

A Study of Aromatic Plant Species Especially in Thoubal District, Manipur, North East India

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Abstract- The present paper deals with an extensive study of aromatic plants in twelve sites of Thoubal district of Manipur. Aromatic plants of the district were available in varying forms ranging from thickest bush to food plants with medicinal value. Altogether 80 aromatic plant species under 35 families were collected. *Allium ascalonicum*, *A. hookeri*, *A. sativum* Linn, *A. tuberosum*, *Coriandrum sativum*, *Curcuma aromatic*, *Elshotiza blanda*, *Eryngium foetidum*, *Foeniculum vulgare*, *Hedychium flavum*, *Houttuynia cordata*, *Mentha arvensis*, *Meriandra benghalensis*, *Ocimum canum*, *Polygonum posumba*, *Sesbania sesban* and *Zingiber officinale* were mainly used as vegetables as well as medicine. For cultural and offered to God, the species of *Aegle marmelos*, *Artabotrys hexapetalous*, *Eupatorium birmanicum*, *Gardenia jasminoides*, *Nyctanthes arbor-tristi*, *Pandanus foetidus*, *Plectranthus ternifolius* and *Plumeria rubra* were used. *Artemisia nilagarica*, *Citrus aurantifolia*, *Dicrocephala latifolia* and *Gynura cusimba* were employed mainly for hair lotion. Amongst collected plant species *Aquilaria malaccensis* was found critically endangered. *Artabotrys hexapetalous*, *Curcuma caesia*, *Elshotiza blanda*, *Ocimum basilicum* and *Plectranthus ternifolius* were thinly distributed.

Index Terms- Aromatic plants, *Plectranthus ternifolius*, Thoubal, Traditional healers.

I. INTRODUCTION

Aromatic plants are those plants that give sweet fragrance or pungent smelt due to the presence of odorous volatile compounds in the form of essential oil in one or more parts of the plant and they belong to family Asteraceae, Apiaceae, Lamiaceae, Rutaceae, Zingiberaceae etc. (Verma, 2012). Aromatic Plants play a valuable and important role in economic, social, cultural and ecological aspects of local communities and also have the medicinal properties. Therefore these plants are known as medicinal and aromatic plants (MAPs) that provide people with medicines to prevent disease, maintain health or cure ailments (Elaine Marshall, 2011). MAPs grow in almost all terrestrial and in aquatic ecosystems around the world. However increasing demand on plants and human exploitation become a great threatening in their indigenous habitation. Several works on aromatic plants in relation to their utilization and conservation have been conducted in different parts of the world (Joy *et al.* 2001), (Lyle, 2007), (MAPs, 2009), (M. Gogoi. *et al.* 2010), (Sukhdev *et al.* 2008) (Pasupuleti Sreenivasa *et al.* 2008), (J.S. Elangbam *et al.* 1989). Manipur, the north eastern region of India has a wide range of biodiversity because of two hot spots

amongst the bio-diversities of the world viz. Eastern Himalayas and Indo Myanmar, forming a unique biogeography province harboring major biomes recognized in the world (P.K. Singh, 2011). It has the richest reservoir of plant diversity and supporting about 50% of India's biodiversity (Mao and Hynniewta, 2000). Out of nine districts in Manipur, Thoubal is one of the valley districts that occupies the bigger portion of the eastern half of the Manipur valley and takes the shape of an irregular triangle with its base facing north (Fig.1). It lies between 23°45' N and 24°45' N latitudes and 93°45' E and 94°14' E longitude with an area of 514 sq. km. and its average elevation is not very much different from the rest of the Manipur valley, which is about 790 msl (Singh, 1991), (Yoirntomba *et al.* 2007). In Manipur, the aromatic plants are associated with religious ceremony and cultural activities and also therapeutically used as diuretic, antiseptic, antihelminthic, antirheumatic, stimulant, carminative, analgesics and counter irritant by the local medicinal practices called Maiba (male) and Maibi (female) from time immemorial. The aromatic plant species like orange, lemon, lime, mints, cedar, citronella, lemongrass, basil, *Eucalyptus*, geranium, lavender, *Litsea cubeba*, *Osmanthus fragrans*, patchouli, rose, tuberose, jasmine, sandalwood, bergamot, coriander, etc. were used for commercial production of essential oils. Manipur has about 1200 plants (FRLHT Database) are used by Maibas-Maibis in traditional remedies (Tombi, 2011). Rapid destruction of forests and terrestrilisation of wetlands for human settlement and urbanization make most of medicinal and aromatic plants (MAPs) were threatening.



II. MATERIALS AND METHODS

An intensive study of aromatic plant diversity was conducted in twelve different sites of Thoubal district viz. Thoubal Khunou Ching, Laurembam Ching, Wangoo Tampha Leirembi Ching, Pallel, Tenta Khunau, Kaina Ching, Ekop Lake and Thoubal river bank of Manipur during the month of December, 2012 to 2013. Plant specimens of tree, shrub and herb were collected, and made herbarium for identification. Information on the aromatic plants and its products were collected from well known Maibas-Maibis (Traditional healers), headman, and village elders through personal contact and also through actual experiences. In case of different information of the same plant species, efforts were made to get the correct uses in order to get the correct nomenclature properly by following the standard field and ethno botanical methods (Brickell, 1993), (Vedaja, 1998). Herbaria of these plants are maintained in the Institutional Biotech Hub, Laboratory, Waikhom Mani Girls' College, Thoubal Okram, and Manipur.

Medicinal and aromatic plants and their uses:

The botanical name, family, common name and local name along with its medicinal uses were presented under its plant species (Table 1).

Table 1: Distribution of wild and cultivated aromatic plant species of Thoubal.

Sl. No.	Botanical name	Family	Common name & Local name	Medicinal uses
1.	<i>Mangifera indica</i> L.	Anacardiaceae	Mango Heinou	Diabetes, tonic, gastric disorders, constipation
2.	<i>Spondias pinnata</i> (L. f.) Kurz	Anacardiaceae	Indian Hog plum Heining	Dysentery, diarrhoea, sprain
3.	<i>Plumeria rubra</i> L.	Apocynaceae	Temple Tree Khagi Leihao	Antirheumatic, skin eruptions, herpes, dysentery, syphilis, itches, fevers, coughs
4.	<i>Cinnamomum verum</i> J. Presl	Lauraceae	Cinnamon Ushingsha	Flavour, digestion, diabetics, flu remedies, relax muscle
5.	<i>C. camphora</i> (L.) J. Presl	Lauraceae	Camphor Karpoor	Cough, diarrhea, dysentery
6.	<i>C. tamala</i> (Buch.-Ham.)	Lauraceae	Bayleaf Tejpata	Antifungal, throat, headache, diarrhea, vomiting, excessive menstruation
7.	<i>Magnolia champaca</i> (L.) Baill.	Magnoliaceae	Fragrant Champaca Leihao	Perfumery, antibacterial
8.	<i>Azadirachta indica</i> A. Juss.	Meliaceae	Neem	Toothache, leprosy, fever, abortions, malaria, skin diseases
9.	<i>Toona ciliata</i> M. Roem.	Meliaceae	Red Cedar Tairel	Dyestuff , insecticides
10.	<i>Acacia catechu</i> (L.f.) Wild	Mimosaceae	Babul Bark Chinggonglei	Digestion, cough, fever, diarrhoea, astringent, infection, piles
11.	<i>Artocarpus lakoocha</i> Wall.	Moraceae	Monkey Jack Tree Hari-Konthong	Tonic, purgative, antibacterial, heart & skin diseases

12.	<i>Myristica fragrans</i> Houtt.	Myristicaceae	Nutmeg Jayphal	Antifungal, aphrodisiac, digestive, toothache, skin problems, rheumatism
13.	<i>Eucalyptus tereticornis</i> Sm.	Myrtaceae	Eucalyptus Nashik	Aromatherapy & sinusitis
14.	<i>Syzygium cumini</i> (L.) Skeels	Myrtaceae	Java Plum Jam	Diabetes & digestion disorders
15.	<i>S. jambos</i> (L.) Alston	Myrtaceae	Rose Apple Gulamcha	Asthma, dysentery, diarrhoea, fever, rheumatism, smallpox, diabetics, bronchitis, epilepsy
16.	<i>Pinus kesiya</i> var. <i>kesiya</i>	Pinaceae	Baguio Pine Uchan	Arthritic pains, antibacterial, expectorant
17.	<i>Zanthoxylum armatum</i> DC.	Rutaceae	Toothache Tree Muthrubi	Rheumatism, fever, hypertension, purification of blood
18.	<i>Z. acanthopodium</i> DC.	Rutaceae	Prickly Ash Muthrubitingkhangpanbi	Antimicrobial
19.	<i>Z. rhetsa</i> (Roxb.) DC	Rutaceae	Indian Pepper Ngang	Astringent, digestive, flavor, anti- inflammatory
20.	<i>Citrus aurantiifolia</i> Christm.	Rutaceae	Mexican Lime Champra	Astringent, tonic, bronchitis, asthma, disinfectant, cool fevers, sore throats
21.	<i>C. hystrix</i> DC.	Rutaceae	Khasi Papeda Heiribop	Hair lotion, purify blood, flavouring
22.	<i>C. maxima</i> (Burm. f.) Merr.	Rutaceae	Pomelo <i>Nobap</i>	Cold, influenza, hemorrhoids
23.	<i>C. reticulata</i> Blanco	Rutaceae	Orange Komla	Hypertension, coughs, arthritis
24.	<i>Aegle marmelos</i> (L.) Corrêa	Rutaceae	Indian bael Harikhagok	Diabetes, dysentery

25.	<i>Santalum album</i> L.	Santalaceae	Sandalwood Cha-Chandan	Coughs, dry eczema, irritability, sedative, tonic
26.	<i>Aquilaria malaccensis</i> Lam.	Thymalaeaceae	Eagle wood Agor	Dyspepsia, cough, skin disease, arthritis, kidney disease
27.	<i>Gmelina arborea</i> Roxb.	Verbenaceae	Gumhar Wang	Stomachic, ulcers, diuretic, piles, fevers
28.	<i>Artabotrys hexapetalus</i> (L. f.)	Annonaceae	Tail Grape Chini Champa	Aromatherapy, perfume
29.	<i>Artemisia nilagarica</i> L.	Asteraceae	Indian Worm Wood Laibakngou	Hair lotion, tonic, antiseptic, analgesic, stomachic
30.	<i>A. maritima</i> L.	Asteraceae	Old Woman Ching Laibakngou	Flavouring, fevers, stomachic, antispasmodic, tonic,
31.	<i>Blumea balsamifera</i> (L.) DC.	Asteraceae	Nagai Camphor Tree Karpoor	Analgesic, coughs, hair lotion, insomnia, sinusitis, bronchitis, rheumatism, hypertension
32.	<i>Cannabis sativa</i> L.	Cannabaceae	Marijuana Ganja	Indigestion, wounds, tonic, sedative, anodyne
33.	<i>Sesbania sesban</i> (L.) Merr.	Fabaceae	Egyptian Pea Chuchurangmei	Antitumor, catarrh, headache, epilepsy
34.	<i>Clerodendrum serratum</i> (L.) Moon	Lamiaceae	Bharmgi Moirangkhanambi	Headache, dyspepsia, asthma, rheumatism, appetizer, fevers, ophthalmia, antihistamine, tumours, skin disease
35.	<i>Ocimum tenuiflorum</i> L.	Lamiaceae	<i>Holy Basil</i> <i>Tulsi</i>	Stomachic, bronchitis, expectorant, analgesic, hypertension, diarrhoea
36.	<i>O. kilimandscharicum</i> Baker	Lamiaceae	Camphor Basil Tulashi amuba	Insecticide, cough, flavouring
37.	<i>Isodon ternifolius</i> (D. Don)	Lamiaceae	<i>Khoiju</i>	<i>Antifungicide</i> , disinfectants

	Kudo			
38.	<i>Ardisia crenata</i> Sims	Myrsinaceae	Coralberry Uthum	Cough, diarrhea
39.	<i>Jasminum nitidum</i> Skan	Oleaceae	Angelwing Jasmine Warakundo	Diabetes, headaches, insomnia, gallstones, fracture, muscle pain, cancers, coughs
40.	<i>Nyctanthes arbor-tristis</i> L.	Oleaceae	Coral Jasmine Singarei	Fevers, cough, gout, astringent, carminative, rheumatism, skin infection, hair tonic
41.	<i>Pandanus foetidus</i> Roxb.	Pandanaceae	Ketukee	Leprosy, small pox, syphilis, scabies, diabetes, heart & brain diseases
42.	<i>Gardenia jasminoides</i> J.Ellis	Rubiaceae	Cape Jasmine Kaboklei	Jaundice
43.	<i>Murraya paniculata</i> (L.) Jack	Rutaceae	Orange Jasmine Kamini kusum	Diarrhea, dysentery, abortive, joint pain, body aches, anti-inflammatory activity
44.	<i>Lantana camara</i> L.	Verbenaceae	Largeleaf Lantana Nongbanlei	Antibacterial, diabetes, antiinflammatory, anthelmintic, antifungal
45.	<i>Paederia foetida</i> L.	Rubiaceae	Stinkvine Oinam	Dyspepsia, flatulence, gastritis, digestion, dysuria, diarrhoea, stomachache, flatulence,
46.	<i>Andrographis paniculata</i> (Burm. f.) Wall.	Acanthaceae	Andrographis Bhubati	Inflammation, fever, dysentery, diarrhoea, sore throat
47.	<i>Acorus calamus</i> L.	Acoraceae	Sweet Flag Ok-Hidak	Asthma, rheumatism, epilepsy, dyspepsia, skin ailments, diarrhoea, dysentery
48.	<i>Allium hookeri</i> Thwaites	Alliaceae	Hooker Chives	Flavoring, heart diseases

			Maroi Napakpi	
49.	<i>A. tuberosum</i> Rottler ex Spreng.	Alliaceae	Garlic chives Maroi Nakupi	Hair growth, heart diseases, urinary problems
50.	<i>A. sativum</i> L.	Alliaceae	Garlic Chanam	Cough, skin and menstrual problems, hypertension
51.	<i>Coriandrum sativum</i> L.	Apiaceae	Coriander Phadigom	Digestive, flavoring, appetizer, carminative, insomnia
52.	<i>Eryngium foetidum</i> L.	Apiaceae	Coriander Awaphadigom	Hypertension, fevers, epilepsy, constipation, stomachache, asthma, diarrhea, malaria
53.	<i>Foeniculum vulgare</i> Mill	Apiaceae	Fennel Hop	Flavoring, breath freshener, menstrual pain, digestion
54.	<i>Catharanthus roseus</i> (L.) G. Don	Apocynaceae	Periwinkle Sahib Lei	Leukemia, rheumatism , diabetes , hypotension
55.	<i>Blumea densiflora</i> (Wall.) DC.	Asteraceae	Sambong Karpoor	Hair lotion, flavoring, fevers, kidney stones, insomnia, hypertension, cystitis
56.	<i>Ageratum conyzoides</i> L.	Asteraceae	Goat weed Khongjainapi	Diarrhoea, dysentery
57.	<i>Eupatorium cannabinum</i> L.	Asteraceae	Burma Agrimony Langthrei	Inflammation, hypertension, cough, insomnia, body pain
58.	<i>Cardamine hirsuta</i> L.	Brassicaceae	Hairy Bitter Cress Chantruk Maan	Digestion, detoxification, regulate blood sugars
59.	<i>Ocimum basilicum</i> L.	Lamiaceae	Sweet Basil <i>Naoseklei</i>	Skin diseases, cough, digestive, antispasmodic, toothaches
60.	<i>O. americanum</i> L.	Lamiaceae	Hoary basil Mayangba	Flavoring, epilepsy, diabetic
61.	<i>Mentha arvensis</i> L.	Lamiaceae	Wild Mint Nungshihidak	Fever, headache, vomiting, antispasmodic, diarrhea,

				carminative, dyspepsia, heat sensation, coughs, colds
62.	<i>Salvia bengalensis</i> K. D. Koenig	Lamiaceae	Bengal Sage Kanghu-maan	Hypertension, tonsillitis, dyspepsia, urinary problem
63.	<i>Anisomeles indica</i> (L.) Kuntze	Lamiaceae	Indian Catmint Thoiding Angouba	Toothache, rheumatism, cold
64.	<i>Elsholtzia ciliata</i> (Thunb.) Hyl.	Lamiaceae	Crested Mint Tekta	Stomach disorder, antibacterial, antiviral, anti-inflammatory
65.	<i>Leucas aspera</i> (Willd.) Link	Lamiaceae	Thumbai Meiteilembum	Sinusitis, headaches, intestinal, worms, fevers
66.	<i>Elsholtzia blanda</i> Benth.	Lamiaceae	Lomba Lomba	Cough, sore throat
67.	<i>Allium ascalonicum</i> L.	Liliaceae	Shallot Tilhou Macha	Anthelmintic, antiseptic, antispasmodic, tonic oral anti-inflammatory, diuretic, expectorant, stomachic,
68.	<i>Cymbopogon citratus</i> (DC.) Stapf	Poaceae	Lemon Grass Haona	Diuretic, tonic, digestive, carminative, antifungal, rheumatic pains
69.	<i>Imperata cylindrica</i> (L.) Raeusch.	Poaceae	Blady Grass Ee Nakuppi	Tonic, carminative, diarrhea, dysentery, gonorrhoea. sweats, piles, rheumatism
70.	<i>Polygonum posumba</i> Ham.	Polygonaceae	Smartweed Phakpai	Antipyretic, dyspeptic
71.	<i>Houttuynia cordata</i> Thunb.	Saururaceae	Chameleon Toning kok	Detoxification, boils, allergy, antipyretic, anti-inflammatory, tumors, asthma, analgesic, diuretic, hemorrhoids

72.	<i>Nicotiana plumbaginifolia</i> Viviani	Solanaceae	Tex-Mex Tobacco Meiteihidakmana	Insecticide, toothache
73.	<i>Viola canescens</i> Wall	Violaceae	Himalayan White Violet Mansang	Stomach ulcer & cardio - vascular diseases
74.	<i>Alpinia galanga</i> (L.) Willd.	Zingiberaceae	Greater Galangal Kanghoo	Rheumatism, fever, dysentery, skin diseases, respiratory diseases
75.	<i>Curcuma angustifolia</i> Roxb.	Zingiberaceae	East Indian Arrow Root Yaipan	Antifungal, antibacterial , bronchitis , coughs, dyspepsia, diarrhea, colitis
76.	<i>C. aromatica</i> Salisb.	Zingiberaceae	Wild Turmeric Lam-Yaingang	Antibiotic, cancer, tonic, antidote to snake bite, indigestion, rheumatism, dysentery
77.	<i>C. caesia</i> Roxb.	Zingiberaceae	Black Turmeric Yaimu	Dysentery, cough, tumours, diarrhea, asthma, epilepsy, toothache, skin problems, tonsillitis, piles
78.	<i>Hedychium coronarium</i> J.König	Zingiberaceae	White Ginger Lily Takhellei Angouba	Headache, arthritis, antifungal, antimicrobial activities
79.	<i>Hedychium flavum</i> Roxb.	Zingiberaceae	Yellow Ginger Loklei	Flavouring, bronchitis, tonsillitis
80.	<i>Zingiber officinale</i> Roscoe	Zingiberaceae	Ginger Sing	Antiemetic, anti-inflammatory, rheumatism, coughing, neurological disorders, cancer

The ethnobotanical survey recorded 80 species of medicinal and aromatic plants (Table 1), representing 35 families. Of all the families Lamiaceae recorded the highest number of species (12) followed by Rutaceae (9), Zingiberaceae (7), Asteraceae (6); Lauraceae, Alliaceae, Apiaceae, Myrtaceae, (3 species each), Anacardiaceae, Apocynaceae, Meliaceae, Oleaceae, Poaceae Rubiaceae and Verbenaceae (2 species each). However twenty

families were represented by one species (fig.2). During the survey, most of the aromatic plant habitats were found in the order herbs (44%) > tree (34%) > shrubs (21%) > climber (1%) (fig.3).

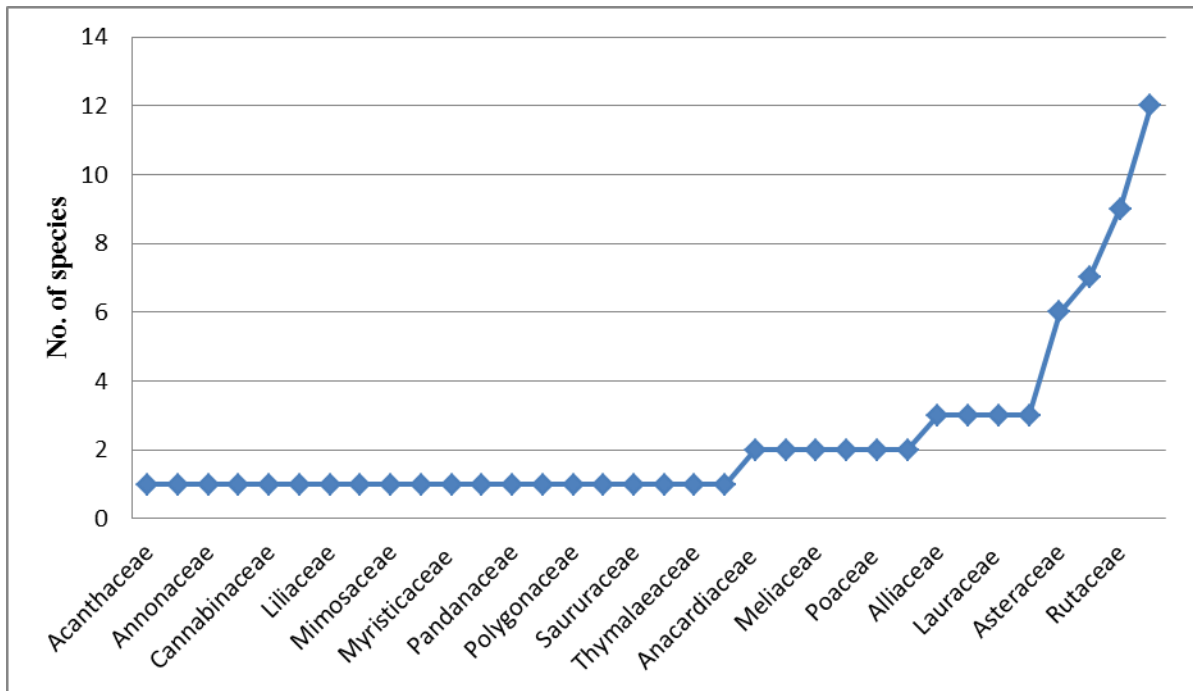


Fig.2. Family distribution of aromatic plant species

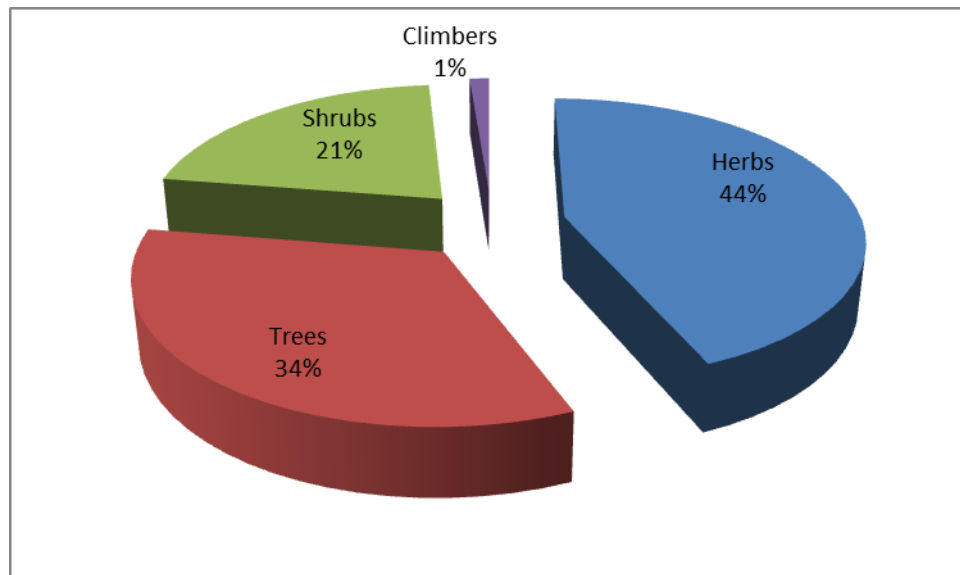


Fig.3. Composition of MAPs species richness to each life form

III. RESULTS AND DISCUSSION

In the present study, a total of 80 aromatic plant species are recorded from twelve sites of Thoubal district of Manipur (table 1) that was enlisted alphabetically of the respective families and botanical name followed by local name. The survey of aromatic plants is done by selecting few plants, which had aromatic value, rich bioresource and sustainability. This research programme will be useful in the exploration of aromatic plant wealth in a place where almost botanical unexploration prevailed. Out of the total aromatic plant species *Aquilaria malaccensis*, a critically endangered species of different places was found in this district. *Artabotrys hexapetalous*, *Curcuma caesia*, *Elshotiza blanda*,

Pandanus foetidus, *Plectranthus ternifolius* and *Ocimum basilicum* (Vedaja, 1998) were thinly distributed. The aromatic plant species is higher in Lamiaceae followed by Rutaceae, Zingiberaceae, Asteraceae and *Aquilaria malaccensis* of Thymalaeaceae. However on species wise distribution of aromatic plants, it is evident that aromatic herb species were found maximum (44%) habitat followed by tree (34%), shrub (21%) and climber (1%).

Majority of the aromatic plants of the district were found growing in the wild. Commercial exploitation, unsustainable use, cultural changes and lack of institutional support have threatened resources and local traditional knowledge (Rajendro *et al.* 2009). The main constraints in commercial exploitation of aromatic plants are due to the fact that the people of the region lack of

post-harvest treatment practices, lack of proper domestication, lack of research and development on product and process development and lack of latest technologies and market information. It is obvious that in the hilly areas of Thoubal district, many valuable wild medicinal and aromatic plants are found extinct due to traditional Jhum cultivation. Therefore, it is quite needed for coordination among the researchers, governments, NGOs, farmers and traditional healers for conservation of aromatic plant species. On the other hand traditional way of identification of unknown wild species is not an easy one that consumes time and even causes error in some case if the species are morphologically similar. Therefore, genetic level of identification is required and for this DNA barcodes are developed which provide unambiguous identification of species (Sukhdev *et al.* 2006) and it focus was mostly on assessing the relative efficiency of molecular markers that had been used in various phylogenetic studies (Vijayan *et al.* 2010). Therefore it is needed for in-situ and ex-situ conservation of aromatic plant species in the Thoubal district.

ACKNOWLEDGEMENT

The department of biotechnology, New Delhi is highly acknowledged for financial assistance to the Institutional Biotech Hub at the Waikhom Mani Girls' College, Thoubal, Manipur.

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