goniothalamus simonsii* Hk.f. & Th., *Lindera latifolia* Hk.f., *Piper griffithii* C.DC., *Impatiens laevigata* Hk.f., *Piper peepuloides* Roxb., *Capparis acutifolia* Sw., *Apios carnea* Benth., *Acer cappadocicum* Gleditsch.
Nartiang	*Cymbopogon khasianus* Stapf., *Digitaria compacta* Veldk., *Luisia inconspicua* King. and Pantl., *Boehmeria sidaefolia* Wedd., *Pogonatherum rufo-barbatum* Griff., *Tarphochlamys affinis* Bremek., *Curcuma montana* Roxb., *Cinnamomum pauciflorum* Nees.
Pynursla	*Ischaemum hirtum* Hack., *Schizostachyum pallidum* Majumdar., *Osbeckia capitata* Benth., *Chimonobambusa khasiana* Nakai., *Nepenthes khasiana* Hk.f., *Chimonobambusa griffithiana* Nakai., *Arundinella intricata* Hughes., *Alsoedaphne khasiana* Kosterm., *Pogostemon strigosus* Bentham.
Nongstoin	*Phyllomphax obcordata* Sch., *Chimonobambusa khasiana* Nakai., *Vigna vexillata* Benth., *Osbeckia capitata* Benth.
Mawsynram	*Viburnum simonsii* Hk.f. & Th., *Camellia caduca* Brandis., *Litsea laeta* Wall. ex. Nees., *Osbeckia capitata* Benth.
Nongkrem	*Phyllomphax obcordata* Sch., *Hedera helix* Cl., *Osbeckia capitata* Benth., *Codonopsis viridis* Wall., *Pogostemon strigosus* Bentham.
Nongpoh	*Luisia inconspicua* King. and Pantl., *Hymenodictyon excelsum* Wall., *Cymbidium aloifolium* Sw.
Mawsmai	*Lasianthus tubiferus* Hk.f., *Sonerila khasiana* Cl., *Vaccinium vacciniaceum* Sleum., *Osbeckia capitata* Benth., *Camellia caduca* Brandis., *Agapetes obovata* Hk.f. , *Medinilla erythrophylla* Lindl., *Aeschynanthus parasitica* Cl., *Baliospermum micranthum* Muell.-Arg., *Sophora acuminata* Baker., *Coffea jenkinsii* Hk.f., *Ericybe punguensis* Prain., *Ilex excelsa* Hk.f., *Neanotis oxyphylla* W.H. Lewis., *Polygala tricolopha* Chodat., *Viburnum odoratissimum* Ker., *Elaeocarpus acuminatus* Wall. ex. Mast., *Litsea laeta* Wall. ex. Nees., *Goniothalamus simonsii* Hk.f. & Th., *Piper griffithii* C.DC., *Polygonum bistorta* L., *Pogostemon strigosus* Bentham

contd....

Table 4 ... *contd*.

Locations	Species
Nongkhyllem	*Schizostachyum dullooa* Majumdar, *Gastrodia exilis* Hk.f., *Goniothalamus simonsii* Hk.f. & Th., *Piper griffithii* C. DC., *Piper peepuloides* Roxb., *Xylia dolabriformis* Taub.
Umling	*Xylia dolabriformis* Taub., *Elaeocarpus lucidus* Roxb.
Balphakram	*Aeschynanthus manii* Kurz., *Aeschynanthus parasitica* Cl., *Areca nagensis* Griff., *Argostemma khasiana* Cl., *Argostemma rostratum* Wall., *Arisaema album* N.E.Br., *Aspidiopteris elliptica* A.Juss., *Bambusa mastersii* Munro., *Cardiopteris lobata* Wall. ex R.Br., *Ceropegia angustifolia* Wt., *Cymbidium mastersii* Lindl., *Cymbopogon khasianus* Stapf., *Didymocarpus razii* Kurz., *Docynia hookeriana* Decne., *Elaeagnus conferta* Roxb., *Eragrostiella leioptera* Bor., *Eria tomentosa* Hk.f., *Eriocaulon cristatum* Mast., *Eriocaulon echinulatum* Mart., *Glochidion acuminatum* Muell.-Arg., *Goniothalamus simonsii* Hk.f. & Th., *Grewia hirsuta* Vahl., *Hiptage acuminata* Wall. ex Hk.f., *Ilex umbellulata* Loes. , *Impatiens juripa* Hk.f. & Th., *Impatiens tripetala* DC., *Isachne clarkei* Hk.f., *Jasminum listeri* Gage., *Lasiobema scandens* de. Wit., *Munronia pinnata* Harms., *Peristylis manii* Mukh., *Phanera khasiana* Thoth., *Phlogacanthus guttatus* Nees., *Phyllanthus longiflorus* Heyne. ex Hk.f., *Phyllomphax obcordata* Sch., *Pseudaechnanthera glutinosa* Bremek., *Pteracanthus denticulatus* Bremek., *Thelasis pygmaea* Lindl., *Tupidanthus calyptratus* Hk.f. and Th.
Jarain	*Aeschynanthus sikkimensis* Stapf., *Aeschynanthus parasitica* Cl., *Begonia rubrovenia* Hk., *Berchemia floribunda* Brongn., *Callicarpa psilocalyx* Cl., *Ceropegia angustifolia* Wt., *Ceropegia longifolia* Wall., *Cocculus mollis* Hk.f. & Th., *Dipsacus asper* DC., *Elaeocarpus prunifolius* Mast., *Eragrostiella leioptera* Bor., *Eria ferrugienea* Lindl., *Eriocaulon cristatum* Mast., *Erythroxylum kunthianum* Wall. ex Kurz., *Gomphostemma lucidum* Wall. ex. Benth., *Habenaria khasiana* Hk.f., *Hedychium dekianum* Rao. and Verma., *Hiptage acuminata* Wall.ex.Hk.f., *Ilex venulosa* Hk.f., *Impatiens porecta* Hk.f. & Th., *Ixora sub-sessilis* G.Don., *Lasianthus hookeri* Cl. ex. Hk.f., *Lasianthus tubiferus* Hk.f., *Liparis acuminata* Hk.f., *Litsea laeta* Wall. ex. Nees., *Mahonia pycnophylla* Takeda., *Medinilla erythrophylla* Lindl., *Michelia punduana* Hk.f. & Th., *Mitrasacme nudicaulis* R.Br., *Neillia thyrsifolia* D.Don., *Nepenthes khasiana* Hk.f., *Osbeckia capitata* Benth., *Photinia cuspidata* Balak., *Photinia integrifolia* Lindl., *Photinia polycarpa* Balak., *Pogostemon strigosus* Bentham., *Porana racemosa* Roxb., *Pteracanthus nobilis* Bremek., *Pteracanthus rubescens* Bremek., *Pteracanthus urophyllus* Bremek., *Quercus glauca* Thunb., *Rhaphidophora calophyllum* Schott., *Rhaphidophora decursiva* Schott., *Schizostachyum pallidum* Majumdar., *Sonerila khasiana* Cl., *Sympagis maculata* Bremek., *Sympagis monadelpha* Bremek., *Trachyspermum Khasianum* Wolff., *Tupidanthus calyptratus* Hk.f. & Th., *Turpinia nepalensis* W. and A., *Viburnum simonsii* Hk.f. & Th.

endemic species, Nokrek with 42 (17.6%) and Shillong with 41 (17.2%) endemic species (Tables 4 and 5 and Fig. 6).

Discussion

Of the 3128 flowering plant species found in the state, 1173 are stated to be endemics (Khan *et al.*, 1997). These represent 37.5% of the state's flora. From the present study of 239 endemics, it was found that the species diversity and the endemic richness are positively correlated and therefore, biodiversity rich areas of the state such as Jowai, Jarain, Nokrek and Shillong are also rich in endemics. The reason of concentration of endemics in a particular area may be attributed to habitat specificity, low regeneration capacity, geographic isolation, fragility or sensitivity to natural factors, and narrow ecological amplitude of the endemic species.

The wide use of such plants in medicine (36 species) and for other ethnobotanical purposes (39 species) by the indigenous tribes of the state associated with the increasing demand in pharmaceutical industries, have posed a major threat to the

Table 5. The number of endemic species at different centers of endemism in Meghalaya

Locations	Total number of endemic species	Percentage of the total endemics (Out of the total 239)
Jowai	61	25.5
Jarain	51	21.3
Nokrek	42	17.6
Shillong	41	17.2
Balphakram	39	16.3
Raliang	36	15.1
Ialong	35	14.6
Mawsmai	22	9.21
Mawphlang	21	8.79
Sohra-rim	10	4.18
Pynursla	9	3.77
Nartiang	8	3.35
Nongkhyllem	6	2.51
Nongkrem	5	2.09
Nongstoin	4	1.67
Mawsynram	4	1.67
Nongpoh	3	1.26
Umsaw	2	0.84
Umling	2	0.84

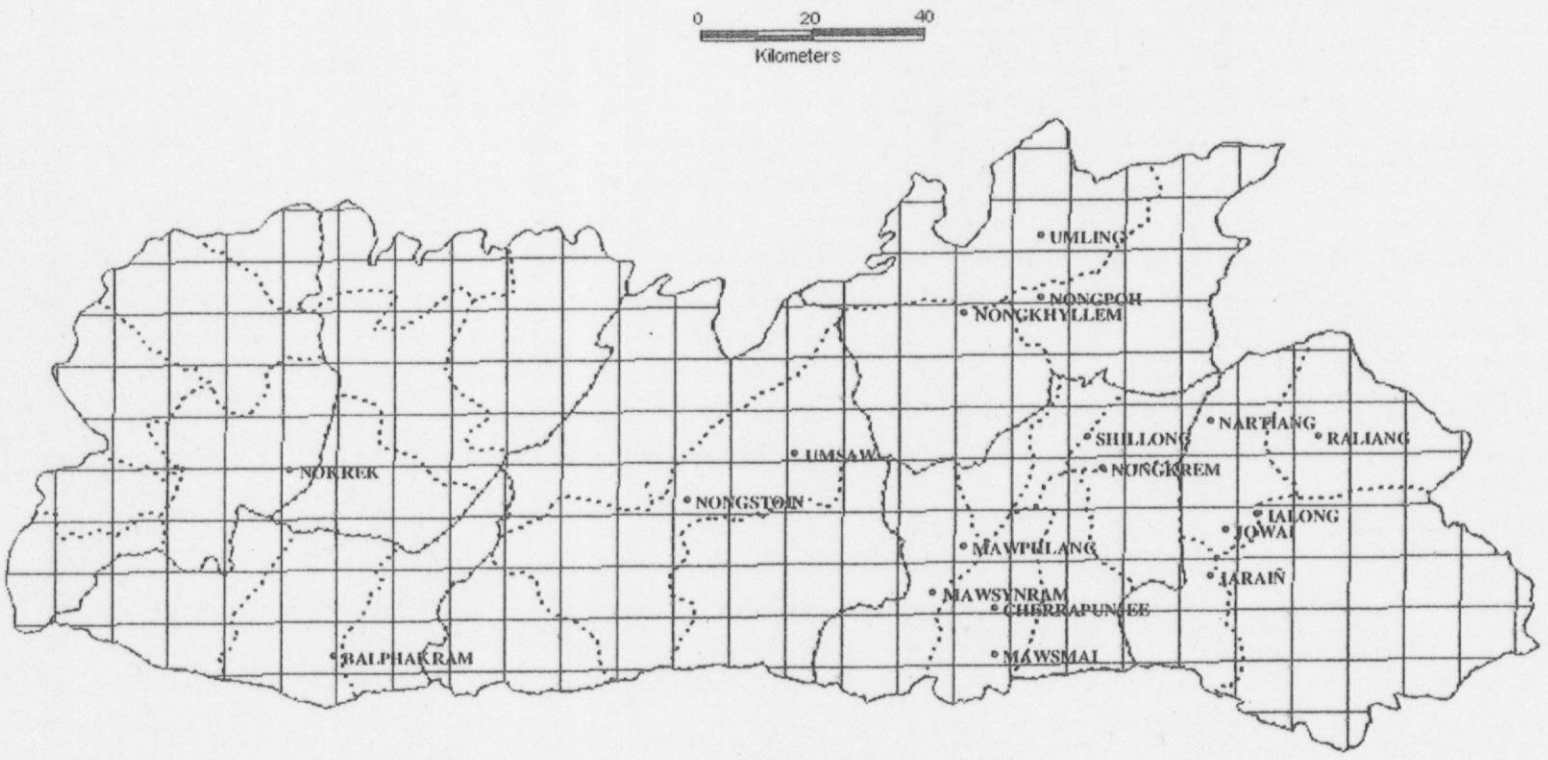

Fig. 6. Map of Meghalaya showing the area of concentration of endemics.

existence of these species. Over-exploitation, unsustainable harvesting techniques, over-dependence on the plants from wild origin and no concern for conservation of their populations are depleting their population size in the wild to an alarming level. Therefore, conservation measures for these species need to be taken up urgently. In order to undertake an effective conservation measure, identification of conservation areas is a prerequisite. The areas identified as centres of endemism in this study are recommended for conservation areas, where complete habitat protection and ban on collection of plant resources should be enforced. Besides, species-specific special conservation measures may be introduced for the betterment of these endemics.

References

Balakrishnan, N.P. 1981–83. Flora of Jowai and its vicinity, Meghalaya. 2 Vols. BSI, Howrah.

Das, S. and N.C. Deori. 1983. A census of endemic orchids of North-Eastern India. In: *An Assessment of Threatened Plants of India.* S.K. Jain and R.R. Rao (eds.) pp. 104–9. Howrah: Botanical Survey of India.

Dhar, U. 2002. Conservation implications of plant endemism in high-altitude Himalaya. *Current Science.* **82(2):**141–154.

Haridasan, K. and R.R. Rao. 1985–87. Forest Flora of Meghalaya. Vol. 1, Bishen Singh, Mahendrapal Singh. Dehradun, India.

Haridasan, K., G.P. Shukla and B.S. Beniwal 1995. Medicinal Plants of Arunachal Pradesh. SFRI, Itanagar, India.

Hooker, J.D. 1854. *Himalayan Journals.* 2 vols.

Jain, S.K. and A.R.K. Sastry. 1984. The Indian Plant Red Data Book-I. Botanical Survey of India, Dept of Environment.

Kanjilal, U.N., P.C. Kanjilal, A. Das, R.N. De and N.L. Bor. 1934–40. Flora of Assam. 5 Vols. Govt. press, Shillong.

Khan, M.L., M. Shaily and S.B. Kamaljit. 1997. Effectiveness of the protected area network in biodiversity conservation, a case study of Meghalaya state; *Biodiversity and Conservation* 6:853–868.

Kumar, Y. 1988–89. Floristic studies on Balphakram wildlife sanctuary in Meghalaya–5: Rare, Endemic or Threatened flora. *J. Meghalaya Sci. Soc.* 11 and 12:33–48.

Maikhuri, R. and A. Gangwar. 1993. Ethnobiological notes on the Khasi and Garo tribes of Meghalaya, *Northeast India. Econ. Bot.* 47(4):345–357.

Myers, N., C.G. Mittermeier, G.A.B. da Honseca and J. Kent. 2000. Biodiversity Hot Spots for Conservation Priorities. *Nature.* 403:853–858.

Nayar, M.P. and A.R.K. Sastry. 1988. *Red Data Book of Indian Plants.* Vol I. Botanical Survey of India, Howrah.

Nayar, M.P. and A.R.K. Sastry. 1989. *Red Data Book of Indian Plants.* Vol II. Botanical Survey of India, Howrah.

Nayar, M.P. and A.R.K. Sastry. 1990. *Red Data Book of Indian Plants.* Vol-III. Botanical Survey of India, Howrah.

Peterson, A.T. and D.M. Watson. 1998. Problems with areal definitions of endemism: The effects of spatial scaling. *Journal of Biogeography.* 4(4):189.

Rao, R.R. and K. Haridasan. 1982. Notes on the distribution of certain Rare, Endangered or Endemic plants of Meghalaya with a brief remark on the flora. *J. Bombay. Nat. Hist. Soc.* 79(1):93–99.

Shevock, J.R. 1996. Status of Rare and Endemic plants. Assessment and scientific basis for management options. Vol. II. Chapter 24.

Trivedi, P.C. (ed.). 2002 Ethnobotany. Aavishkar Publishers. xvi, p. 455.