

## **FIFTEEN SPECIES OF MEDICINAL PLANTS FROM KAWLIYA RESERVED FOREST IN DAIK-U TOWNSHIP, BAGO REGION**

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### **Abstract**

The present study was carried out, to assess record and report the taxonomical and medicinal properties of wild plants from Kawliya Reserved Forest in Daik-U Township, Bago Region. Plants were collected from the research area during the flowering and fruiting period. All the specimens were classified and identified according to the standard literatures. Moreover, medicinal uses and other related information was confirmed by standard literatures. The present study comprises 15 species belonging to 12 families used by the local people. Among them 3 species are monocotyledons and 12 species are dicotyledons. The most common wild medicinal plants in Kawliya Reserved Forest are *Leea macrophylla* Roxb., *Desmodium triquetrum* (L.) DC., *Passiflora foetida* L., *Clerodendrum indicum* L. and *Thunbergia laurifolia* Lindl. Most important families having medicinal importance are *Rauwolfia serpentina* (L.) Benth., *Gloriosa superba* L., *Senna alata* (L.) Roxb., *Zingiber zerumbet* (L.) Rosc. ex. J.E.Sm., *Justicia adhatoda* L., *Melastoma malabathricum* L. and *Costus speciosus* Sm. In this study area, *Rauwolfia serpentina* (L.) Benth. and *Gloriosa superba* L. are depleted due to over-exploitation of the local people.

**Keywords:** Kawliya Reserved Forest, Taxonomic and Medicine.

### **Introduction**

Daik-U Township is located on the Yangon-Mandalay railroad and highway which lies to the West of Sittaung River in Southeastern part of Bago Region. It lies between North latitudes 17° 34' and 17° 58' and between East longitudes 96° 19' and 96° 52' (Mon Mon Htay, 2012). Forest coverage is 31% and it has four Reserved Forests. These are Kawliya, Bander, Auk-kanyin myaung and Salu Reserved Forest (Kyaw Zay Moe, 2008). Among them Kawliya Reserved Forest is the selected area for this research. The range of study area is 73898 acres. People in this study area rely on Reserved Forest

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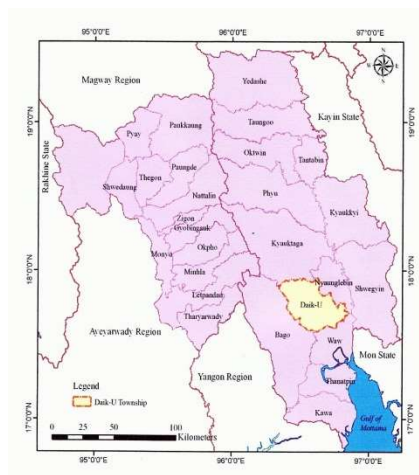
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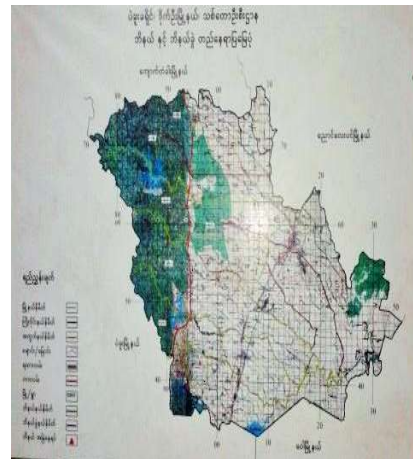
in many ways such as timbers, fuel, food, fodder, medicinal plants, etc. The people in Daik-U Township are still forced to practice traditional medicine for their health care treatment. The knowledge of uses of plants are transmitted from one generation to the next. Over-exploitation and extension of new agriculture lands are a great impact of local human life as well as local human right. As a result a lot of medicinal plant habitats are degraded and valuable medicinal plant are becoming rarer.

This paper represented the taxonomic study and medicinal uses on 15 species from Kawliya Reserved Forest in Daik-U Township. The specimens were collected for the present study from July 2015-January 2016. In taxonomic study, the plants collected were classified and identified by using standard literatures. Such as (Lawrence, 1969), (Hooker, 1875), (Dassanayake, 1996) and (Hu Qi-ming, 2008 & 2009). Medicinal uses and other related informations was confirmed by standard literatures (Kyaw Soe & Tin Myo Ngwe, 2004 and Kirtikar & Basu, 1975). Elder people were real users and had a lot of information about the plants and their traditional uses.

The objectives of this work are to classify and identify some wild plants by using their morphological characters and to provide knowledge of medicinal plant uses of wild plants from Kawliya Reserved Forest.



**Figure 1.** Location of Daik-U Township in Bago Region



**Figure 2.** Location of Reserved Forest in Daik-U Township

## Materials and methods

The present study was conducted during July 2015-January 2016. Work plan was prepared and general information about the area was gathered before the start of field work. Plants were collected from the research area during the flowering and fruiting period. Map were obtained from Forest Department, Daik-U Township, Bago Region, as shown in Figure 1 and 2.

### Collection of medicinal Data

Frequent trips were arranged during raining and winter season during 2015-2016. Medicinal uses and other related information was confirmed by standard literatures (Kyaw Soe & Tin Myo Ngwe, 2004).

### Morphological study of collected specimens

Plant were collected from various sites during the period of research work and documented according to (Lawrence, 1964).

The taxonomic descriptions are accompanied by the photographs of habits, a single branch with inflorescence, parts of the flower and fruit. Plants were classified and identified with the help of (Hooker, 1875), (Dassanayake, 1996) and (Hu Qi-ming, 2009). Classification system of selected species were arranged according to Angiosperm Phylogeny Group ( APG-III).

## Results

The collected species are arranged according to APG-III system as shown in Table 1.

**Table 1.**List of the 15 collected species of medicinal plants according to APG III.

Super order	Order	Family	Scientific Name
Lilianae	Liliales	Colchicaceae	(1) <i>Gloriosa superba</i> L.
	Zingiberales	Costaceae	(2) <i>Costus speciosus</i> Sm.
		Zingiberaceae	(3) <i>Zingiber zerumbet</i> (L.) Rosc. ex. J.E.Sm.
Rosanae	Vitales	Vitaceae	(4) <i>Leea macrophylla</i> Roxb.
	Fabales	Fabaceae	(5) <i>Senna alata</i> (L.) Roxb.
			(6) <i>Desmodium gyrans</i> DC.
			(7) <i>Desmodium triquetrum</i> (L.) DC.
	Malpighiales	Passifloraceae	(8) <i>Passiflora foetida</i> L.
Myrtales	Melastomataceae	(9) <i>Melastoma malabathricum</i> L.	

Super order	Order	Family	Scientific Name
Caryophyllanae	Caryophyllales	Polygonaceae	(10) <i>Polygonum chinense</i> L.
Asteranae	Gentianales	Apocynaceae	(11) <i>Rauwolfia serpentina</i> (L.) Benth.
	Lamiales	Lamiaceae	(12) <i>Clerodendrum indicum</i> (L.) Kuntze.
		Acanthaceae	(13) <i>Thunbergia laurifolia</i> Lindl.
			(14) <i>Justicia adhatoda</i> L.
Bignoniaceae	(15) <i>Markhamia stipulata</i> (Wall.) Seem. ex. K. Schum.		

1. Scientific Name - *Gloriosa superba* L. (Semidauk)

Family - Colchicaceae

Morphological Character

Annual herbaceous climber. Stems cylindrical. Leaves alternate, sessile, laminae ovate-lanceolate, base cuneate, margin entire, tip modified into tendril. Inflorescence terminal and axillary, solitary to subcorymbose. Flower large and showy. Perianth segments 6, greenish yellow at the base with red tinge at the tips when young, becoming red after anthesis, margin crispy waved. Stamen 6, filament filiform, recurved. Carpel (3), trilocular, two ovule in each locule, axile placentation, style deflexed, stigma trifid. Fruits loculicidal capsules, distinctly 3-lobed. (Figure-3)

Flowering and Fruiting period : June to September

Parts used - Roots

Medicinal Uses - Toothache, stomach problem, scabies, ulcer, diarrhea, dysentery, leukorrhea, silkworm, piles, jaundice, ear disease, oxystocic, pustules, boils.

Location : N - 17° 53' 27.7', E - 096 ° 29' 11.6'



**Figure 3.** Habit and Inflorescence of *Gloriosa superba* L.

2. Scientific Name - *Costus speciosus* Sm. (Hpalan-taung-hmwe)  
 Family - Costaceae

Morphological Character

Perennial herbs with underground rhizomes. Leaves simple, spirally arranged with the coriaceous sheath closed to the apex, laminae elliptic oblong, upper surface glabrous and lower one with silky hairs, base ovate, margin entire, tip acute. Inflorescence terminal cone like spikes with bright red bracts. Flower showy. Sepal (3), tubular. Petal (3), companulate. Stamen 1 fertile, epipetalous, lateral staminodes absent, other staminodes fused to form a labellum, infundibuliform, cream white with yellow center, filament of fertile stamen flattened, white with yellow apex. Carpel (3), 3-locule, many ovule in each locule, axile placentation, stigma protruding between the anther lobes. Fruits loculicidal capsule, ovoid, crowned by persistent calyx. (Figure-4)

Flowering and Fruiting period : June to October

Parts used - Stems, roots.

Medicinal Uses - Carminative, fever, cough, arthritis, bronchitis, inflammation, dyspepsia, rheumatism, earache.

Location : N - 17° 52' 34.2', E - 096 ° 29' 16.3'



**Figure 4.** Habit and Inflorescence of *Costus speciosus* Sm.

3. Scientific Name - ***Zingiber zerumbet*** (L.) Rosc. ex. J.E. Sm.  
(Gan-eik)

Family - Zingiberaceae

#### Morphological Characters

Perennial rhizomatous herbs, leafy stem, pubescent. Leaves alternate and distinct, simple, petiole long with sheathing bases, ligulate, laminae oblong-obovate, base obtuse, margin entire, tip acuminate, both surface pubescent. Inflorescence borne separately from the leaves, peduncle up to 40 cm long, rounded at the apex, spikes. Flowers pale yellow, bracteate. Calyx 3-toothed, white tubular. Corolla 3-lobed. Stamen one fertile, other staminodes to form labellum, coloured as petal. Carpel (3), trilobular, 2-4 ovules in each locule, axile placentation, style filiform, stigma oblongoid, protruding between the anther lobes. Fruits not seen. (Figure-5)

Flowering and Fruiting period : June to September

Parts used - Rhizome

Medicinal Uses - Cough, asthma, worms, skin disease, laxative, stomachic, aphrodisiac, carminative, dyspepsia, inflammation, bronchitis, diarrhea.

Location : N - 17° 52' 34.2', E - 096 ° 29' 16.3'



**Figure 5.** Habit and Inflorescence of *Zingiber zerumbet* (L.) Resc ex. J.E.Sm.

4. Scientific Name - *Leea macrophylla* Roxb. (Kya-hpetgyi)

Family - Vitaceae

#### Morphological Characters

Erect shrubs. Stems flexuose. Leaves alternate, simple, very large, laminae broadly ovate, base subcordate, margin coarsely serrate or sublobed, tip acute or acuminate, upper surface dark green and lower white, pubescent. Inflorescence terminal, much branched puberulous corymbose cymes. Flower small white, bracteates. Calyx (5), campanulate. Corolla (5), connate at the base and adhering to the steminal tube. Stamen (5), filament inserted between the lobes of the tube, anther connected laterally. Carpel (6), one ovule in each locule, style short, stigma thickened. Fruits berry, usually 3-6 lobes. (Figure-6)

Flowering and Fruiting period : July to November

Parts used - Leaves, roots

Medicinal Uses - Lymphadenitis, dry cough, tingling and numbness, septic wound, abortion, guinea-worm.

Location : N - 17° 53' 25.0', E - 096 ° 29' 10.9'



**Figure 6.** Habit and Inflorescence of *Leea macrophylla* Roxb.

5. Scientific Name - *Senna alata* (L). Roxb. (Pwesay-mezali)  
 Family - Fabaceae (Caesalpinioideae)

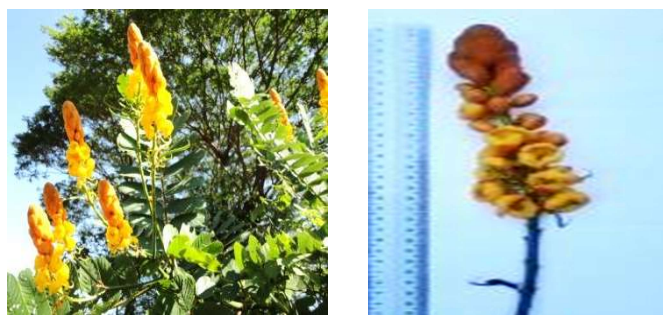
#### Morphological Character

Perennial shrubs, horizontally branches. Stem furrowed. Leaves unipinately paripinnate compound, leaflets 10-15 pairs, bilateral symmetrical opposed and fold together at night, pulvinate, laminae oblong obtuse, base rounded oblique, margin entire, tip mucronulate. Inflorescence terminal and axillary racemose. Flower yellow cluster, bract large caducous. Sepals 5. Petals 5. Stamen 10, unequal, 7 fertile and 3 staminodes. Carpel 1, many ovule in the locule, style curved, stigma simple. Fruit black pod, thick flattened winged. (Figure-7)

Flowering and Fruiting period : November to February

- Parts used - Leaves, pods.  
 Medicinal Uses - Constipation, dermatomytosis, scabies, tinea imbricate, arthritic.  
 Location : N - 17° 56' 26.9' , E - 096 ° 27' 48.9'





**Figure 7.** Habit and Inflorescence of *Senna alata* (L). Roxb

6. Scientific name - *Desmodium gyrans* DC. (Say-kamyin)

Family - Fabaceae (Papilionoideae)

Morphological Characters

Shrubs. Stems cylindrical. Leaves alternate, trifoliolate compound, leaflets 1-2, unequal, laminae oblong-lanceolate, base rounded or obtuse, margin entire, tip obtuse, stipulate deltoid. Inflorescences terminal and axillary, racemes. Flower blueish yellow, bracteates. Calyx campanulate, teeth deltoid, shorter than the tube. Standard orbicular, wings oblong-obovate, keels slightly beaked. Stamen 1+5, diadelphous. Carpel 1, monocarpellary, 4-7 ovule in the locule, style slender, stigma simple, gynophores present. Pods lomentum. Seeds 4-7, globose. (Figure-8)

Flowering and Fruiting period : December to February

Parts used - Leaves

Medicinal Uses - Antidote, cardiac-tonic, wound healing, rheumatism, pyrexia, dysentery, malaria, hepatitis, hemoptysis.

Location : N - 17° 52' 45.6', E - 096 ° 29' 09.4'



**Figure 8.** Habit and Inflorescence of *Desmodium gyrans* DC.

7. Scientific Name - *Desmodium triquetrum* (L.) DC.  
(Lauk-thae)

Family - Fabaceae (Papilionoideae)

**Morphological Characters**

Erect shrubs. Stems triangular. Leaves alternate, unifoliolate compound, laminae lanceolate, base subcordate, margin ciliated, tip acute, both surface pubescent, petiole 1-1.5 cm long with broadly winged. Inflorescence axillary and terminal racemes. Flower violet, bracteates. Sepals (5), campanulate. Standard orbicular, wings oblong, keels slightly beaked. Stamen 1+(9), diadelphous. Carpel 1, monocarpellary, many ovule in the locule, ovary densely pubescent, stigma capitate. Fruits lomentum with calyx, flattened, 6-8 jointed. (Figure-9)

Flowering and Fruiting period : November to December

Parts used - Leaves

Medicinal Uses - Urinary infection, earache, helminthic, tuberculosis, lung disease, headache, scabies.

Location : N - 17° 52' 46.5', E - 096 ° 29' 09.4'



**Figure 9.** Habit and Inflorescence of *Desmodium triquetrum* (L.) DC.

8. Scientific Name - *Passiflora foetida* L. (Taw-suka)

Family - Passifloraceae

#### Morphological Characters

Tendrillar climbers. Stems herbaceous, cylindrical, pubescent. Leaves alternate, simple, stipules modified into tendrils, petioles with tomentose, laminae ovate with 3-lobed, bases cordate, margin ciliate, the tip acuminate, both surface pilose. Inflorescence axillary and solitary cymes. Flower white, bracteoles 3, fimbriate, persistent. Sepals 5. Petals 5. Corona 2 rims, corona filament purple with white-tinged. Stamen 5, free, androgynophore present, the filament dilated, anther ditheous, dorsifixed. Carpel (3), trilocular, 2 ovule in each locule, parietal placentation, style 3, stigma capitate. Fruits berries. Seed numerous, flattened, arillate. (Figure-10)

Flowering and Fruiting period : March to November

Parts used - Leaves, fruits.

Medicinal Uses - Asthma, nervous anxiety, hysteria, giddness, skin disease with inflammation.

Location : N - 17° 53' 24.8', E - 096 ° 29' 02.4'



**Figure 10.** Habit and Inflorescence of *Passiflora foetida* L.

9. Scientific Name - *Melastoma malabathricum* L. (Oboke-gyi)  
 Family - Melastomaceae

**Morphological Characters**

Strigose or villous shrubs. Stems cylindrical, short dense hair. Leaves opposite and decussate, laminae elliptic lanceolate, both surface pubescent, base ovate, margin entire, tip acute. Inflorescence terminal 3-7 flowered cymes. Flower mauve- purple, bract large elliptic narrowed into a stalk generally enclosing the buds. Sepals (5), deciduous. Petals 5. Stamens 5+5, outer whorl is sickle shaped and long, filament yellow. Carpel (5), many ovule in each locule, style simple, curved. Fruits loculicidal capsule with persistent calyx, ovoid. Seeds numerous, oblongoid. (Figure-11)

Flowering and Fruiting period : Throughout the year

Parts used - Leaves, roots.

Medicinal Uses - Toothache, wound, stomach problems, diarrhea, dysentery, wash for ulcers to prevent scarring from smallpox, piles, leukorrhea, scabies, ulcers.

Location : N - 17° 56' 33.9', E - 096 ° 28' 05.0'



**Figure 11.** Habit and Inflorescence of *Melastoma malabathricum* L.

**10.** Scientific Name - *Polygonum chinense* L. (Mahaga-kyan-sit)

Family - Polygonaceae

Morphological characters

Perennial herbs. Stems cylindrical and grooved at the bases. Leaves simple, alternate, stipules ochreate, usually sheathing the stem, laminae ovate oblong, base truncate or rounded, margin entire, tip acute. Inflorescence terminal, paniculate corymbose cymes. Flower white and small, bracteates. Perianth 5-lobed, connate up to half the length. Stamen (4+4), connate at the base, biseriate, the filament unequal, the anther ovoid, dithecous, dorsifixed. Carpels (3), unilocular, one ovule in each locule, basal placentation, style 2-3 cleft, stigma capitate. Fruits ovoid, nutlet with persistent style. (Figure-12)

Flowering and Fruiting period : November to May

Parts used - Whole plants

Medicinal Uses - Dysentery, gastroenteritis, hepatitis, wash for dermatitis, worm, scorpion bite, arthritis, oedema.

Location : N - 17° 53' 26.2 ", E - 096° 29' 11.4 "



**Figure 12.** Habit and Inflorescence of *Polygonum chinense* L.

11. Scientific Name - *Rauwolfia serpentina* (L.) Benth (Bonma-yaza)

Family - Apocynaceae

Morphological Characters

Perennial undershrubs. Stems cylindrical. Leaves whorls, simple, green in upper surface, pale green in lower surface, the laminae ovate, the bases attenuate, the margins entire, the tips rounded or acute. Inflorescence terminal corymbose cymes. Flower pink, bracteae. Sepals (5), campanulate, lobe unequal. Petals (5), corolla tube long, white hair present in the tube. Stamens 5, epipetalous, filament very short. Carpels (2), bilocular, 2 ovule in each locule, style long and filiform, stigma bi-apiculate. Fruit a drupe, deeply 2-lobed. Seeds ovoid. (Figure-13)

Flowering and Fruiting period : October to March

Parts used - Roots

Medicinal Uses - Hypertension, helminthic infection,

Location : N - 17° 53' 27.7', E - 096 ° 29' 11.6'



**Figure 13.** Habit and Inflorescence of *Rauwolfia serpentina* (L.) Benth.



12. Scientific Name - *Clerodendrum indicum* (L.) O. Ktze. (Nga-yant-padu)

Family - Lamiaceae

Morphological Characters

Shrubs. Stem quadrangular. Leaves 3-5 whorled, laminae oblong-lanceolate, base acute, margin entire, tip acuminate. Inflorescence terminal and axillary dichasial cymes. Flower white, bracteate. Sepals 5, connate at the base, cup-shaped, persistent. Petals 5-lobed, salverform. Stamens 4, epipetalous, didynamous, filament white with red top. Carpels 2, bicarpellary, 4 locules due to false septum, axile placentation, one ovule in each locule, style filiform, stigma bifid. Fruit a drupe, globose, persistent calyx. (Figure-14)

Flowering and Fruiting period- November to March

Parts used - Leaves, roots.

Medicinal Uses - Indigestion, piles, amenorrhoea, giddness, vomitng, improvement of memory due to neural deficit, white-patches.

Location : N - 17° 52' 33.8', E - 096 ° 29' 16.2'



**Figure 14.** *Clerodendrum indicum* (L.) Kuntze.

13. Scientific Name - *Thumbergia laurifolia* Lindl. (Panye-sut)

Family - Acanthaceae

### Morphological Characters

Woody vines. Stem subquadrangular, node slightly tumid. Leaves opposite and decussate, laminae elliptic or oblong-lanceolate, base rounded to caudate, margin entire or slightly undulate, tip acuminate. Inflorescence terminal and axillary racemose. Flower purple, bracteoles large, more or less obliquely oblong, cream colour with reddish brown veins. Calyx annular ring unlobed. Corolla purple, lobes 5, subequal, tubular below, campanulate above. Stamens 4, didynamous, filament flattened, anther with hairy, epipetalous. Carpels (2), bilocular, two ovule in each locule, style slender, stigma bifid, funnel shaped. Fruits capsule. (Figure-15)

Flowering and Fruiting period : December to March

Parts used - Leaves, roots.

Medicinal Uses - Menorrhagia, ear ailments, deafness, alcoholic liver toxicity, scorpion bite, diabetic, anti-inflammatory, diarrhea.

Location : N - 17° 52' 46.6', E - 096 ° 29' 09.4'



**Figure 15.** Habit and Inflorescence of *Thunbergia laurifolia* Lindl.

14. Scientific Name - ***Justicia adhatoda*** L. (Maya-gyi)

Family - Acanthaceae

### Morphological Characters

Large shrubs. Stems cylindrical, swollen above the nodes. Leaves opposite and decussate, laminae elliptic, base obtuse, margin entire, tip



acuminate. Inflorescence terminal and axillary spikes. Flowers bilabiate, white with spot, bracteate, bracteolate, sessile. Sepals 5-tooth, campanulate. Petals bilabiate, limb 2-lipped, upper lip erect, shallowly 2-lobed, lower lip 3-lobes. Stamens 2, petalostemonous, the filament long. Carpels (2), bilocular, one ovule in each locule, the style long, stigma simple, disc present. Fruit not seen. (Figure-16)

Flowering and Fruiting period : January to May

Parts used - Leaves, roots.

Medicinal Uses - Haematemesis, melena, pulmonary disease, bleeding piles, dry cough, bronchitis, asthma, diabetes, tuberculosis, heavy menstrual bleeding.

Location : N - 17° 53' 25.0', E - 096 ° 29' 10.9'



**Figure 16.** Habit and Inflorescence of *Justicia adhatoda* L.

15. Scientific Name - *Markhamia stipulata* (Wall.) Seem. ex K.Schum. (Ma-hlwa)

Family - Bignoniaceae

Morphological Characters

Perennial trees. Leaves unipinnately imparipinnate compound, leaflets 3-9 pairs, laminae ovate oblong, base slightly cordate, margin entire, tip acute. Inflorescence terminal racemose, rusty yellow pubescent, 4-10 flowered. Flower brownish yellow, bracteate, bracteolate. Sepals aestivation closed, at flower time clef to the base on one side, spathaceous, brown hairy. Petals (5),

campanulate, lobe crisped crenate. Stamens 4, epipetalous, didynamous. Carpel 1, many ovule in the locule, style terminal, filiform, stigma bifid. Fruits capsule, linear-oblong, epicarp brown hairy. Seed including wing. (Figure-17)

Flowering and Fruiting period : December to April

Parts used - Roots, flowers.

Medicinal Uses - Skin disease, analgesic

Location : N - 17° 56' 26.9', E - 096 ° 27' 48.9'



**Figure 17.** Habit and Inflorescence of *Markhamia stipulata* (Wall.) Seem. ex. K. Schum.

### Discussion and conclusion

This paper provide comprehensive information on the native and the uses of medicinal plants in Kawliya Reserved Forest in Daik- U Township, Bago Region. The present investigation comprises the indigenous uses of 15 species belonging to 12 families from the study area. Among them 3 species are monocotyledons and 12 species are dicotyledons. Fabaceae has the highest number of 3 species followed closely by Acanthaceae with 2 species. The remaining families were represented with 1 species each. The most common wild medicinal plants in Kawliya Reserved Forest are *Leea macrophylla* Roxb., *Desmodium triquetrum* (L.) DC., *Passiflora foetida* L., *Clerodendrum indicum* L. *Thunbergia laurifolia* Lindl. and *Markhamia stipulata* (Wall.) Seem. The most important species having medicinal importance are *Rauwolfia serpentina* (L.) Benth. which use traditionally to reduce hypertension (Nargathein, 1972 and Bhattacharjee, 1998). The roots of *Costus speciosus*

Sm. is useful for dyspepsia, inflammation and rheumatism (Kirtikar & Basu, 1958). The treatment of cough, asthma and worm is used to *Zingiber zerumbet* (L.) Rosc ex. Sm. and diarrhea and dysentery is used to *Melastoma malabathricum* L. (Kirtikar & Basu, 1958). *Gloriosa superba* L. is useful for the commercial colchicine compound production (Ponglux et. al., 1987) and *Justicia adhatoda* L. have the bioactive compounds, amrinone and phytol (Jayapriya & Shoba, 2015). *Senna alata* (L.) Roxb. is the most potent species for having significant antimicrobial activity (Nayak et. al., 2015). *Desmodium gyrans* DC. have anticoagulant activity (Vipin et. al, 2015) and the ethanol extract of *Polygonum chinense* L. against on *Escherichia coli* and *Pseudomonas aeruginosa* (Thomas et. al., 2012). Among them, *Rauwolfia serpentina*. (L.) Benth. and *Gloriosa superba* L. are depleting in study area due to over-exploitation by the local people. In summary, the conservation of the wealth of medicinal plant resources and transfer of plants knowledge should be established with the cooperation of local people otherwise the potential medicinal plants in Kawliya Reserved Forest may be lost forever and become extinct.

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## References

- Bhattacharjee, S.K., (1998) *Handbook of Medicinal Plants*, Indian Agricultural Research Institute, New Delhi.
- Dassanayake, M.D., (1996) *A revised hand book to the flora of Ceylon*, Vol-IV, X, XII, XIV. University of Peradeniya, Department of Agriculture, Peradeniya: Sri Lanka.
- Hooker, J.D.,(1975) *The flora of British India*, Vol-I . London: L. Reeve & Co., Ltd.
- Hooker, J.D.,(1979) *The flora of British India*, Vol-II, III . London: L. Reeve & Co., Ltd.
- Hooker, J.D.,(1885) *The flora of British India*. Vol- IV, V. London: L. Reeve & Co., Ltd.
- Hu Qi-ming, WU De-Lin & XIA Nian-he,(2008) *Flora of Hong Kong*, Vol- II, Published by Agriculture, Fishries and Conservation Department, Government of the Hong Kong Special Administrative Region.
- Hu Qi-ming, WU De-Lin & XIA Nian-he, (2009) *Flora of Hong Kong*, Vol- III. Published by Agriculture, Fishries and Conservation Department, Government of the Hong Kong Special Administrative Region.
- Jayapriya,G.,& F.G.Shoba, (2015) “GC-MS analysis of bio-active compounds in methanolic leaf extracts of *Justicia adhatoda* L.” *Journal of Pharmacognosy and Phytochemistry*, Vol.4(1), p.113-117.
- Kirtikar, K.R.,& B.D. Basu, (1975) *Indian medicinal plants*, Vol- IV, 2<sup>nd</sup> ed., 318-A, Dehra Dun, India.
- Kyaw Soe & Tin Myo Ngwe, (2004) *Medicinal plants of Myanmar*, Ministry of Health Department of Traditional medicine, Yangon, Myanmar.
- Kyaw Zay Moe (2008) *Plant-pollinator interactions and pollination status in Bago Yoma Forest of Daik-U Township*. PhD Dissertation, Botany Department, Yangon University, Myanmar.
- Lawrence, G.H.M.,(1969) *Taxonomy of vascular plants*, 10<sup>th</sup> ed, Published by Macmillan Company: New York.
- Mon Mon Htay (2012) *Geographic analysis of Agriculture in Daik-U Township*, PhD Dissertation, Geography Department, Yangon University, Myanmar.
- Nargathein, Ashin,(1972) *Pon Pya Say Abidan*, Vol. II, Mangala Press, Yangon.
- Nayak, B.K., V. Mukilarasi and A. Nanda, (2015) “Antibacterial activity of leafextract of *Cassia alata* separated by soxhlet extraction method.” *Der Pharmacia Letter*, vol. 7(4), p.254-257.
- Ponglux, D., S. Wongeseripipatana, T. Phadungcharoen, N. Ruangrungsri and K. Likhitwitayawuid, (1987), *Medicinal Plants*, International Congress on Natural Products, Bangkok.
- Reveal, J.L.& M.W. Chase, (2011) “APG III : Bibliographical Information and Synonymy of Magnoliidae.” *Phytotaxa*, vol.19, p.71-134.
- Thomas B., M. Maharajan and A. Rajendran, (2012) “Antibacterial and antifungal activities of *Polygonum chinese* L.”, *Asian Journal of Plant Science and Research*, vol.2 (5), p.577-580.
- Vipin P.S., N.M. Johannah., M.Seema, L.Lawrence and J.Padikkala, (2015) “Antithrombotic and anticoagulant activities of *Desmodium gyrans* DC.” *Journal of Chemical and Pharmaceutical Research*, vol.7(5), p.973-980.

