

## Taxonomic Study on Some Species of Rubiaceae From Dee Dote Area, Pyin Oo Lwin Township

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### Abstract

The present paper deals with some species of Rubiaceae in Angiospermae growing in Dee Dote area, Pyin Oo Lwin Township. Some species of Rubiaceae were collected, preserved and systematically treated from June to August, 2018. Among these, 20 species of which possess 15 genera of family Rubiaceae were identified and classified. And then all of identified species were described with taxonomic characters, Scientific names, Myanmar names, and their flowering periods. Adding together with an artificial key of the identified species were constructed and presented. Their preferential photographic figures with reference to the habits and flowers were also reported. This study will contribute the valuable information of some species of Rubiaceae for future scientific research.

**Key words:** Rubiaceae, Taxonomic, Dee Dote Area, Identified

### Introduction

The Rubiaceae belonging to the order Gentianales is one of the large families among the dicotyledons of flowering plants. The members of this family are widely dispersed all over the world, especially in subtropical, tropical, and temperate regions of the world. Most members of the family are annual or perennial herbs, shrubs and trees, which may become large in cooler areas, especially mountainous and shaded regions. The majority of the herbs are annual or short-like perennial. The stems of Rubiaceae are mostly terete, especially when young, erect or procumbent.

The leaves are usually simple, opposite and decussately arranged and stipulate. The interpetiolar or intrapetiolar usually born in the base of leaves. The inflorescences are axillary or terminal cymes in various types of clusters, solitary, head, capitate, globose heads or paniculate, with 2-to many-flowers. Some members of Rubiaceae are ornamental plants because of their flowers which are showy in congested inflorescences and actinomorphic and fragrant flowers that aid to the attractiveness of inflorescences.

This family is characterized by usually bisexual, epigynous, tetramerous or pentamerous, complete, actinomorphic flowers. The calyx is cup-shaped or campanulate, with 4 or 5 teeth or lobes, equal and unequal in *Mussaenda*. The corolla is tubular with 4 or 5-lobed, variously coloured and often hairy( Heywood, 2007).

Dee Dote area is located in Pyin Oo Lwin township of Mandalay region, near the Ohn Chaw -Ye Ywar Main Road. This study area lies near Nget Kyi Thaik village. It is situated between latitude 21°42' 15.2" and 21°42' 38.76" N to longitude 96°21' 7.13" to 96° 21' 20.07" E. The elevation of this area is 542 meter above sea level.

Topographically, the study area is Shan plateau, characterized by the plain area as well as the mountainous area. According to the latitude, this area is situated within tropical

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climate. Natural water falls occur in Dee Dote area. In study area, various types of vegetation are found due to its climate, topography and sufficient water resources. Dee Dote area become popular and it can be regarded as a recreation spot due to natural waterfalls, rock decorations and various types of naturation. Because of its topography, it is hard to reach there and the area appeals to do taxonomic research for rubinaceous plants. The aim and objectives of the present study are; to identify and classify the members of Rubiaceae in Dee Dote Area; to describe the detail characters of the identified species; to contribute valuable information for future scientific researches.

### Materials and Methods

The some species of Rubiaceae were collected and studied from Dee Dote Area, its surrounding area during the 2018. All of the collected specimens were recorded by colored photographs while flowering time.

Taxonomic identification of the specimens were carried out by referring to available literature such as Hooker (1879), Backer & Brick (1965), Dassanayake (1998), and Qi-ming & De-lin (2009). All of nomenclatural studies were finalized by referring to the web site of International Plant Names Index (IPNI) and online Botanical Database of Tropical Plants (TROPICOS). Myanmar names were furnished from the Checklist of Hundley & Chit Ko Ko (1987) and Kress *et al.* (2003). All presented species were described with taxonomic descriptions and were also Moreover, an artificial key of these species were constructed by using their contrast characters.

### Results

#### An Artificial Key to the Species:

- |   |                                 |
|---|---------------------------------|
| 1.Plants woody -----                              | 2                               |
| 1.Plants shrubby or herbaceous -----              | 11                              |
| 2.Stamens included -----                          | 3                               |
| 2.Stamens exerted -----                           | 8                               |
| 3.Fruits capsular -----                           | 4                               |
| 3.Fruits drups or syncarps -----                  | 5                               |
| 4.Leaves oblong ovate, cordate at the base; ----- | <i>Mitragyn diversifolia</i>    |
| 4.Leaves orbicular, truncate at the base -----    | <i>Mitragyna parvifolia</i>     |
| 5.Inflorescences with few-flowered-----           | 6                               |
| 5.Inflorescences with many-flowered -----         | 7                               |
| 6.Stems brownish grey -----                       | <i>Gardenia coronaria</i>       |
| 6.Stems brownish red -----                        | <i>Dioecrescis erythroclada</i> |
| 7.Bracts triangular, small -----                  | <i>Morinda tinctoria</i>        |
| 7.Bracts orbicular, large -----                   | <i>Nauclea orientalis</i>       |
| 8.Inflorescences corymbose cymes -----            | <i>Pavetta indica</i>           |
| 8.Inflorescences paniculate cymes -----           | 9                               |

9.Stipules cupidate-----	<i>Wendlandia bicuspidate</i>
9.Stipule triangular -----	10
10.Calyx lobes triangular or subulate -----	<i>Wendlandia puberula</i>
10.Calyx lobes ovate -----	<i>Wendlandia tinctoria</i>
11.Stamens included -----	12
11.Stamens exerted -----	16
12.Calyx lobes petaloid -----	13
12.Calyx lobes not sepaloid -----	14
13. Bracts trifid at the apex; seeds pitted -----	<i>Mussaenda incana</i>
13. Bracts acute at the apex; seeds smooth -----	<i>Mussaenda roxburghii</i>
14. Stipules pectinate, with 3 to 5 bristiles -----	<i>Oldenlandia diffusa</i>
14.Stipules triangular , without bristile-----	15
15. Plants erect; fruits capsular -----	<i>Luculia intermedia</i>
15.Plants twining; fruits drupaceous -----	<i>Paederia foetida</i>
16.Stipules not fimbriate; stamens 5 -----	17
16.Stipules fimbriate; stamens 4-----	18
17.Plants without prickle; stipules not foliaceous -----	<i>Hamelia patens</i>
17.Plants with prickles; stipules foliaceous -----	<i>Rubia cordifolia</i>
18.Anthers ovoid; corolla with a ring of hairs -----	<i>Mitracarpus hirtus</i>
18.Anthers oblongoid; corolla without a ring of hair -----	19
19.Capsules opening by two valves -----	<i>Spermacoce articularis</i>
19.Capsules opening by four valves -----	<i>Spermacoce ramanii</i>

## Taxonomic Description

**1.***Dioecrescis erythroclada* (Kurz.)Tirverg,Thampla.Numtok. 36.1976. (Fig.1.A)

Perennial, deciduous trees; stems and branches terete, stout with curious brick red or brownish red. Leaf blades elliptic or obovate, 11.0-18.5 cm by 6.0-12.5 cm, the base cuneate, the margin entire, the apex obtuse; stipules triangular. Inflorescences axillary cymose, few-flowered. Flowers 1.0-1.3 cm across at the anthesis, pale yellowish green. Calyx shallowly campanulate, 5-lobed; lobes rounded. Petals 5, ovoid. Stamens 5, included; anthers oblongoid , basifixed. Ovary oblongoid, bilocular with one ovule in each; style terminal; stigma clavate.

**2.***Gardenia coronaria* Buch-Ham.,in Syme's Embassy to Ava,3.ed.2. 307. t.22.1800. (Fig.1.B)

Deciduous trees with resinous shoots; stem and branches, woody, brownish-grey. Leaf-blades broadly oblong, 6-12 cm by 3.5-7.5 cm, the bases rounded, the margins slightly wavy, the apex acuminate; stipules ovate. Flowers about 5.5 cm across at anthesis, white turning yellow, fragrant. Calyx cup-shaped, 5-angled; lobes 5-6, spathaceous. Corolla funnel-shaped, bright yellow; lobes 5, broadly ovate, soft and

leathery. Stamens 5, included; anthers linear, dorsifixed. Ovary oblongoid, unilocular, with numerous 2-seriate ovules; style cylindrical; stigma clavate. Drupe ellipsoid, 5-ribbed, with woody endocarp, thick and smooth between the ribs. Seeds smooth and rather large.

**3. *Hamelia patens*** Jacq. Enum. Pl. Carb. 16.1760. (Fig.1.C)

Perennial erect shrubs; stem and branches woody, velutinous-hairy while young. Leaf-blades elliptic, 3-11 cm by 1.5-4.0 cm, the bases attenuate, the margins entire, the apex acuminate; stipules subulate. Inflorescences panicles of helicoid cymes, terminal, numerous-flowered. Flowers about 3.5 mm across at anthesis, reddish-yellow; bracts triangular, bifid at the tip; bracteoles minute. Calyx campanulate; teeth 5, triangular, bright red. Corolla tubular; reddish orange to bright red, longitudinally 5-ribbed; lobes 5, obtuse. Stamens 5, exserted; anthers linear, basifixed. Ovary ovoid, pentalocular, with many ovules in each; style filiform; stigma club-shaped. Berry ovoid, glossy black, crowned by globose disc. Seeds numerous, triangular or elongate, variable, smooth.

**4. *Luculia intermedia*** Hutch., Brit. Fl. Gard, 2. 145.1826. (Fig.1.D)

Perennial shrubs. Stems and branches terete. Leaves simple, opposite and decussate; interpetiolar stipules triangular; blades elliptic-oblong, base cuneate, margin entire, apex acute. Inflorescences terminal in axile of uppermost leaves, corymbiform cymes. Flowers 1.5-2.0 cm across at the anthesis, white. Calyx tubular, deeply 5-lobed. Corolla salverform, 5-lobed, white; tubes short; lobes orbicular, crisped. Stamens 5, included; anthers dithecous, dorsifixed. Ovary bilocular; style exserted; stigma bifid. Fruits capsule, ellipsoid, deflexed and fusiform seeds.

**5. *Mitracarpus hirtus*** (L.) DC., Prod. 4:527.1830. (Fig.1.E)

Annual erect or spreading herbs; stem and branches 4-angled. Leaf-blades elliptic, 1-3 cm by 0.5-1.5 cm, the bases acute, the margins entire, the apices subacute, scabrid on both surfaces; petioles flattened; stipules fimbriate sheath, apex bristle. Inflorescences axillary capitate clusters present at most nodes. Flowers about 2 mm across at anthesis, white; bracteoles filiform. Calyx lobes 4, 2 oblong-lanceolate, 2 narrowly triangular. Corolla-tube slightly hairy with a ring of hairs within; lobes 4, ovate. Stamens 4, exserted; anthers ovoid, dorsifixed. Ovary globoid, bilocular, with one ovule in each; style filiform; stigma bifid. Capsules globoid. Seeds ellipsoidal-rectangular, compressed.

**6. *Mitragyna diversifolia*** Havil., in Journ. Linn. Soc. 33:71 (Fig.1.F)

Unarmed trees; stem and branches terete, woody, stout. Leaf-blades oblong-ovate, 7-15 cm by 4-10 cm, the bases cordate, the margins entire, the apices obtuse to round; stipules ovate. Inflorescences terminal or axillary dichotomously branched of globose heads. Flowers about 2 mm across at anthesis, greenish white, fragrant; bract oblanceolate, foliaceous; bracteoles spatulate. Calyx 5-lobed, truncate. Corolla infundibuliform; lobes 5, elliptic-ovate, spatulate. Stamens 5, included; anthers linear, basifixed. Ovary bilocular, with numerous ovules in each; style filiform; stigma mitriform, exserted. Fruits capsular with persistent calyx. Seeds numerous, minute.

**7. *Mitragyna parvifolia*** (Roxb.) Korth., in Verh. Gesch. Nat. Bot. 161.1842. (Fig.1.G)6

Perennial trees; stem and branches terete, woody, stout. Leaves orbicular 3.5-5.5 cm by 2.0-3.5 cm, the bases truncate, the margins entire, the apices rounded; stipules oblong-elliptic. Inflorescences axillary or terminal globose heads with 2 linear elliptic leaves at the base. Flowers about 5 mm across at anthesis, pale yellow, fragrant; bract spatulate.

Calyx club- shaped, 4- or 5- lobed, white. Corolla infundibuliform, yellow; lobes 4 or 5, elliptic. Stamens 5, included; anthers linear, basifixed. Ovary oblongoid, bilocular, numerous ovules in each; style filiform, exserted; stigma mitriform. Capsules of 2 dehiscent cocci, forming together a fleshy syncarp. Seeds numerous.

**8. *Morinda tinctoria* var. *tomentosa*** (Hyene)Hook.f.,FL.Br.Ind. 3:156.1882. (Fig.1.H)

Perennial small trees; stem and branches woody, quadrangular while young, with distinct leaf-scars. Leaf-blades broadly elliptic to elliptic- oblong, 9-20 cm by 4.5-10.0 cm, the bases attenuate, the margins entire, the apices acuminate; stipules triangular. Inflorescences axillary pedunculate heads. Flowers about 1.5 cm across at anthesis, white, fragrant. Calyx truncate. Corolla salverform; tube cylindrical; lobes 5, lanceolate or elliptic, incurved at the apex. Stamens 5, included; anthers linear, dorsifixed. Ovary ovoid, tetralocular, 4-ovulate, immersed in the calyx-tube; style slender; stigma capitate. Fruits of many drupes coalescent into a globoid fleshy syncarp, black. Seeds globoid.

**9. *Mussaenda incana*** Wall.in Roxb.,Hort.Beng.1814. (Fig.1.I)

Perennial erect or climbing shrubs; stems and branches terete, woody, stout. Leaf-blades broadly ovate or rounded, 10-15 cm by 6-10 cm, the bases acute, the margins entire, the apices acute; stipules triangular, deeply bifid at the tip. Inflorescences terminal dichasial cymes. Flowers about 1.5 cm across at anthesis, yellowish-orange;bract lanceolate, trifid at the apex. Calyx-tube short, adnate to the ovary; lobes 5, unequal, the smaller four, linear lanceolate; the larger one stalk, petaloid; blade ovate-lanceolate, white. Corolla salverform, yellowish-white; lobes 5, ovate-acuminate. Stamens 5, included; anthers linear, basifixed. Ovary ellipsoid, bilocular with many ovules in each; styles, included; stigma bifid. Fruits berries, obovoid, crowned with the calyx-teeth. Seeds numerous, minute, pitted.

**10. *Mussaenda roxburghii*** Hook.f.,Fl.Brit.Ind.3:87.1882. (Fig.1.J)

Perennial erect or scandent shrubs; stem and branches terete, woody, stout. Leaf-blades elliptic-lanceolate, 5.0-7.5 cm by 2.0-3.0 cm, the bases acute, the margins entire, the apices long acuminate; stipules triangular-lanceolate,bifid at the tip. Inflorescences terminal dichasial cymes. Flowers about 1cm across at anthesis, yellowish-orange; bracts lanceolate, acute at the apex. Calyx-tube very short; lobes 5, unequal, the smaller four, filiform, the larger one stalk, petaloid; blades elliptic-lanceolate, pale yellow. Corolla salverform, yellowish-white; lobes 5, ovate. Stamens 5, included; anthers linear, basifixed. Ovary ovoid, bilocular with many ovules in each; styles included; stigma bifid. Berries ellipsoid, crowned with the calyx-teeth. Seeds many, smooth.

**11. *Nauclea orientalis*** L.,Sp.Pl.Ed.2,1.243.1762. (Fig.1.K)

Large trees, spreading; stems and branches terete, woody, stout. Leaf- blades ovate to broadly ovate, 10-20 cm by 5-12 cm, the bases cordate, the margins entire, the apices obtuse; stipules large, foliaceous. Inflorescence terminal globose pedunculate heads. Flowers about 5 mm across at anthesis, yellow, fragrant. Calyx-tube very short, persistent; lobes 5, oblong- spatulate, persistent. Corolla infundibuliform; lobes 5, ovate, pale yellow, fleshy. Stamens 5, included; anthers ellipsoidal, basifixed. Ovary globoid, bi or tetra locules; style filiform, exserted; stigma 2- to 3- clefted. Fruits woody syncarp. Seeds ovoid, numerous.

**12. *Oldenlandia diffusa*** (Willd.) Roxb., FL. Ind. 1:444. 1820. (Fig. 1.L)

Annual erect herbs; stems and branches terete, scabrid. Leaf-blades linear-lanceolate, 2.0-3.5 cm by 0.3-0.4 cm, the bases cuneate, the margins entire, the apices acute; stipules slightly pectinate, bristle 3-5. Inflorescences axillary cymes, 1-3 flowered. Flowers 1-2 mm across at anthesis, white small. Calyx tube very short; lobes 4, narrowly triangular. Corolla funnel or salver form; lobes 4, ovate to triangular, white. Stamens 4, included; anthers globoid, dorsifixed. Ovary ovoid, bilocular with numerous ovules in each; style filiform; stigma bifid. Capsules subgloboid with persistent calyx-teeth, dehiscing by a longitudinal slit. Seeds numerous, black.

**13. *Paederia foetida*** L. Mant. PL. 1:52. 1767. (Fig. 1.M)

Perennial slender twining shrubs; stem and branches terete, flexuous. Leaf-blades ovate-lanceolate, 4-10 cm by 2-6 cm, the bases cordate, the margins entire, the apices acuminate; stipules triangular. Inflorescences axillary and terminal paniculate cyme. Flowers about 8 mm across at anthesis, purple; bract subulate. Calyx small; tube campanulate; teeth 5, short triangular. Corolla tubular, reddish purple; tube widened at the mouth; lobes ovate. Stamens 5, included; anthers linear, dorsifixed. Ovary ellipsoid, bilocular, with one erect ovule in each; style filiform; stigma cleft into 2 arms. Fruits drup, broadly elliptic compressed, crowned by the conical disk. Seeds 2, black.

**14. *Pavetta indica*** L., Sp. Pl. 1: 110. 1753. (Fig. 1.N)

Perennial branching small trees; stem and branches quadrangular woody, stout. Leaf-blades elliptic-lanceolate, 5-12 cm by 4-8 cm, the bases acute, the margins entire, the apices obtuse to acute; stipules broadly triangular. Inflorescences terminal and axillary dichotomously corymbose cymes, many-flowered. Flowers about 1 cm across at anthesis, white; bracts minute. Calyx shortly triangular; lobes 4, dentate to triangular. Corolla salverform, white; lobes 4, elliptic-oblong. Stamens 4, exserted; anthers linear-oblong, basifixed. Ovary ovoid, bilocular with one ovule in each; styles filiform; stigma bilobed. Fruits globoid, black at maturity. Seeds subgloboid, plano-convex.

**15. *Rubia cordifolia*** L., Syst. Nat. ed 12, 3:229. 1768. (Fig. 1.O)

Perennial climbing herbs; stem and branches 4 angled, long weakly scrambling, brittle, with recurved prickles on the ribs. Leaf-blades obovate-lanceolate, 2-10 cm by 1.0-3.5 cm, the bases cordate, the margins entire and with a few coarse recurved hairs, the apices acute; petioles with recurved pickles; stipules foliaceous. Inflorescences axillary lax dichasial cyme. Flowers about 3 mm across at anthesis, white; bracts oblong-lanceolate; hypanthium globose. Calyx indistinct. Corolla shortly campanulate; lobes 5, triangular, tip incurved. Stamens 5, exserted; anthers oblong, dorsifixed. Ovary globoid, 1-2 locular, ovules one in each; styles bifid; stigma capitate. Fruits globoid, fleshy. Seeds 1-2, globose.

**16. *Spermacoce articularis*** L.f., Suppl. PL. 119. 1782. (Fig. 1.P)

Perennial prostrate herbs; stem and branches 4-angled, rusty brown hairs. Leaf-blades obovate, 2-3 cm by 1.0-1.5 cm, the bases cuneate, the margins entire, the apices acute; stipules pectinate, the apex bristle pubescent. Inflorescences axillary clusters of 1 or 2 flowers. Flowers about 5 mm across at anthesis, light purple; bracteoles inconspicuous. Calyx 4 lobes, oblong, ciliate on the margins. Corolla hypocrateriform, light purple; lobes 4, triangular. Stamens 4, exserted; anthers linear-oblong. Ovary bilocular with one ovule in each; style exserted; stigma bilobed. Capsules obovoid, splitting into two valves, hispid. Seeds oblong, brown.

**17. *Spermacoce ramanii*** Sivarajan&Nair, Taxon 35:367.1986. (Fig.1.Q)

Annual small herbs; stem and branches slightly 4-angled, hispid to scabrous at the angles. Leaf-blades elliptic-lanceolate, 3-4 cm by 0.5-1.0 cm, the base cuneate, the margins entire, the apices acute; stipules pectinate, the apex bristle. Inflorescences terminal, capitate cluster of 1-3 flowers. Flower about 2 mm across at anthesis, white; bracteoles filiform. Calyx- tube minute; lobes 4, equal, subulate. Corolla infundibuliform, white; lobes 4, elliptic-lanceolate. Stamens 4, exserted; anthers oblongoid, dorsifixed. Ovary oblongoid, bilocular with one ovule in each; style filiform; stigma bilobed. Capsules ellipsoidal, splitting into 4-valves. Seeds oblong, brown.

**18. *Wendlandia bicuspida*** Wight&Arn., Prod. 1:403.1834. (Fig.1.R)

Perennial small trees; stem and branches woody. Leaf-blades oblanceolate, 4.5-12.5 cm by 2.5-5.0 cm, the bases cuneate, the margins entire, the apices acute; stipules cuspidate. Inflorescences terminal dense thyrsoid paniculate cymes. Flowers about 1.5 mm across at anthesis, pale yellowish white; bracteoles linear. Calyx-tube short; lobes 5, small, triangular. Corolla yellowish white; lobes 5, oblong. Stamens 5, exserted; anthers sagittate, dorsifixed. Ovary globoid, bilocular with numerous ovules in each; style filiform; stigma bilobed. Capsules globoid, loculicidally. Seeds very minute, compressed, brown.

**19. *Wendlandia puberula*** DC., Prodr. 4:412. (Fig.1.S)

Perennial small trees; stem and branches woody, reddish brown. Leaf-blades elliptic-lanceolate, 10-15 cm by 3.5-4.0 cm, the bases cuneate, the margins entire, the apices acuminate; stipules triangular. Inflorescences terminal dense paniculate cymes. Flowers about 4 mm across at anthesis, white, slightly fragrant; bracteoles linear. Calyx-tube less than 1 mm long; lobes 5, triangular or subulate. Corolla tubuliform, white; tube cylindrical; lobes 5, oblong, lobes shorter than the tube. Stamens 5, exserted; anthers linear, dorsifixed. Ovary globoid, bilocular, with numerous ovules in each; style filiform; stigma bilobed. Capsules ovoid. Seeds numerous, spherical, minute, black.

**20. *Wendlandia tinctoria*** Roxb. in DC., Prodr. 4:411.1830. (Fig.1.T)

Perennial small trees; stem and branches woody, reddish brown. Leaf-blades elliptic-obovate, 8-13 cm by 4-5 cm, the bases cuneate, the margins entire, the apices acute; stipules triangular. Inflorescences terminal dense thyrsoid paniculate cymes. Flowers about 2 mm across at anthesis, white or cream; bracteoles linear. Calyx triangular; lobes 5, ovate. Corolla tubuliform, white; lobes 5, oblong. Stamens 5, exserted; anthers sagittate, dorsifixed. Ovary globoid, bilocular with numerous ovules in each; style filiform; stigma bilobed. Fruits oblongoid, loculicidally. Seeds compressed, brown.

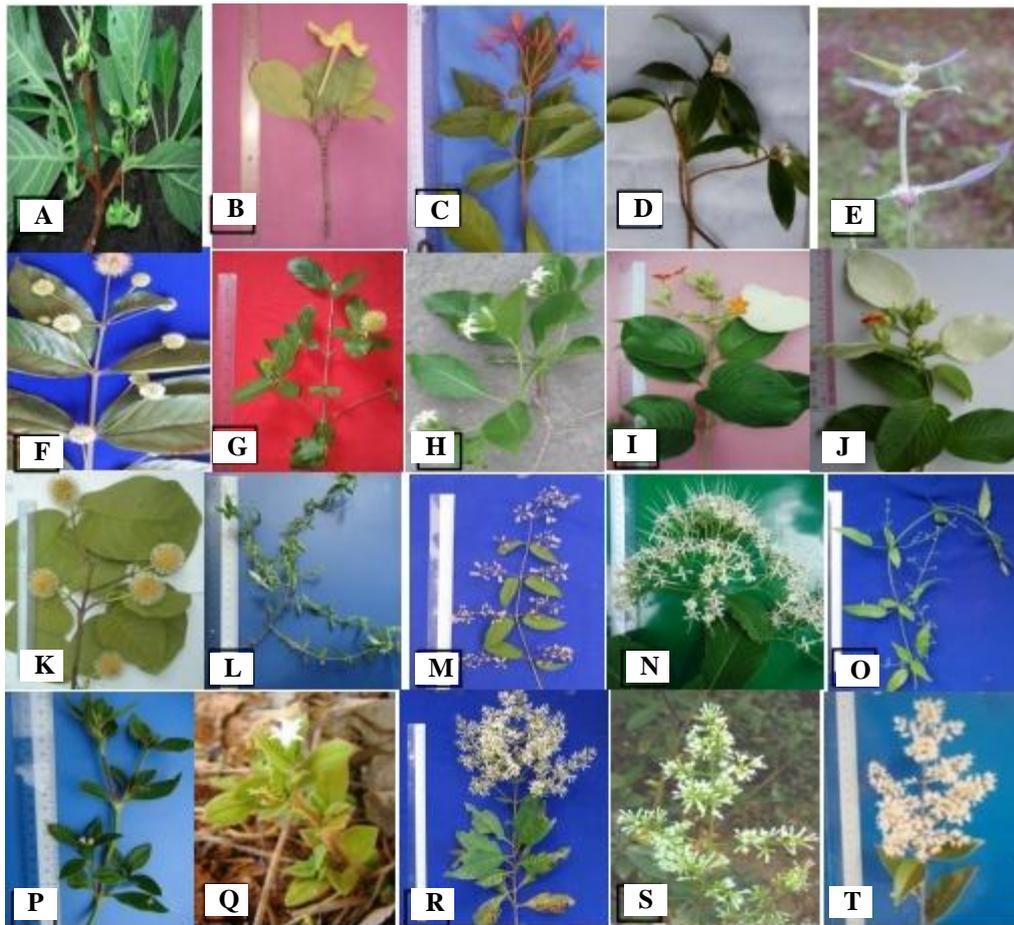


Figure 1.

- |   |   |
|---|---|
| A. <i>Dioecrescis erythroclada</i> (Kurz.) Tirverg              | K. <i>Nauclea orientalis</i> L.               |
| B. <i>Gardenia coronaria</i> Buch-Ham.                          | L. <i>Oldenlandia diffusa</i> (Willd.) Roxb.  |
| C. <i>Hamelia patens</i> Jacq                                   | M. <i>Paederia foetida</i> L.                 |
| D. <i>Luculia intermedia</i> Hutch.                             | N. <i>Pavetta indica</i> L.                   |
| E. <i>Mitracarpus hirtus</i> (L.) DC.                           | O. <i>Rubia cordifolia</i> L.                 |
| F. <i>Mitragyna diversifolia</i> Havil.                         | P. <i>Spermacoce articularis</i> L.           |
| G. <i>Mitragyna parvifolia</i> (Roxb.) Korth.                   | Q. <i>Spermacoce ramanii</i> Sivarajan & Nair |
| H. <i>Morindia tintonica</i> var. <i>tomentosa</i> (Hyene) Hook | R. <i>Wendlandia bicuspidata</i> Wight & Arn. |
| I. <i>Mussaenda incana</i> Wall.a                               | S. <i>Wendlandia puberula</i> DC.             |
| J. <i>Mussaenda roxburghii</i> Hook. f.                         | T. <i>Wendlandia tinctoria</i> Roxb.          |

Table.1 List of plant species From Natma Taung National Park

No.	Scientific name	Local name		Flowering Period	Latitudes (N)	Longitudes (E)	Elevation (m)
1	<i>Dioecresis erythroclada</i> (Kurz.) Tirverg	Hmanni		Mar- Apr	21°42'27"	96°21'16"	537
2	<i>Gardenia coronaria</i> Buch-Ham.	Yin-gat-gyi		Feb-May	21°42'33"	96°21'19"	540
3	<i>Hamelia patens</i> Jacq.	Thaw-ka-kalay		Jul-Dec	21°42'17"	96°21'11"	528
4	<i>Luculia intermedia</i> Hutch.	Kyweno pan		Feb-May	21°42'24"	96°21'14"	533
5	<i>Mitracarpus hirtus</i> (L.) DC.	Unknown		Sep-Dec	21°42'38"	96°21'20"	542
6	<i>Mitragyna diversifolia</i> Havil.	Hnaw - htein		Jun-Aug	21°42'25"	96°21'15"	535
7	<i>Mitragyna parvifolia</i> (Roxb.) Korth.	Htein		Jun-Aug	21°42'20"	96°21'14"	529
8	<i>Morinda tinctoria</i> var. <i>omentosa</i> (Hyene)	Hook.fNibase		May-Jun	21°42'15"	96°21'7"	527
9	<i>Mussaenda incana</i> Wall.	Pwinttu-ywettu		Jun-Oct	21°42'37"	96°21'19"	541
10	<i>Mussaenda roxburghii</i> Hook. f.	Pwinttu-ywettu		Jul-Sep	21°42'31"	96°21'19"	539
11	<i>Nauclea orientalis</i> L.	Ma-u-ga-ton		May-Jun	21°42'20"	96°21'14"	529
12	<i>Oldenlandia diffusa</i> (Willd.) Roxb.	Sula-napha		Jul-Sep	21°42'22"	96°21'14"	531
13	<i>Paederia foetida</i> L.	Pe-bok-new		Sep- Nov	21°42'29"	96°21'18"	538
14	<i>Pavetta indica</i> L.	Za-gwe-pan		May-Jun	21°42'17"	96°21'11"	528
15	<i>Rubia cordifolia</i> L.	Unknown		Sep- Nov	21°42'33"	96°21'19"	540
16	<i>Spermacoce articulata</i> L.	Unknown		Sep-Dec	21°42'15"	96°21'7"	527
17	<i>Spermacoce ramanii</i> Sivarajan & Nair	Unknown		Jun-Sep	21°42'24"	96°21'14"	534
18	<i>Wendlandia bicuspisdata</i> Wight & Am.	Thit-ni		Feb-Mar	21°42'31"	96°21'19"	539
19	<i>Wendlandia apuberula</i> DC.	Thit-ni		Jan-Mar	21°42'25"	96°21'15"	535
20	<i>Wendlandia tinctoria</i> Roxb.	Thit-ni		Jan-Mar	21°42'27"	96°21'16"	537

### Discussion and Conclusion

The taxonomic study on some species of Rubiaceae from Dee Dote area was conducted. In this study, 20 species belonging to 15 genera from Rubiaceae have been presented. It was noticed that some genera of Rubiaceae such as *Gardenia*, *Dioecrescis*, *Hamelia*, *Luculia*, *Mitracarpus*, *Mitragyna*, *Morinda*, *Mussaenda*, *Nauclea*, *Oldenlandia*, *Paederia*, *Pavetta*, *Rubia*, *Spermacoce*, and *Wendlandia* are common in their natural habitat. Although the study site is mountainous area and in temperate zone, the distribution of plants are not only woody but also shrubby herbs and shrubs. As a result, 10 tree species were found as woody and five species are shrubby and the other species are herbs. Among them, the distribution of woody plants are not only evergreen trees but also deciduous plants.

The majority of the studied species are erect plants but climbing plants of *Paederia foetida* and *Rubia cordifolia* are also fairly abundant and later is spinous herbs. The shrubby plants of *Mussaenda incana* and *Mussaenda roxburghii* are very interesting species and widely distributed throughout the Dee Dote area. The leaves of *Oldenlandia diffusa* are linear-lanceolate and others are ovate, elliptic-ovate or elliptic lanceolate, ovate-oblong, and broadly oblong or ovate. All the species of Rubiaceae have stipules, but in some species, they are foliaceous in *Rubia*. Inflorescences are generally cymose. They are globose heads, dichasial, corymbiform or paniculate and solitary flower. The inflorescences are terminal, axillary or sometimes fasciated at the nodes in *Mitracarpus*, and *Spermacoce* species, terminal globose pedunculate heads in *Mitragyna* and *Nauclea*. In *Morinda* species, the flowers are terminal or axillary globose heads, dichasial cyme in *Mussaenda*, paniculate in *Paederia* species. Thyrsoid paniculate cymes are found in *Wendlandia* species, helicoid cyme in *Hamelia* and solitary flowers in *Gardenia* species. Then the remaining species are corymbose cymes.

The calyx-lobes are equal in size, but subequal in *Mussaenda* species, one of the larger calyx-lobe is petaloid, and in *Morinda* the calyx-lobes are not conspicuous. The stigma is mostly bilobed or equal. The shape of stigma capillary twisted in *Paederia* species, and mitriform in *Mitragyna*. The fruits are mostly drupes, berries, capsules or schizocarp. Among them, *Knoxia* species are schizocarps. Drupes are mostly ovoid or ellipsoid in *Gardenia* species, in *Morinda* and *Nauclea* species fruits are syncarp. Capsule in *Luculia*, *Mitracarpus*, *Mitragyna*, *Oldenlandia*, *Spermacoce* and *Wendlandia* and the rest are berries.

Curing the field trip in this area, it has been noticed that so many visitors often came there and Dee Dote area will be regarded as a resort spot. In addition, this plant in the natural vegetation is utilized by local people for pick up bamboo-shoots, bamboo, mushroom and fuelwood that is used for brick-baking by local people. Thus, the depletion of natural vegetation occurred in most area. Therefore, all nationality should be maintaining valuable species for natural resources of Myanmar. In conclusion, the present study provides the valuable taxonomic information for identification of naturally distributed wild species of Rubiaceae.

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### References

- Backer, C. A & R. C. (1965). *Flora of Java*, Vol. 2. Rijksherbarium, Leyden, N. V. P.Noordhoof. 1. Groningen. The Netherlands.
- Dassanayake, M. D. (1998). *A revised handbook to the Flora of Ceylon*. Vol. 12.Rubiaceae, University of Peradeniya, Department of Agriculture, Peradenya, Sri Lanka.
- Heywood, V. H., R.K, Brummit, A., Culham & O. Seberg. (2007). *Flowering plant of the families of the World*. Firefly Books; Ontario, Canada.
- Hooker, J. D., (1879). *The Flora of British India*, Vol.3, L. Reeve & Co. 5 Henrietta Street,Covent Garden, London.
- Hundley, H. G., (1987). *List of Trees, Shrubs, Herbs and principal Climbers*, etc. Fourth Revised Edition, Shwe Daw Oo Press, Mayangon, Rangoon, Burma.
- Jackson, B.D. et.al, (1885). *Index Kewensis.*, An Enumeration of the Genera and species flowering plants part I-IV and supplements 1-21. Royal Botanical Garden, Kew.
- Kress, J. and *et al.* (2003). *A Checklist of the trees, shrubs, Herbs and Principal Climbers of Myanmar*. Department of Systematic Biology- botany. National Museum of Natural History, Washington DC.USA.
- Qi-ming, H.U. & W.U. De-lin. (2009). *Flora of Hong Kong*. Vol 1 to 3, Hong Kong Herbarium South China Botanical Garden, Chinese Academy of sciences.