

STATUS OF THREATENED ETHNO-MEDICINAL PLANTS FROM IMPHAL VALLEY (MANIPUR), INDIA

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ABSTRACT

Survey of Rare, Endemic and Threatened (RET) ethno-medicinal plants was carried out in 24 locations of Imphal valley, Manipur State, during June, 2018 to March 2020. Distribution pattern, status, threats and conservation aspects 32 RET plants were studied. Information on traditional medicinal uses were also collected from the surrounding villagers. Population many plant species has been found to be drastically reduced due to habitat loss, over-exploitation, improper conservation methods and forest fires.

Keys words: RET, Ethno-medicinal plants, Imphal valley, over-exploitation forest fires, conservation.

Introduction:

According to International Union for Conservation of Nature (IUCN, 2010) the vascular plants have been classified into nine categories e.g. Extinct (EX), Extinct in the Wild (EW), Regionally Extinct (RE), Critically Endangered (CR), Endangered (EN), Vulnerable (VU), Near Threatened (NT), Least Concern (LC) and Data Deficient (DD). Several lists of rare plants have been developed over the years for a various purposes. Endemic plants are restricted to an area, which may range from a small habitat to bio-geographical region. Endemism is a significant factor in diversity assessment and conservation.

The Manipur state lies in the North-eastern part of the Indian sub-continent which is blessed with a unique biodiversity and diverse ecosystems with specific biological components. It falls under the Indo-Burma (IBR) hotspot region which ranks 8th amongst the 34 biodiversity hotspots of the world (Meyers *et al.*, 2000). This hotspots is likely to

lose most plants and vertebrates as a result of reducing forest area, which is still continuing (Brooks *et al.*, 2002). A conservative estimate of plant diversity in the hotspot reveals about 13,500 species of vascular plant, of which 7000 (52%) are endemic (Van Dijk *et al.*, 2004), with gradually increasing number of threatened plant species. The flora Manipur state is blessed with nearly 4000 Angiospermic plant species including approximately 450 medicinal plants.

Since time immemorial, the use of traditional medicine and consultations with traditional healers for the treatment of various primary health ailments is widely acknowledged in Manipur. The people of Manipur continued the use of folk-medicine till recent years even though modern medical science is well established. There are many reports on folkloric treatment with herbal medicines by the various communities in Manipur (Ahmed and Singh, 2007; Sinha, 1987,1996; Singh, 2009; Singh *et al.*, 1996; 1997; Lokho, 2012; Singson *et al.*, 2016).

Habitat degradation, unsustainable

harvesting and over-exploitation of medicinal plants led to the extinction of more than 150 plant species (Singh and Rawat, 2011), due to unscientific collection of drugs from natural habitat (Shankar and Rawat, 2013). Continuous exploitation of medicinal plants from is leading to substantial loss of their habitat during past 15 years (Kala, 2003), which resulted in population decline of many valuable medicinal plant species.

So far, little research work has been undertaken in the field of RET plants of Manipur state. However, Devi and Das (2016) studied the occurrence of some rare and threatened vascular plants in Senapati District of Manipur. Singh *et al.* (2017) studied the status of threatened ethno- medicinal plants from sub- alpine areas of Ukhrul and Senapati districts of Manipur and reported 18 taxa belonging to 16 families and 16 genera.

Except few reports, there is insufficient information regarding availability of the threatened ethno-medicinal plants of Manipur with regards to their distribution, status, habitat and traditional methods of collection.

Considering these aspects, present study was an attempt to undertake detail vegetation study of the threatened medicinal plants found in sub alpine region of Manipur. Moreover, the causes of disappearance and best conservation and management approach for the observed species will also be discussed. This will allow an appropriate conservation measures as a guide to future conservation efforts of some threatened ethno-medicinal plants (Singh *et al.*, 2017).

Keeping above facts in view, present work has been undertaken to assess the threatened ethno-medicinal plants found in Imphal valley.

Material and Methods::

The present study was carried out during June 2018 to March 2020 at Manipur. state of India, It shares national boundary with Nagaland, Mizoram and Assam to the North, South and West respectively while bordered by the international boundary of Burma to the East. The state is blessed with a unique

topography of having a small lacustrine oval shaped alluvial valley encircled by ninety percent tract of hilly terrains that belong to the alpine system of the young fold mountains of Himalaya.

It has 16 districts viz., Churachandpur, Ukhrul, Tamenglong, Chandel, Senapati, Kamjong, Kangpokpi, None, Pherzawl, Jiribam, Tengnoupal, Imphal West, Imphal East, Thoubal, Bishnupur and Kakching. The later five districts belong to the Imphal valley of Manipur. The southwest monsoon is the primary source of rainfall and climatic pattern throughout the state. It receives average annual rainfall of 1600-3430 mm and is characterized by pleasant subtropical monsoon type of climate with temperature ranging from subzero to 36 °C. Seventy percent of the rainfall is restricted to the hilly areas.

The plants were collected from the Imphal valley of the study sites during repeated field survey conducted during June, 2018 to March 2020; Categorization of RET plants and selection of planting materials were conducted from the naturally available locations. Twenty four (24) study sites of Imphal valley, Manipur State were selected, viz.: *Imphal West District*: Khongampat, Iroisemba, Chingmeirong, Langjing, Langthabal; *Imphal East District*: Heingang, Nongdam, Nongmaijing, Andro, Ngarian and Keirao; *Bishnupur District*: Nambol, Ishok, Waithou, Yairipok, Nungshai, Ningthou-khong, Moirang and Loktak; *Thoubal District*: Tenthia, Sugnu, Serou, Kumbi and Thongjao.

The plants were identified following Clarke (1889); Kanjilal *et al.*, (1934-1940); Deb (1961 a, b); Sinha, (1987); Singh, *et al.*,(1988) and Singh *et al.*,(2000). The ethno-medicinal uses, reported by Sinha (1996); Singh *et al.*,(2003); Singh, (2009); Lokho (2012); Ningombam *et al.*, 2014; Singson *et al.*,(2016) were taken into consideration. Herbarium sheets were prepared following Jain and Rao (1977) and deposited for inclusion in the *BAMU* herbarium, Department of Botany, Dr. Babasaheb Ambedkar Marathwada University, Aurangabad; and Manipur University Museum of Plants (MUMP) herbarium, Department of Life Sciences,

Manipur University, Imphal. Author's name of the plants were reported following Brummitt and Powell (1992) and the plants names were updated using International Plant Name Index database (www.ipni.org).

Results and Discussion:

The present study was carried out at

24 sample plots, 5 of which were in West Imphal, 6 from East Imphal, 8 from Bishnupur District and 5 from Thoubal District. Altogether 32 species belonging to 22 families were recorded, of which herbs were represented by 12 species, shrubs and aquatic floating by 2, trees by 8, climbers by 4, Fern by 1 species, while 3 species were of Orchids. The enumeration of the 32 species along with their uses, distribution, locations and status has been summarized in Table 1.

Table 1. Red list category from the 24 locations of Imphal valley, Manipur.

Sl.	Species/ Family/Local Name	Reported uses	Present study	Distribution pattern	Threat
1.	<i>Actinodaphne obovata</i> (Nees) Blume var. <i>wattii</i> King/ Lauraceae/ Laikhut MUMP-002381	Leaves-urinary complaints, diabetes,	Thoubal, Langol, Nongmaijing	India, Western ghats, North eastern	Loss of habitat due to forest fire.
2.	<i>Aldrovanda vasiculosa</i> L./ Droseraceae MUMP-002380	Tonic, burnt ash of the dried plant is taken in the preparation of <i>Ooti</i> for increasing immune system	Yena-Pat, Bishnupur	Africa, Asia, Australia, Europe	Habitat destruction by the pollutant water
3.	<i>Aquilaria malaccensis</i> Lam./ Thymelaeaceae/ Agar MUMP-002377	Wood is stimulant, carminative, tonic, aphrodisiac, snake-bite	Langol, Nongmaijing	Burma, Asia, Australia, Europe	Habitat destruction by surrounding villagers
4.	<i>Arisaema lobatum</i> Engl./ Araceae/ <i>Leencheisu</i> MUMP-002341	Tubers applied as antiseptic to malignant sores	Langol, Nongmaijing	Northeast India, Central & Southern China, South-east Asian countries	Habitat destruction by surrounding villagers
5.	<i>Artabotrys hexapetalus</i> (L. f.) Bhandari/ Annonaceae/ <i>Chini-champra</i> MUMP-002376	Flowers-insect repellent, Leaves-antifertility principle, in cholera	Langol, Nongmaijing	Northeast India, South-east Asian countries	Forest fires, timber collection and trade of the plant
6.	<i>Begonia adscendens</i> C.B. Clarke/ Begoniaceae/ Banhang (in Rongmei) MUMP-000127	Whole plant is used in cough and dysentery.	Serou, Langol, Nongmaijing	Assam to Myanmar, S. Laos	Loss of habitat due to forest fire.
7.	<i>Bulbophyllum japonicum</i> Makino/ Orchidaceae MUMP-002375	Bulb used in treatment of cracks and cuts and wounds	Langol, Nongmaijing	Japan, Taiwan, Southeast China.	Forest fires, timber collection and trade of the plant

8.	<i>Canarium bengalense</i> Roxb./ Burseraceae/ <i>Mekruk</i> MUMP-002364	Leaves and bark applied externally for rheumatic swelling	Langol, Nongmaijing Khongampat	Assam to Myanmar, S. Laos	Forest fires, timber collection and trade of the plant
9.	<i>Canarium strictum</i> Roxb./ Burseraceae/ <i>Mekruk</i> MUMP-002363	Leaves and bark applied externally for rheumatic swelling	Langol, Nongmaijing Khongampat	Assam to Myanmar, S. Laos	Forest fires, timber collection and trade of the plant
10.	<i>Cinnamomum tamala</i> (Buch.-Ham.) T. Nees & Eberm./ Lauraceae/ <i>Tejpata</i> MUMP-002373	Bark/leaves-in gonorrhoea, rheumatism, colic, diarrhea, enlargement of spleen and snake-bite	Langol, Nongmaijing	Japan, Taiwan, Southeast China.	Habitat destruction by surrounding villagers
11.	<i>Cinnamomum verum</i> J. Presl./ Lauraceae/ <i>Using-sha</i> MUMP-002374	Bark and root used in bad breath / mouth freshener	Langol, Nongmaijing	India: Northeast India and western Ghats	Population decline due to overharvesting, market demand and unsustainable collection methods
12.	<i>Clerodendrum glandulosum</i> Lindl./ Lamiaceae/ <i>Kuthap</i> MUMP-002372	Leaves are used in rheumatic pain, blood pressure	Langol, Nongmaijing	India: Northeast India and western Ghats	Population decline due to overharvesting
13.	<i>Curcuma angustifolia</i> Roxb./ Zingiberaceae/ <i>Yaipal</i> MUMP-002378	Rhizomes are easily digestible, recommended for invalids and children	Langol, Nongmaijing,	India, especially in Northeast and western coastal plains and hills. It is also found in Burma, Nepal, Laos and Pakistan.	Population decline due to overharvesting
14.	<i>Curcuma caesia</i> Roxb./ Zingiberaceae/ <i>Yaimu</i> MUMP-002379	Rhizome is stimulant, carminative, used externally for sprains and bruises	Nongmaijing, Khongampat, Ishok, Nongdam, Thongjao	Northeast India, South-east Asian countries	Population decline due to overharvesting
15.	<i>Cyathea gigantea</i> (Wall. ex Hook.) Holtt. /Cytheaceae/ <i>U-charang</i> MUMP-002352	Pith used to make poultice, skin disease	Nongmaijing,	India: Assam, Arunachal Pradesh, Meghalaya, Sikkim	Population decline due to over harvesting,

16.	<i>Dendrobium densiflorum</i> Lindl./ Orchidaceae/ <i>Yerum-lei</i> MUMP-002351	Tubers are used in the treatment of bronchitis, tumors and other diseases of blood, fresh plant paste in boils and abscesses	Nongmaijing, Langol, Khongampat	Assam, Arunachal Pradesh, Meghalaya, Sikkim	Population decline due to overharvesting ,
17.	<i>Dendrobium nobile</i> Lindl./ Orchidaceae/ <i>Yerum-lei</i> MUMP-002350	The aerial roots are tonic, cooling and prescribed in general debility	Nongmaijing, Langol, Khongampat	Assam, Arunachal Pradesh, Meghalaya, Sikkim	Habitat destruction by surrounding villagers
18.	<i>Dioscorea deltoidea</i> Wall. ex Griseb./ Dioscoreaceae/ <i>Haa</i> MUMP-002349	Root tuber juice is applied in skin diseases, constipation, cardiovascular system, central nervous system, inflammation	Nongmaijing, Khongampat, Ishok, Nongdam, Thongjao	Assam, Arunachal Pradesh, Meghalaya, Sikkim	Habitat destruction by surrounding villagers
19.	<i>Diospyros lanceifolia</i> Roxb./Ebenaceae/ <i>Kap</i> MUMP-002348	Infusion of leaves is prescribed for bath of anaemic children,	Nongmaijing, Langol, Khongampat	Assam, Arunachal Pradesh, Meghalaya, Sikkim	Habitat destruction by surrounding villagers
20.	<i>Elsholtzia communis</i> (Collett & Hemsl.) Diels/ Lamiaceae/ <i>Lomba</i> MUMP-002371	Leaves in fresh wound, fever, cold and cough, blood pressure, nose bleeding and menstrual disorder	Yairipok, Langol, Tentha, Sugnu, Nongmaijing	Assam, Arunachal Pradesh, Meghalaya, Sikkim	Population decline due to overharvesting ,
21.	<i>Goniothalamus sesquipedalis</i> (Wall.) Hook. f. & Thomson/ Annonaceae/ <i>Leikham</i> MUMP-002347	Leaf decoction is used as bath for new born child, antibacterial property, traditionally leaves are burnt and the smoke is believed to protect the health of the inmates	Yairipok, Langol, Tentha, Sugnu, Nongmaijing	Assam, Arunachal Pradesh, Meghalaya, Sikkim	Habitat destruction by surrounding villagers
22.	<i>Hedychium marginatum</i> C. B. Clarke/ Zingiberaceae/ <i>Takhellei-angangba</i> MUMP-002370	Decoction of the rhizome in bronchitis and stomach complaints	Nongmaijing, Khongampat, Ishok, Nongdam, Thongjao	Northeast India, South-east Asian countries, Assam to Myanmar	Habitat destruction by surrounding villagers

23.	<i>Hedychium spicatum</i> Sm./ Zingiberaceae/ <i>Takhellei</i> MUMP-002346	Rhizomes are stomachic, carminative, stimulant, tonic, dyspepsia, liver trouble, vomiting, diarrhea, pains and inflammation and snake-bite	Yairipok, Langol, Tenta, Sugnu, Nongmaijing	Northeast India, South-east Asian countries	Habitat destruction by surrounding villagers
24.	<i>Iris laevigata</i> Fisch./ Iridaceae/ <i>Kombirei</i> MUMP-002369	Roots and leaves are febrifuge, given in fever, socio-religious uses, ornamental	Uripok, Lamphel, Lamlong,	Assam, Myanmar, Arunachal Pradesh, Meghalaya, Sikkim	Habitat destruction by surrounding villagers
25.	<i>Mahonia napaulensis</i> DC. / Berberidaceae/ <i>U-napu</i> MUMP-002362	Bark is used in Dizziness. Tender shoots are used as wild edible food	Khongampat, Nongmaijing, Langol	India: Nagaland, Manipur, Arunachal Pradesh, Assam, Meghalaya & Sikkim	Very less population due to habitat loss. Indiscriminate collection of bark and young shoots leading to death of the plant
26.	<i>Oroxylum indicum</i> (L.) Kurz/Bignoniaceae/ <i>Shamba</i> MUMP-002368	Bark and leaves are tonic, astringent, cancer, diarrhea, dysentery, enlarge spleen, rheumatism; Tender fruits are stomachic, seeds are purgative	Khongampat, Nongmaijing, Waithou, Yairipok	India: Assam, Arunachal Pradesh, Meghalaya, Sikkim	Habitat destruction by surrounding villagers
27.	<i>Paris polyphylla</i> Sm. / Melanthiaceae./ <i>Pan-manbi/ Kazeapai</i> MUMP-002365	Tuber used in Bronchitis, stomach ulcers, diarrhea, dysentery, sore throat, Anthelmintic, tonic, respiratory problems	Khongampat, Nongmaijing, Langol	India : Jammu & Kashmir, Sikkim, Arunachal Pradesh, Nagaland and Manipur	Population has greatly declined due to overexploitation and improper collection methods for market demand in both study sites

28.	<i>Piper griffithii</i> DC./ Piperaceae/ <i>Chingmarich</i> MUMP-000130	Inflorescent and seeds is used in Gastrointestinal Problems	Khongampat, Nongmaijing, Langol	India: Assam, Arunachal Pradesh, Meghalaya, Sikkim, west Bengal.	Low population and restricted fragmented distribution
29.	<i>Rubia cordifolia</i> L. / Rubiaceae/ <i>Moyoom</i> MUMP-002367	Roots, stem and leaves Used in rheumatism, anti-inflammatory,	Khongampat, Nongmaijing, Langol, Sugnu, Serou	Asia, Africa and Australia. In India: North east India.	Population decline due to habitat loss, forest fire and low regeneration
30.	<i>Swertia angustifolia</i> Don / Gentianaceae./ <i>Chiraita</i> MUMP-000138	Young shoots used in Jaundice, fever, cough, stomach ulcers, diabetes and indigestion	Nongmaijing, Langol,	In India: Endemic to Manipur & Nagaland	Population declined due to habitat destruction.
31.	<i>Trapa natans</i> L./ Lythraceae/ <i>Heikak</i> MUMP-002345	Plant is used in normal blood circulation and leucorrhea; Fruits are cooling, diarrhea, bilious affections	Loktak, Yaral pat, Yena pat	Assam, Arunachal Pradesh, Meghalaya, Sikkim	Population has greatly declined due to over exploitation and improper collection methods
32.	<i>Zanthoxylum acanthopodium</i> DC./ Rutaceae/ <i>Mukthruhi</i> / MUMP-002380	Leafs and seeds used in cold and tonsillitis	Khongampat, Nongmaijing, Langol, Sugnu, Serou	Bangladesh, Bhutan, India, Indonesia, Laos, Malaysia, Myanmar, Nepal, Thailand.	Overharvesting of seeds, habitat destruction and forest fires.

Imphal valley is a tropical region, blessed with high diversity of flora and rare medicinal plants. In the present survey out of the 32 medicinal plants recorded, herbs contributed 40 % of the total plants, followed by trees 28 %, climbers 14 %, orchids 9 %, shrubs and floating plants 7 % and fern 2 %. The medicinal plants recorded were used in the treatment of 14 major ailments by different communities residing in the Imphal valley Manipur. (Figure 1)

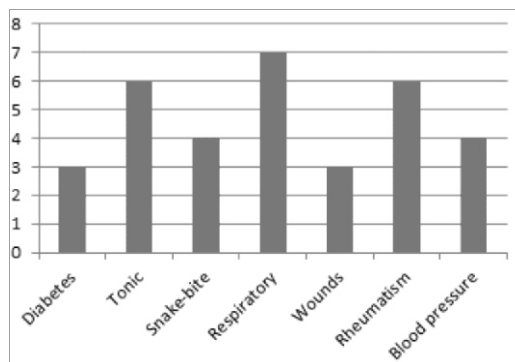


Figure 1. Number of species used for the treatment of major health ailments

These medicinal plants were found in natural ecosystems. Their growth in hilly regions, made them as important economical resource for poor people in these region. Export of these species to neighboring states and countries like Myanmar, China etc., is a major concern. Over-exploitation of plant species for marketing led to decline in population of medicinal plants. Very little efforts are being made for conservation and sustainable utilization of these threatened medicinal flora (Devi and Das, 2016; Singh *et al.*, 2017).

The major cause of decline in population is habitat destruction (45%), followed by trade of plants (37%) and forest fires (18%). The communities residing in these study sites were dependent on forest resources for their livelihood. Moreover, the local peoples collect these medicinal plants in unsustainable manner, which leads to the status of Critically Endangered. Strong winds and dried plant biomass increase the risk of uncontrolled fires during dry season. The natural cycle and biological integrity is being threatened by uncontrolled fire. With the increasing in demand of timber, medicinal plants and other resources, there is drastic decline in the population of RET plant species.

Many RET ethno-medicinal plant species are naturally distributed, which have narrow area of distribution in the tropical regions of Imphal valley. Short or long term management planning and programs may play an important role in conservation of these plants. If the over-exploitation and habitat degradation continues, the RET plants may probably disappear from the area within a few years to come.

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