Some medicinal tree species found in Padaung Township

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Abstract

Plant biodiversity survey was conducted in two reserved forests situated in Padaung Township. Two reserved forests are Kyauk Phu and Buyo, which have been providing the local people with various types of forest products including medicinal plants. In this study, some medicinal tree species found in Padaung Township are presented with their outstanding morphological characters and uses. These tree species are *Albizia Procera* (Sit), *Adina Cordifolia* (Hnaw), *Alstonia scholaris* (Letpankha), *Oroxylum Indicum* (Kyaung Shar), *Strychnos nax-bland* (Kha baung), *Croton oblongifolius* (Thet yin gyi), *Vitex pubescens* (Kyet yo), *Cinnamomum obtusifolium* (Nalin kyaw), *Ficus hispida* (Kha aung), *Miliusa velutina* (Thabut gyi) *Premna pyramidata* (Taung tan gyi), *Bauhinia malabarica* (Bwe Chin), *Emblica officinals* (Zee phyu) *Lannea grandis* (Nabe) , *Gardenia obtusifolia* (Yin gat) and *Mitragyna diversifolia* (Binga).

Introduction

Padaung Township is located between Ayeyawady delta and central dry zone, and beside the Ayeyawady River. It is bordered by Magwe Region on the north, Ayeyawady Region on the south and Rakhine State on the west. Within this Township, there are two reserved forests namely Kyauk-phu and Buyo. Kyauk-phu reserved forest area has high mountains with steep slopes, low mountains with moderate slopes and rounded hills. The average height of this area is between 80 m and 700 m above sea level. Buyo reserved forest area has low mountains with slight slopes and ridges, and its average height is below 150 m.

Forest resources are one of the most critical and principal suppliers for the livelihood of the people and the national economy as well. Medicinal plants could be defined as plants that may have medicinal properties and many of them were collected from the forests. The plant has been used for ages for food, shelter, treat human disorders and disease. According to the biological survey conducted in two reserved forests within Padaung Township, tree species of Kyauk-phu area is found to be more diverse than that of Buyo area. In this study, some medicinal tree species found in both reserved forests are observed. These species are selected based on their IVI value. Their outstanding characteristics are described and their medicinal uses are

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compiled by literature. The aim of this study contributes the information on biodiversity status of some medicinal tree species and their medicinal uses. The specific objectives are to identify the diagnostic characteristics of some medicinal tree species, to review their medicinal uses and to establish their biodiversity status.

Materials and Methods

For species identification, an intensive collection of specimens was made during the flowering and fruiting times. Plant specimens were collected, pressed, dried, and identified by matching Herbarium specimens of Botany Department, Yangon University and by checking Hundley and Chit Ko Ko 1961, Kress et al. 2003, and referring the literature cited by Flora of British of India (Hooker 1885), Flora of Java (Backer and Brink 1963), Lawrence 1969 and Flora of Ceylon (Dassanayake 1980-2001).

Data collected were used to calculate frequency, density and basal area. Density, frequency and basal area of each species in each plot were calculated to seek an important value index (IVI). Important value index (IVI) is the sum of relative density, relative dominance and relative frequency for a species and is calculated as follows (Curtis and Mclntosh, 1950).

The relative density (R.D), relative dominance and relative frequency of a species can be calculated with the help of the following formula:

$$\text{Relative Density of tree species} = \frac{\text{No. of individuals of the species}}{\text{No. of individuals of all the species}} \text{ x } 100$$

$$\text{Relative Frequency of tree species} = \frac{\text{No. of sample plots in which the species occurs}}{\text{Total no. of plots sampled}} \text{ x} 100$$

$$\text{Relative Dominance} = \frac{\text{Total basal area of the species}}{\text{Total basal area of all the species}} \times 100$$

Results

From the diversity survey, a total of 1393individuals, representing 123 species,90 genera and 41families in Kyauk-phu reserved forest and 2763individuals, representing 99 species,72 genera and 36 families 99 in Buyo reserved forest were recorded.

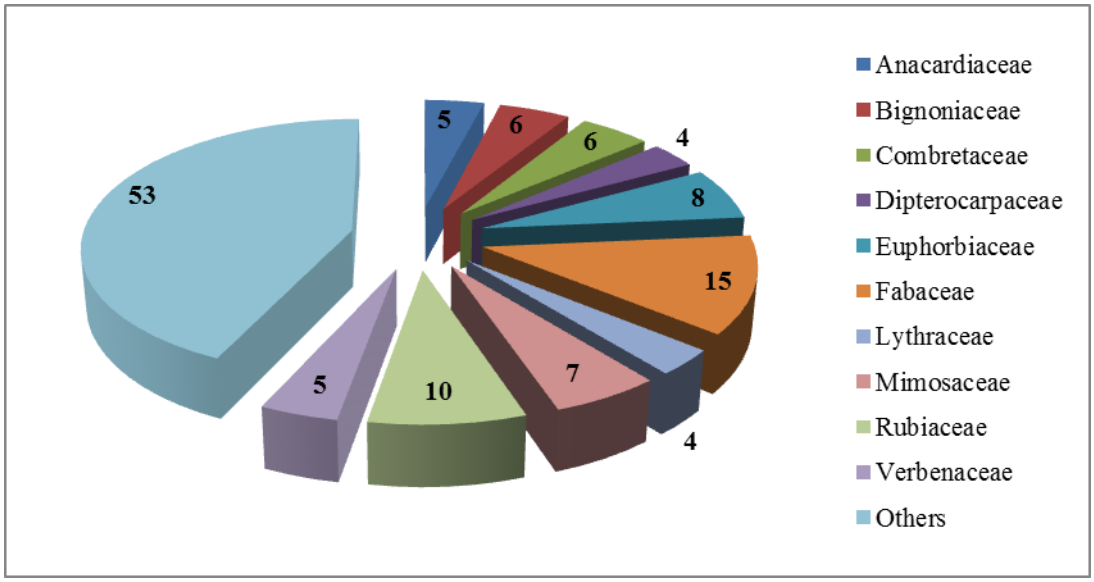

Figure 1. Ranking of Family by Number of Tree Species Composition in Kyauk-phu Reserved Forest

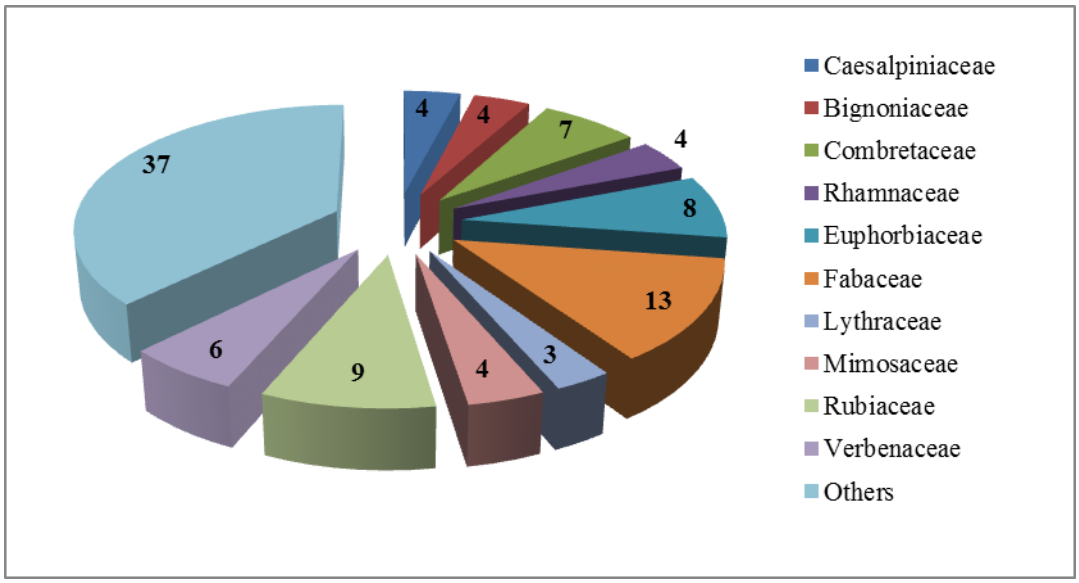

Figure 2. Ranking of Family by Number of Tree Species Composition in Buyo Reserved Forest

Table 1. Top 15 tree Species (based on IVI) in Kyauk-phu Reserved Forest

No.	Scientific Name	RF (%)	RD (%)	RDM (%)	IVI (%)
1	*Shorea oblongifolia* Thw.	2.81	7.76	12.19	22.77
2	*Dipterocarpus turbinatus* Gaertn. f	1.93	2.95	16.78	21.67
3	*Dipterocarpus tuberculatus* Roxb.	0.88	5.18	8.48	14.53
4	*Vitex pubescens* Vahl.	4.04	5.46	4.65	14.16
5	*Xylia xylocarpa* (Roxb.) Taub.	3.34	5.1	4.49	12.94
6	*Terminalia tomentosa* W. A.	3.16	3.31	3.3	9.77
7	*Anneslea fragrans* Wall.	1.76	1.22	5.49	8.47
8	*Dalbergia ovata* Grah.	2.46	3.31	1.62	7.38
9	*Dillenia pentagyna* (Roxb.)	2.46	1.44	3.37	7.27
10	*Rhus paniculata* Wall.	2.99	2.16	1.95	7.09
11	*Milanorrhoea usitata* Wall.	1.58	3.02	2.27	6.87
12	*Lannea grandis* Engl.	1.76	3.45	0.75	5.96
13	*Microcos paniculata* L.	1.41	2.23	1.91	5.55
14	*Croton oblongifolius* Muell.	1.93	2.59	0.99	5.52
15	*Lithocarpus elegans* (Blume) Hatusima ex Socpadmo	1.93	1.37	2	5.3
	Others	65.56	49.45	29.76	144.75
	Total	100	100	100	300

Table 2. Top 15 tree Species (based on IVI) in Buyo Reserved Forest

No.	Scientific Name	RF (%)	RD (%)	RDM (%)	IVI (%)
1	*Xylia xylocarpa* (Roxb.) Taub.	3.56	7.87	10.06	21.48
2	*Mitragyna diversifolia* Havil.	3.56	8.4	7.63	19.59
3	*Shorea oblongifolia* Thw.	2.13	4.15	11.2	17.48
4	*Millettia pendula* Benth.	3.08	5.18	5.29	13.55
5	*Terminalia tomentosa* W. A.	2.73	2.55	5.56	10.84
6	*Dillenia pentagyna* Roxb.	2.61	2.84	4.79	10.23
7	*Bombox insigne* Wall.	2.73	2.02	5.22	9.97
8	*Lannea grandis* Engl.	2.37	2.91	4.48	9.76
9	*Miliusa velutina* Hook. f. & Thomson	2.51	3.51	2.83	8.85
10	*Stereospermum fimbrialum* (Wall.ex G. Don) A. DC.	2.84	2.94	2.24	8.03
11	*Adina cordifolia* Hook. f.	2.49	1.77	2.91	7.17
12	*Lagerstroemia floribunda* Jack	2.73	2.8	1.36	6.88
13	*Lagertroemia villosa* Wall.ex Kurz	1.9	2.62	2.24	6.76
14	*Dalbergia paniculata* Roxb.	2.13	1.7	2.65	6.49
15	*Ziziphus oenoplia* Mill.	2.61	3.01	0.59	6.21

Table 3.Outstanding morphological characteristics of some tree medicinal species found in Kyauk-phu and Buyo reserved forests

Species name	Morphological characteristics	Medicinal uses
Adina cordifolia (Hnaw)	Deciduous tree; Leaves simple, broadly ovate with heart shaped base, Spherical head containing yellow or pinkish yellow flowers with long exerted style and globose stigma.	The bark is antiseptic and febrifuge. The juice of the plant is applied externally to kill worms in sores. An infusion of the roots is used in the treatment of diarrhoea and dysentery.
Albizzia procera (Sit)	Deciduous tree; Leaves bipinnate compound with 2-5 pairs of secondary rachis bearing 5-8 pairs of elliptic leaflets, large distinct gland near the base of primary rachis; Terminal panicle with many flower heads containing white sessile flowers.	Antidote to poison, the bark is given for the treatment of rheumatism and haemorrhage, stomachache and problems of pregnancy. The leaves are poulticed onto ulcers.
Alstonia scholaris (Letpankha)	Evergreen tree; Leaves simple, oblong lanceolate to obovate, whorl at the node; Terminal compound umbel containing creamy white flowers; Long cylindrical capsules in pair at one stalk.	Abdominal pains, fevers and irregular menstruation. skin diseases, gargle. antimalaria. The latex is applied externally to ulcers and for rheumatic pains.
Bauhina malabarica (Bwe Chin)	Deciduous tree; Leaves simple, circular with rounded and shallow cleft tip and rounded or slightly heart shaped base, flowers with white petals; reddish brown strap shaped fruit.	The root, stem bark, leaves and flowers are used to treat diabetes, ulcers, tumors, skin diseases, inflammations, wounds and liver disorders.
Cinnamomum obtusifolium (Nalin kyaw)	An evergreen large straight forward tree; bark grey. Leaves simple, alternate, oblong obtuse, tip acute, 3- nerved. Leathery texture; Cymose, flowers white, small, silky-hairy pedicels. Fruits small succulent drupes.	Wood is used for muscle stiffness and pain, tingling and numbness, skin diseases and arthritis.
Croton oblongifolius (Thet yin gyi)	Deciduous tree; Leaves simple, elliptic oblong to oblong lanceolate, dentate margin; fascicled raceme bearing male flowers at the upper portion and female flowers at lower portion; capsules subglobose, slightly 3-lobed.	Root, bark and leaf are used for arthritis. Root, bark and seed are used as purgative, and to treat liver diseases and high blood pressure.

Emblica officinals (Zee phyu)	Deciduous tree; Leaves simple, appear like a leaflet of pinnate compound leaf; Axillary fascicle with tiny pale green unisexual flowers at the base of branchlets bearing leaves; globose fleshy fruits.	All parts including fruit are used in cancer, diabetes, heart disease and various other ailments and as an antioxidant, antimicrobial and anti- inflammatory.
Gardenia obtusifolia (Yin gat)	Deciduous tree, branches stout. Leaves opposite, stipule intrapetiolar , sub-sessile, obovate, shortly acuminate Inflorescence terminal or axillary flowers white changing to yellow, fragrant. Fruits smooth, endocarp thick.	Extracts of this plant are used as inhibitors of implantation (2), ulcer suppressants (3), and antibacterial (4), analgesic (5), diuretic (5) and hypotensive (5) agents.
Lannea grandis (Nabe)	Deciduous tree; Leaves imparipinnate compound containing a narrow elliptic leaflet with tapering tip and slightly oblique base; Simple raceme clustered at end of leafless twigs; Flower unisexual, tiny, pale yellow or pale green; Dull red or pink colored drupe with 3 lobes.	The boiled leaves are applied for local swellings and body pains. The juice of bark and leaves is applied to ulcers and swellings. The stem bark is used as an antifertility drug. The paste of stem bark is applied to cuts and burns. The crushed bark extract is taken to cure dysentery. The bark paste is given in stomach pain. The bark decoction is used as a gargle for toothache.
Miliusa velutina (Thabut gyi)	Deciduous tree; Leaves simple, elliptic with rounded or slightly heart shaped base; 1- to 3-flowered cymes opposite to leaf; 5-15 red fruits densely clustered on common stalk, turning into black when fully ripen.	Bark is used in the treatment of gout.
Oroxylum indicum (Kyaung Shar)	Deciduous tree; Leaves bi to tri-pinnate compound with opposite pinnae bearing ovate or elliptic leaflets; Large erect terminal raceme containing many large fleshy flowers; Capsule flat, straight, tapering to both ends.	The root bark is used for astringent, blood purifier and tonic, diarrhoea and dysentery. The seed is used as expectorant and laxative, and for coughs, bronchitis, gastritis and ulcers.
Premna pyramidata (Taung tan gyi)	Deciduous tree; young shoot with creamy stellate hairs; Leaves simple, oblong elliptic to oblong ovate with stellate hairs and yellow glands along the veins; Terminal panicles bearing flowers with calyx and corolla covering by stellate hair on the outside surface and villous in the throat.	The roots and leaves are used as a tonic after childbirth. The bark is used to treat diarrhoea. Wood is used for arthritis.

Strychnos nux-blanda (Kha baung)	Deciduous tree; Leaves simple, broadly ovate to elliptic ovate with 3-5 main veins from the base; dichasial cymes; large globose orange berry with very thick and sooth skin.	Root and wood are used as antipyretic. Leaf is used for a good complexion. Seeds are used to treat dysentery, psychosis, asthma, nerve tonic, insomnia and diuretic, to promote digestion and to reduce body weight.
Vitex pubescens (Kyet yo)	Evergreen tree, young parts, leaves and inflorescence densely covered with soft pubescence. Leaves opposite, palmately compound, terminal dichasial cyme, flowers with bracts densely pubescent, persistent, zygomorphic,Stamen didynamous.	Barks and leaves are used for inflammatory, antimicrobial, antioxidant and anti-asthmatic.
*Mitragyna diverifolia (*Bin-ga)	A large tree. Leaves petiolate with transverse parallel nerves; elliptic, suborbicular; tip rounded stipules large, caduceus; Inflorescences crowded in globose.	The whole plant is tonic and febrifuge.

Discussion and Conclusion

Nowadays, there is an increasing of interest on the value of medicinal plants. Possibly, the demand for these plants will increase as well for future health care needs (Shaharddin, 2005). In this study, medicinal uses of 16 medicinal tree species belonging to 14 families were observed in literature and presented. Among 14 families, Rubiaceae, Mimosaceae, Euphorbiaceae, Anarcardiaceae, Bignoniaceae and Verbenaceae are diverse with more species composition and the rest families are low diverse with very few species compositions as shown in fig.1 and fig.2.

Traditional medicine is an important part of Myanmar culture and was practical by ancestors long before the introduction of modern medicine. Important value index (IVI) is the sum of relative density, relative dominance and relative frequency for a species. According to the IVI results, among the sixteen species, *Vitex pubescens* Vahl,. *Mitragyna diversifolia* Havil. *Lannea grandis* Engl., *Miliusa velutina* Hook. f. & Thomson, *Adina cordifolia* Hook. f . and *Croton oblongifolius* Muell had the highest IVI value. Therefore these species may be regarded as ecologically important species in the study areas.

Relative frequency is the frequency of one species compared to the total frequency of all the species. According to the results *Vitex pubescens* Vahl., *Mitragyna diversifolia* Havil.,and *Lannea grandis* Engl., had high relative frequency value. So these species are said to be common in the study areas As a relative density result, the highest density was observed in *Vitex pubescens* Vahl., *Mitragyna diversifolia* Havil and *Miliusa velutina* Hook. f. This shows that these species are

abundant in the study area. As shown in table 3, *Alstonia scholaris* (L.) R.Br. and *Cinnamomum obtusifolium* Nees. had only one individual each in Kyauk-phu area. *Gardenia obtusifolia* Roxb. was found only three individuals. These three species were not found in Buyo area. So these species may be regarded as rare species.

According to the result, *Alstonia scholaris* (L.) R.Br. *Bauhina malabarica* Roxb. *Cinnamomum obtusifolium*Nees and *Oroxylum indicum* (L.) Kurz were observed to be very rare. As the bark of *Alstonia scholaris* (L.) R.Br. is the principle part of medicine. Local people take the bark by peeling. This manner effects on plant growth and plant survivor. *Oroxylum indicum* (L.)Kurz was found with few individuals. It has not only medicinal value but also multipurpose utilization. The young fruits and young leaves of *Oroxylum indicum* (L.)Kurz are used as vegetables. The dried fruits are marketable by its dry seeds using for stuff

Albizzia procera (Roxb.)Benth. and *Oroxylum indicum* (L.)Kurz are regarded as endangered species by IUCN list (2009).

Some human impacts like fire wood, baking charcoal and illegal logging were also occurred in the study area. It is necessary to conserve not only endangered species but also locally rare species.

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