

## Concentration of endemic plant species in some community forests in Nagaland, Northeast India

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### Abstract

Nagaland in Northeast India constitute, part of 'Indo-Burma hotspots of biodiversity conservation area' and is very rich in biodiversity and unique in its vegetation. Floristic study conducted in four community forests of Nagaland revealed presence of 73 endemic species, 18 rare species and 13 species to be either threatened or endangered, out of 520 species recorded in these forests. Some of these species have potential economic value. Community forests in Nagaland are patches of ancient forest owned and protected by the indigenous communities of the villages. Most of the floristic components of the region are present in these forests due to the close relationship of the people with nature and their cultures being deeply rooted in the biodiversity of the area. The study emphasizes the need of conservation of these species before they are completely extinct from the region under severe biotic stresses.

**Key words:** Community forests, endemic, rare, endangered plants, Nagaland, Northeast India

### INTRODUCTION

Endemism is one component of biodiversity that particularly interests biologist and plant enthusiasts (Stebbins & Major 1965; Kruckeberg & Rabinowitz 1985). Endemism is an important concept in conservation biology and documentation of endemics is helpful to understand the past vegetation history, to characterize floristic regions, and to study taxonomic relationships and distribution of species. An endemic species is one that evolved in and has remained restricted to a particular place (Quammen 1996).

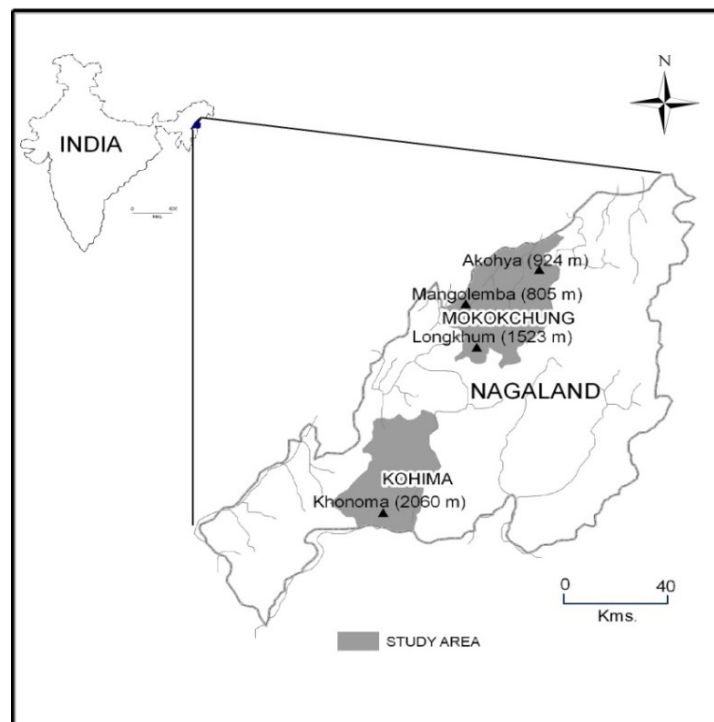
It is estimated that about 8 % of the world's known plant species are at the verge of extinction (Chapin *et al* 2000). In India serious studies on endemic plant species started only in 1960s after which many important papers on rare, endangered and endemic plant species of India have been published (Subramanyam & Sreemadhavan 1969; Rao 1972; Subramanyan & Nayar 1974; Nayar 1977; Raghavan & Singh 1983; Vajravelu & Daniel 1983; Jain & Rao 1983; Raghavan & Singh 1984; Singh & Raghavan 1986; Mistry & Almieda 1989; Nayar & Sastry 1987 – 1990 and Yadav 1997a, b). Of the estimated 17000 species of flowering plants in India, 5725 (33.5 %) are found to be endemic to India (Nayar 1996). According to Chatterjee (1940, 1962), about 60 % of the Indian flora is of Indian origin and out of which 40 % being exclusively endemic to India. At the confluence of the Indian-Malayan, Indo-Chinese and Indian biogeographical realms, the Northeast region is unique in providing a profusion of habitats, which features diverse biota with a high level of endemism (Chatterjee *et al* 2006). North-east India with only 8 % of the total geographical area of India supports about 50 % of the floristic wealth of India. Of the known species in the region, about 10 % are considered to be endemics.

The state of Nagaland is floristically rich by virtue of its geographical location, varied forest types and topography. This region (i.e. North-east India) is part of two IUCN recognized Hotspots

for Biodiversity conservation, the *Himalaya Hotspot* and *Indo-Burma Hotspot* priority areas of the world (Meyers *et al* 2000; Conservation International 2005). The scientists at the Botanical survey of India and the universities of this region have conducted floristic surveys in the past (Jamir & Rao 1988; Changkhija 1992; Gurung 1993; Hynniewta 1994), which have contributed to the understanding of the floristic diversity in the state. The present paper enumerates the endemic flowering species of plants found in four community forests of Nagaland, which have not been explored so far. Community forests in Nagaland are patches of ancient forest owned and protected by the indigenous communities of the villages. The community forests in Nagaland are the most valuable natural resource that provides livelihood and subsistence for the rural population in Nagaland. Their relation with these forests is not merely for materialistic and economic purposes, it is a social and religious one. The endemic species recorded from the study areas may not be necessarily endemic to Nagaland; rather they are endemic to the entire Northeast India and the whole of Eastern Himalayan region or may be for the Himalayas.

### Study area

Nagaland with its geographical area of 16527 sq km, a hilly state of the Northeast India, is located between 25° 10'2" and 27° 42' N latitude and 93° 15'2" and 95° 15'2" E longitude and has an altitudinal range of 194 m to 3826 m amsl. Four community forests selected for the study are located at Akhoya, Mangkolemba, Longkhum and Khonoma (Fig 1). Akhoya, Mangkolemba and Longkhum fall under Mokokchung district and Khonoma under Kohima district. The Mokokchung district is the home of the Ao-Naga tribe. Mangkolemba is situated at an altitude of 805 m asl located 66 km north west of Mokokchung. Akhoya is located 40 km north-east of Mokokchung at an altitude of 924 m, and Longkhum is situated at an altitude of 1523 m, about 17 km to the south-west of Mokokchung. Kohima district is located at 25.67° N latitude and 94.12° E longitude. Study site in Khonoma is located 20 km to the west of Kohima, at an altitude of 2060 m. Location Map of the study sites are shown in Figure 1



**Figure 1.** Location map of the study area

### ***Climate***

The climate of Nagaland is monsoonal with high humidity levels. Generally, the climate of Nagaland is warm over the foot hills, moderate in the mid slopes and temperate over higher hills. The average annual rainfall varies between 200 and 250 cm, concentrated in the months of May to September. The average relative humidity varies from 75 % to 90 %. The average maximum and minimum temperatures during summer and winter seasons are 32 & 12 °C and 25 & 5 °C respectively.

## **MATERIALS AND METHODS**

Floristic studies in four selected community forests were conducted in different seasons for two annual seasonal cycles. Plant species collected during field visits were processed and mounted on herbarium sheets and identified with the help of different floras covering this region (Hooker 1872-'97; Kanjilal *et al* 1934 – 1940; Haridasan & Rao 1985 – 1987; Balakrishnan 1981 – 1983; Gamble 1984; Kurz 1974; Brandis 1971). Voucher specimens of these plants have been deposited in the herbarium of Botany department, Nagaland University. List of endemic, rare and endangered species were prepared with the help of published literature (Hooker 1872 – 1997; Haridasan & Rao 1985 – 1987; Chatterjee 1940; Deb 1958; Balakrishnan 1981 – 1983; Das & Deori 1983; Rao & Haridashan 1983; Kumar 1991; Samant *et al* 1996; Khan *et al* 1997; Hynniewata *et al* 2000; Chowdhury 1998, 2001; Bhujel & Das 2002; Deb *et al* 2003; Jamir & Pandey 2003; Das 2004; Lakadong & Barik 2006, Chettri *et al* 2008). Endemism was recognized on the basis of phytogeographical distribution of different species and may be in one of the following categories:

- I. Endemic to Nagaland
- II. Endemic to North-East India
- III. Endemic to North-East India and Eastern Himalaya; and
- IV. Himalayan plants extending to North-East India.

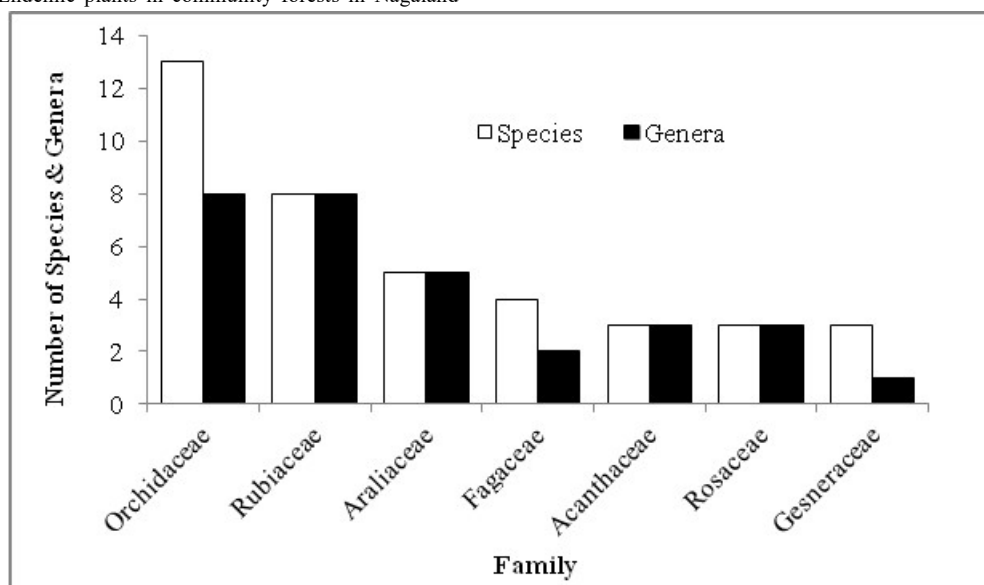
## **RESULTS AND DISCUSSION**

### ***Taxonomic diversity of the endemics***

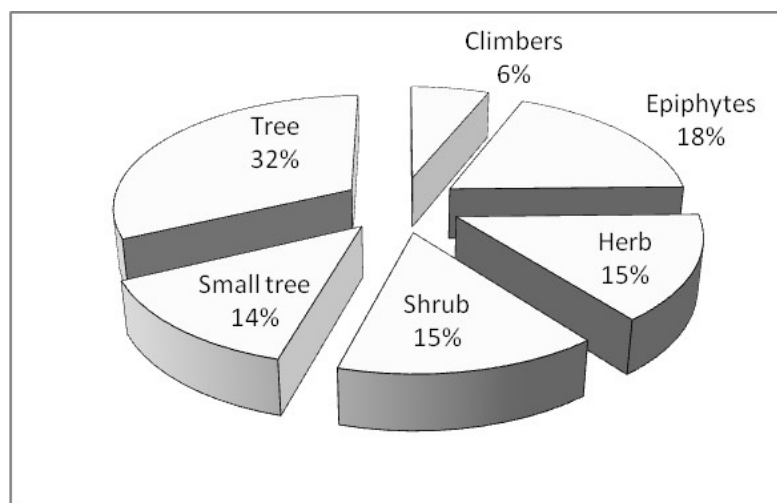
The list of the endemic plant species recorded in the four community forests, their status and distribution is given in Table 1. The results show that out of 520 plant species recorded from the four community forests, 81 species belonged to one of the three categories viz. endemic, rare and endangered. 73 species were found to be endemic of different categories while nine species were both rare and endemic. A total of 17 rare species were also recorded from the study sites and 10 species as endangered and threatened. The total species represented 40 families and 68 genera. Monocotyledons were represented by 19 species while the remaining 62 species are Dicotyledonous. Orchidaceae with 13 species from 8 genera, Rubiaceae with 8 species from 8 genera, Araliaceae with 5 species from 5 genera and Fagaceae with 4 species from 2 genera had the higher number of endemic species (Figure 2).

### ***Habits groups of endemic plant species***

An analysis of the habit groups of the endemic plants shows that the maximum number of endemic species was trees (32 %). This was followed by epiphytes (18 %), shrubs (15 %), small trees (14 %), Herbs (15 %) and climbers with 6 % (Fig. 3). Habit wise distribution of endemic species reported by Ganesh *et al* (1996) in the forest vegetation of South India is 20 % trees, 16 % shrubs, 52 % herbs and 11 % climbers while Khan *et al* (1997) reported 23 % trees, 30 % shrubs, 38.6% herbs and 8 % climbers in the flora of Meghalaya (Fig 3). But in the presently explored vegetation as much as 46 % of the recorded endemic flora are trees.



**Figure 2.** Dominant families showing number of endemic genera and species



**Figure 3:** Habit- wise distribution of the endemic plant species.

**Table 1.** List of the Endemic, Rare and Endangered plants found in Nagaland, North-east India [Abbreviations used: Tr = Tree; Ep = Epiphytes; St = Small tree; S = Shrub; H = Herb; C = Climbers; Sc = Scandent; E = Endemic; R = Rare; En = Endangered; T = Threatened]

Name of species [Family]; Exsiccate	Habit	Status	Distribution
<i>Acer laevigatum</i> Wallich [Aceraceae]; JN-02	Tr	E,R	Temperate Himalayas, Sikkim, Meghalaya, Nagaland (Longkhum)
<i>Acer oblongum</i> Wallich [Aceraceae]; JN-04	Tr	R	Eastern Himalayas, North-east India; Mangkolemba in Nagaland
<i>Actinodaphne obovata</i> Blume [Lauraceae]; JN-07	Tr	E	Eastern Himalaya, Meghalaya, Nagaland (Longkhum, Mangkholemba, Akhoya)
<i>Aeschynanthus grandiflora</i> Sprengel [Gesneriaceae]; JN-013	Ep	E	Confined to Northeast India; Longkhum in Nagaland
<i>Aeschynanthus parasitica</i> Clarke [Gesneriaceae]; JN-015	Ep	E	Eastern Himalaya, Meghalaya, Nagaland (Longkhum)
<i>Aeschynanthus sikkimensis</i> (Clarke) Stapf [Gesneriaceae]; JN-016	Ep	E	Temperate and subtropical Himalayas, North-east India; Khonoma in Nagaland
<i>Aralia armata</i> (G. Don) Seemann [Araliaceae]; JN-029	St	E	Myanmar, North east India; Longkhum in Nagaland

Name of species [Family]; Exsiccate	Habit	Status	Distribution
<i>Aeschynanthus sikkimensis</i> (Clarke) Stapf [Gesneriaceae]; JN-016	Ep	E	Temperate and subtropical Himalayas, North-east India; Khonoma in Nagaland
<i>Aralia armata</i> (G. Don) Seemann [Araliaceae]; JN-029	St	E	Myanmar, North east India; Longkhum in Nagaland
<i>Ardisia virens</i> Kurz [Myrsinaceae]; JN-033	S	E	North-east India; Akhoya in Nagaland
<i>Arisaema petiolulatum</i> Hooker f. [Araceae]; JN-035	H	E	Khasia hills, Manipur, Nagaland (Longkhum)
<i>Aristolochia platanifolia</i> Duchartre [Aristolochiaceae]; JN-37	C	E	Eastern Himalaya to North east India; Akhoya, Longkhum in Nagaland
<i>Begonia griffithii</i> Hooker [Begoniaceae]; JN-052	H	E	Bhutan, Nagaland (Akhoya)
<i>Begonia sikkimensis</i> A. DC. [Begoniaceae]; JN-054	H	E	Sikkim, Darjeeling, Nagaland (Longkhum)
<i>Brassaiopsis hainla</i> Seemann [Araliaceae]; JN-066	St	E	Temperate Himalaya from Nepal to Bhutan, Nagaland (Longkhum)
<i>Bulbophyllum acutiflorum</i> Hooker f. [Orchidaceae]; JN-017	Ep	R, En	Nagaland (Longkhum)
<i>Bulbophyllum wallichii</i> Lindley [Orchidaceae]; JN-077	Ep	R	Sub tropical Himalayas, Nagaland (Longkhum)
<i>Calamus floribundus</i> Griffith [Arecaceae]; JN-078	Tr	E	Sikkim, North-east India; Longkhum in Nagaland
<i>Calanthe biloba</i> Lindley [Orchidaceae]; JN-079	H	E	Temperate Himalaya, East Nepal, Sikkim, Nagaland (Longkhum)
<i>Calanthe manni</i> Hooker f. [Orchidaceae]; JN-080	H	R, En	Western Himalaya, Khasai hills, Nagaland (Mangkolemba)
<i>Camellia kissi</i> Wallich [Theaceae]; JN-085	St	E	Eastern Himalaya, Assam, Khasai hills, Nagaland (Longkhum)
<i>Clematis accuminata</i> DC. [Ranunculaceae]; JN-111	C	E	Temperate Himalaya from Garwhal to Bhutan, Upper Assam, Mishmi and Patkay hills, Nagaland (Khonoma)
<i>Clerodendrum bracteatum</i> Wallich [Verbenaceae]; JN-112	S	E	North-east India and Himalayas; Akhoya in Nagaland
<i>Commelina sikkimensis</i> Clarke [Commelinaceae]; JN-119	H	E	Sikkim Himalaya, Khasia hills, Nagaland (Longkhum, Akhoya, Mangkholemba, Khonoma)
<i>Daphne papyraceae</i> Wallich [Thymelaeaceae]; JN-132	S	E	Temperate Himalaya from Chamba to Bhutan, Khasia hills, Nagaland (Longkhum)
<i>Dendrobium crysotoxum</i> Lindley [Orchidaceae]; JN-137	Ep	E,R,T	North-east India; Akhoya, Longkhum in Nagaland
<i>Dendrobium densiflorum</i> Wallich [Orchidaceae]; JN-138	Ep	E,En,T	Tropical Himalaya, Khasia hills, Nagaland (Longkhum)
<i>Docynia indica</i> (Wallich) Decaisne [Rosaceae]; JN-152	Tr	E	Eastern Himalaya, Sikkim, Bhutan, Khasia, Nagaland (Longkhum) Khonoma
<i>Elaeocarpus lanceaefolius</i> Roxburgh [Elaeocarpaceae]; JN-163	Tr	E	Eastern Himalaya, Sikkim, Bhutan, North-east India; Longkhum in Nagaland
<i>Elatostema platyphyllum</i> Weddell [Urticaceae]; JN-167	H	E	Tropical Himalaya, Kaumaon, Sikkim, Khasia hills, Naga hills; Khonoma in Nagaland
<i>Eranthemum palatiferum</i> Nees [Acanthaceae]; JN-173	H	E	Sub tropical Sikkim, Khasia hills, Bhutan, Assam, Nagaland (Akhoya)
<i>Eria biflora</i> Griffith [Orchidaceae]; JN-175	Ep	E,R	Nagaland (Mangkolemba)
<i>Eria stricta</i> D. Don [Orchidaceae]; JN-176	Ep	E,R	Eastern Himalaya, Nepal, Nagaland (Khonoma)
<i>Fraxinus floribunda</i> Wallich [Oleaceae]; JN-200	Tr	R	Temperate and Sub-tropical Himalaya, Nagaland (Akhoya)
<i>Galeola falconeri</i> Hooker f. [Orchidaceae]; JN-202	H	E,R,En	Sub tropical Himalaya, Nagaland (Longkhum, Khonoma)

Name of species [Family]; Exsiccate	Habit	Status	Distribution
<i>Fraxinus floribunda</i> Wallich [Oleaceae]; JN-200	Tr	R	Temperate and Sub-tropical Himalaya, Nagaland (Akhoya)
<i>Galeola falconeri</i> Hooker f. [Orchidaceae]; JN-202	H	E,R,En	Subtropical Himalaya, Nagaland (Longkhum, Khonoma)
<i>Garcinia anomala</i> Planchon & Triana [Clusiaceae]; JN-203	Tr	E	Eastern Himalaya to North-east India; Longkhum in Nagaland
<i>Garcinia pedunculata</i> Roxburgh [Clusiaceae]; JN-205	Tr	E	Eastern Himalaya to North-east India; Akhoya, Longkhum in Nagaland
<i>Glochidion khasicum</i> Hooker [Euphorbiaceae]; JN-211	Tr	E	Sikkim Himalaya, Khasia hills, Nagaland (Longkhum)
<i>Gynocardia odorata</i> R. Brown [Flacourtiaceae]; JN-218	Tr	E	Eastern Himalaya to North-east India; Longkhum, Mangkholemba in Nagaland
<i>Hedera nepalensis</i> K. Koch [Araliaceae]; JN-219	C	E,T	North-East India; Khonoma in Nagaland
<i>Ilex thomsonii</i> Hooker [Aquifoliaceae]; JN-240	Tr	E	Eastern Himalaya, Bhutan, Khasia hills, Nagaland (Khonoma)
<i>Itea macrophylla</i> Wallich [Iteaceae]; JN-246	St	E	Eastern Himalaya to North-east India, Nagaland- Akhoya, Longkhum
<i>Ixora subsessilis</i> G. Don [Rubiaceae]; JN-247	St	E	North-east India; Longkhum in Nagaland
<i>Lasianthus hookeri</i> Clarke [Rubiaceae]; JN-259	S	E	Endemic to Meghalaya & Nagaland (Longkhu, Mangkholemba, Akhoya)
<i>Leea indica</i> (Burman.f.) Merrill [Leeaceae]; JN-260	St	E	Eastern Himalaya to North east India; Akhoya, Mangkolemba in Nagaland
<i>Leucosceptrum canum</i> Smith [Lamiaceae]; JN- 265	St	E,R	Temperate and sub-Himalayas; Longkhum in Nagaland
<i>Lithocarpus elegans</i> (Blume) Hatusima [Fagaceae]; JN-270	Tr	E	Tropical Himalayas, North East India; Longkhum, Akhoya in Nagaland
<i>Lithocarpus fenestrata</i> (Kurz) Rehder [Fagaceae]; JN-271	Tr	E	North east India; Longkhum in Nagaland
<i>Lithocarpus pachyphylla</i> (Kurz) Rehder [Fagaceae]; JN-272	Tr	E	Sikkim-Darjeeling Himalaya, Manipur, Nagaland (Khonoma)
<i>Livistonia jenkinsiana</i> Griffith [Arecaceae]; JN-277	Tr	E, R,En	North-East India; Akhoya, Longkhum, Mangkolemba, Khonoma in Nagaland
<i>Luculia pinceana</i> Hooker [Rubiaceae]; JN-281	H	E	North-eastern India; Longkhum in Nagaland
<i>Magnolia griffithii</i> Hooker f. & Thomson [Magnoliaceae]; JN-287	Tr	En,T	Assam & Nagaland (Mangkolemba)
<i>Magnolia hodgsonii</i> (Hooker) H. Keng [Magnoliaceae]; JN- 288	Tr	E	Eastern Himalaya, North-east India; Akhoya, Mangkholemba in Nagaland
<i>Mallotus roxburghianus</i> Mueller Argoviensis [Euphorbiaceae]; JN-291	Tr	E	Eastern Himalaya to North east India; Longkhum in Nagaland
<i>Morinda angustifolia</i> Roxburgh [Rubiaceae]; JN-308	S	E	Eastern Himalaya to North east India; Akhoya, Mangkolemba in Nagaland
<i>Neillia thyrsoiflora</i> D. Don [Rosaceae]; JN-315	S	E	Eastern Himalaya to Northeast India, Nagaland (Longkhum, Khonoma)
<i>Nostolachma khasiana</i> (Korthals) Deb & Lahiri [Rubiaceae]; JN-320	S	E	Northeast India; (Longkhum)
<i>Pentapanax racemosum</i> Seemann [Araliaceae]; JN-340	Tr	E	Sikkim, Khasia hills, Nagaland (Akhoya, Longkhum)
<i>Photinia cuspidata</i> (A. Bertoloni) N.P. Balakrishnan [Rosaceae]; JN-353	St	E	Endemic to Meghalaya & Nagaland (Longkhum)
<i>Phlogacanthus tubiflorus</i> Nees [Acanthaceae]; JN-345	S	E	Eastern Himalaya to North East India; Akhoya, Mangkolemba in Nagaland
<i>Picrasma javanica</i> Blume [Simaroubaceae] JN-355	Tr	R	Eastern Himalaya to Northeast India, Nagaland- Akhoya
<i>Piper griffithii</i> A. DC. [Piperaceae]; JN-359	C	E	Northeast India; Mangkolemba in Nagaland
<i>Pleione humilis</i> Linnaeus [Orchidaceae]; JN-365	Ep	E	Temperate Himalaya, Nepal, Sikkim, Nagaland (Khonoma)

Name of species [Family]; Exsiccate	Habit	Status	Distribution
<i>Piper griffithii</i> A. DC. [Piperaceae]; JN-359	C	E	Northeast India; Mangkolemba in Nagaland
<i>Pleione humilis</i> Linnaeus [Orchidaceae]; JN-365	Ep	E	Temperate Himalaya, Nepal, Sikkim, Nagaland (Khonoma)
<i>Pleione maculata</i> Lindley [Orchidaceae]; JN-366	Ep	E,En	Nepal, Sikkim, Bhutan, Khasia hills; (Longkhum)
<i>Pogostemon strigosus</i> Bentham [Lamiaceae]; JN-367	H	E	North-east India; Longkhum in Nagaland
<i>Pollia pentasperma</i> Clarke [Commelinaceae]; JN-368	H	R, En	Khasai hills, Manipur, Nagaland (Longkhum)
<i>Psychotria erratica</i> Hooker [Rubiaceae]; JN-394	S	E	Eastern Himalayas; Longkhum in Nagaland
<i>Pynularia edulis</i> A.DC. [Santalaceae]; JN-399	St	R, E	Temperate and Subtropical Himalayas; Longkhum in Nagaland
<i>Quercus lamellosa</i> Smith [Fagaceae]; JN-400	Tr	E	Eastern Himalaya, Nepal, Bhutan, Naga hills, Duphla hills, Manipur; Khonoma in Nagaland
<i>Randia fasciculata</i> DC. [Rubiaceae]; JN-401	Tr	E	Himalayas, North-east India; Longkhum in Nagaland
<i>Rhaphidophora glauca</i> Schott [Araceae]; JN-405	Ep	E	Tropical & Sub-tropical Himalayas, Khasia hills, Nepal, Naga & Manipur hills; Nagaland- Longkhum, Akhoya, Mangkholemba, Khonoma in Nagaland
<i>Rhynchosstylis retusa</i> Blume [Orchidaceae]; JN-409	Ep	E,R,En	Northeast India; Mangkolemba in Nagaland
<i>Salix pilostigma</i> Anderson [Salicaceae]; JN-419	S	E	Endemic to Meghalaya & Nagaland (Khonoma)
<i>Saurauja punduana</i> Wallich [Saurauiaceae]; JN-427	St	E	Eastern Himalaya to North-east India; Longkhum, Mangkolemba in Nagaland
<i>Stephania elegans</i> Hooker & Thomson [Menispermaceae]; JN-452	C	E	Sub-tropical Himalayas, Sikkim, Khasia hills; Longkhum in Nagaland
<i>Streblus indicus</i> (Bur.) Corner [Moraceae]; JN-450	Tr	E	North-east India; Longkhum in Nagaland
<i>Strobilanthes denticulatus</i> T. Anderson [Acanthaceae]; JN-457	S	E	North-east India; Akhoya in Nagaland
<i>Syzygium kurzii</i> (Duthie) Balakrishnan [Myrtaceae]; JN-464	Tr	E	Eastern Himalaya to North-east India; Longkhum in Nagaland
<i>Tupidanthus calypttratus</i> Hooker f. & Thomson [Araliaceae]; JN-494	Tr	E, R	Myanmar, Khasi hills; Akhoya, Mangkolemba, Longkhum in Nagaland
<i>Vaccinium vacciniaceum</i> Sleumer [Vacciniaceae]; JN-501	Ep	E	North-east India; Khonoma in Nagaland
<i>Vanda coenulea</i> Griffith ex Lindley [Orchidaceae]; JN-503	Ep	E,R,En	Khasia & Jayantia mts; Longkhum in Nagaland
<i>Wendlandia wallichii</i> Wight & Arnott [Rubiaceae]; JN-516	St	E	Eastern Himalaya to North east India; Longkhum in Nagaland
<i>Zanthoxylum acanthopodium</i> DC. [Rutaceae]; JN-518	S	E	Himalayas and North-east India; Khonoma in Nagaland

### ***Economic values of the endemic species***

Out of the 73 endemics recorded 5 endemic species such as *Garcinia pedunculata*, *Camellia kissi*, *Piper griffithii*, etc are used medicinally and 8 species such as *Acer laevigatum*, *Calamus floribundus*, *Ixora subsessilis*, etc are used for other purposes such as house construction, furniture, ornamental etc by the local indigenous community (Table 2). The common ailments treated by these endemic species include dysentery, cough, urinary and stomach problems, diarrhea and dysentery while *Gynocardia odorata* is occasionally used for the poisoning of rats.

**Table 2.** List of the economically valuable species of endemic plants recorded from Mokokchung and Kohima districts of Nagaland

Name of the species [Family]	Parts used	Uses
<b>A. Medicinal plants</b>		
<i>Garcinia pedunculata</i> Roxburgh [Clusiaceae]	Fruit	Dysentery, cough, urinary treatment
<i>Camellia kissi</i> Wallich [Theaceae]	Root	Skin disease
<i>Hedera nepalensis</i> K. Koch [Araceae]	Whole plant	Antiseptic
<i>Piper griffithi</i> A.DC. [Piperaceae]	Leaf, stem and fruit	Stomach problems, diarrhea, dysentery
<i>Gynocardia odorata</i> R. Brown [Flacourtiaceae]	Fruit	Poisoning of rats
<b>B. Miscellaneous uses</b>		
<i>Acer laevigatum</i> Wallich [Aceraceae]	wood	Planking and construction
<i>Calamus floribundus</i> Griffith [Arecaceae]	Canes, Fruits	Furniture, fruits edible
<i>Garcinia pedunculata</i> Roxburgh [Clusiaceae]	Fruit	Edible
<i>Hedera nepalensis</i> K. Koch [Araliaceae]	Whole plant	Ornamental
<i>Ixora subsessilis</i> G. Don [Rubiaceae]	Flower	Ornamental
<i>Saurauja punduana</i> Wallich [Saurauiaceae]	Fruit	Edible
<i>Streblus indicus</i> (Bur.) Corner [Moraceae]	Latex	Painting

The present study showed high concentration of endemic plant species having a distribution restricted to the Eastern Himalayas or adjoining areas. The main reason of the high concentration of endemics is geographical location of the state at the confluence of Indo-Malayan and Indo-Chinese regions (Rao 1994). Though only few endemic species in the area were mentioned by the inhabitants to have economic value, there is need to explore the full potential of these natural resources.

Due to high level of exploitation and lack of awareness many endemic species are becoming rare (Haridasan *et al* 1995). Large number of biotic stresses such as frequent fire, over grazing, jhum cultivation and expansion of human settlements including agricultural land in the region are causing damage to the natural vegetation and depleting of the population size of endemic and rare species to an alarming level. Due to these practices some important species such as the timber producing *Acer laevigatum* (rare and endemic), Ornamental *Hedera nepalensis* (endemic and threatened), *Leucosceptrum canum* (rare and endemic), and *Pyralia edulis* (rare and endemic) which were abundant in the region in the past are now rarely found. Therefore, there is urgent need to undertake concerted efforts to conserve these species through active involvement of people of the region.

### CONCLUSION

It is now concluded that the community forests in Nagaland are rich in endemic plant species. These species are threatened by a variety of anthropogenic disturbances and are becoming endangered and finally facing extinction. Concerted efforts are required to conserve these species.

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