

## **TAXONOMIC STUDY ON TWELVE SPECIES OF ANGIOSPERMAE IN THARTHANAR-2500 HILLOCK, LASHIO AREA**

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### **Abstract**

The present study deals with the members of Angiospermae growing in Tharthanar-2500 Hillock, Lashio area. Some species are collected during December 2019 to June 2020. Some flowering plants from Tharthanar-2500 Hillock have been collected, identified and then morphological characteristic were studied. In this study, twelve species belonging to twelve genera of nine families were identified and systematically arranged according to APG IV system, 2016 (Angiosperm Phylogeny Group). Artificial key to the species, detail taxonomic descriptions of the individual species has also been described with relevant photographs. In addition, their flowering period, Myanmar names and English names were also described.

**Keywords:** Taxonomy, Angiospermae, Tharthanar-2500 Hillock, Lashio area

### **Introduction**

Lashio area is situated in Northern Shan State of Myanmar. Tharthanar 2500 Hillock is located in Lashio area. Lashio area is bounded by Humon village in the east, Ei nine village in the west, Mehan and Man ai villages in the south and Swan kwai village in the north. It lies between 22°53'-23°02' North Latitude and 97°42'-97°48' East Longitude. Lashio area lies 855 meter above sea level. The area is about 4832 kilometer square.

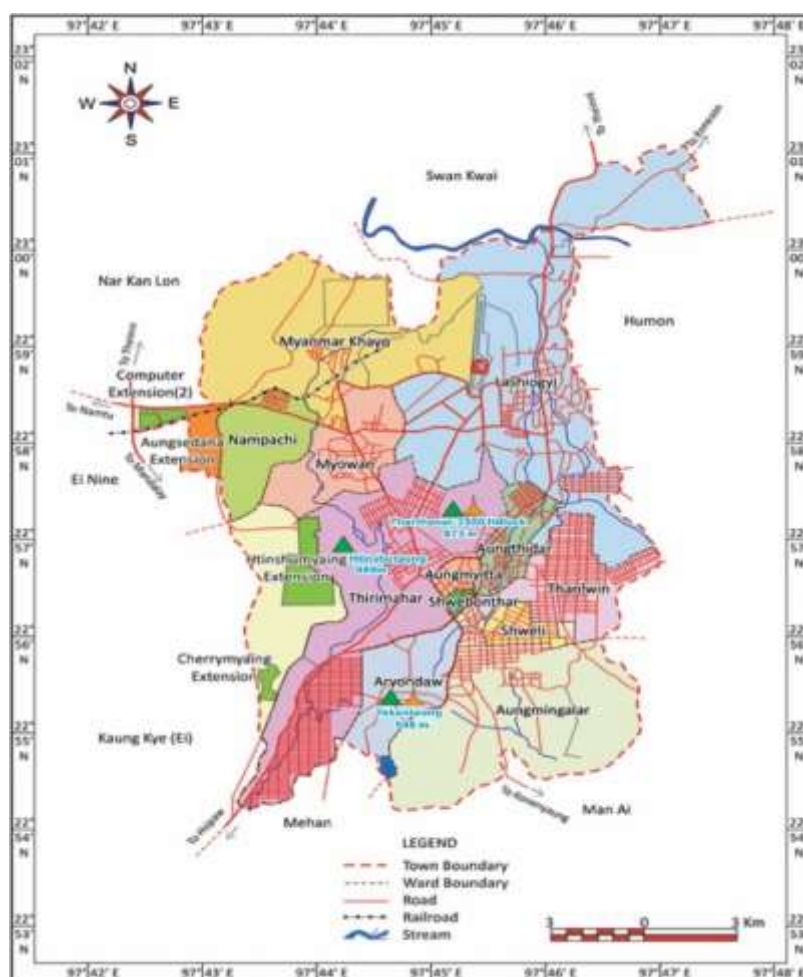
During the period from December 2019 to June 2020, an average monthly rainfall is 76.86 mm and 6 rainy days. This area almost gets no rain fall in February and March. The average maximum temperature is 29.64° C and average minimum temperature is 13.77° C. The coldest month of this area is December (8° C). The warmest month is May (33° C). The maximum percentage of humidity in December and January is 86 and the minimum percentage of humidity in May is 35 (Meteorology and Hydrology Department, Lashio). The climate condition is warm and wet, good rainfall and moderate temperature than the middle part of Myanmar. The soil type is mostly red loamy.

Tharthanar 2500 Hillock is in the mountain deciduous forest region. The natural vegetation of Tharthanar 2500 Hillock consists of herbs, shrubs, climbers, twiners, vines and woody trees. In the present study twelve species belonging to twelve genera of nine families under subclass Magnoliidae had been identified and fully described. The families Proteaceae, Fabaceae, Rosaceae, Moraceae, Cucurbitaceae, Elaeocarpaceae, Cornaceae, Rubiaceae and Apocynaceae are found in this area.

The aim and objectives of the present research are mainly to record the knowledge on the natural resources in study area, to get valuable information of Angiospermae to be used for other researchers and to provide for learning in botany.

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Source: Department of Geography, Lashio University

**Figure 1** Location map of Lashio area

## Materials and Methods

Some members of Angiospermae were collected from Tharthanar-2500 Hillock, Lashio area. The specimens were collected from December 2019 to June 2020. The specimens were kept immediately into the plastic bags to identify and classify systematically. The collected specimens had been observed and noted in detail. And then the collected specimens were identified with the references of Flora of British India (Hooker, 1875, 1878 & 1885), Flora of Java (Backer, 1965), Flora of Ceylon, (Dassanayake, 1980, 1981, 1983, 1991, 1995, 1997, 1998 & 1999), Flora of Hong Kong, (Qi-ming, 2008), Flora of China (Wu. *et al.*, 2010). In addition to construction of artificial key to the species, all the resulting species are systematically arranged into families according to APG IV system, 2016 (Angiosperm Phylogeny Group) and genera and species according to alphabetically. The specimens were recorded by photographs.

## Results

**Table 1 List of the collected species (Subclass: Magnoliidae)**

Super order	Order	Family	Scientific name	Myanmar name
Eudicots	Ranunculales	Proteaceae	1. <i>Grevillea robusta</i> A. Curn.	Khardaw-hmi
Rosids	Fabales	Fabaceae	2. <i>Acrocarpus fraxinifolius</i> Whight & Arn.	Ye-tama
			3. <i>Adenanthera pavonina</i> L.	Ywe-gye
			4. <i>Biancaea sappan</i> (L.) Tod.	Thein-nyet
			5. <i>Caesalpinia minax</i> Hance	known
	Rosales	Rosaceae	6. <i>Rubus alceifolius</i> Poir.	Unknown
		Moraceae	7. <i>Broussonetia papyrifera</i> (L.) L' Herit.	Hmaing-kan-setku
	Cucurbitales	Cucurbitaceae	8. <i>Momordia dioica</i> Roxb.	Kyet-hin-kha-cho
Asterids	Oxalidales	Elaeocarpaceae	9. <i>Elaeocarpus robustus</i> Roxb.	Kaya-hmwe
	Cornales	Cornaceae	10. <i>Alangium chinese</i> (Lour.) Harms	Taw-posita
	Gentianales	Rubiaceae	11. <i>Pavetta indica</i> L.,	Myet-hna-pan
		Apocynaceae	12. <i>Telosma pallida</i> (Roxb.) Craib	Gwedauk-thein

## Taxonomic descriptions

### 1. Proteaceae (Juss, 1789)

#### 1. 1. *Grevillea robusta* A. Curn. ex R.Br., Port. Nov. 24.1830.

Myanmar name : Khardaw hmi  
 English name : Silver oak, Silk oak  
 Flowering period : March to May

Perennial, tall robust trees, 10-30 m high; twigs brownish with more or less appressed whitish hair. Leaves simple, alternate, exstipulate; petioles 2-6 cm long, brownish-tomentose; blades deeply pinnatifid, deltoid-ovate to oblong-ovate, 15-33 cm by 9-15 cm, pinnae 5-11 pairs, 2-12 cm long, the pinnae deeply pinnatifid with entire or incision; lobes lanceolate or linear-oblong, 2.5-8 cm by 0.5-1 cm, acute at the base, recurved along the margin, acuminate at the apex, olive green above, silver grey silky hairy beneath. Inflorescences terminal raceme, 5-15 cm long, many flowered; peduncles solitary or a few together on lateral branchlets, 2-3 cm long, densely tomentose. Flowers orange to golden-yellow, 0.5-1 cm in diameter, zygomorphic; pedicels slender, 1-1.5 cm long, glabrous. Perianth tubular, hooded, 4-lobed, 1.5-2 cm long, orange or golden-yellow to lemon-yellow with dark red inner base; lobes narrowly spatulate, 5-7 mm by 1-2 mm. Stamens 4, free, epitepalous, sessile; anthers dithecous, about 1 mm long; floral disk semi-annular; gynophore about 2-3 mm long. Ovary superior, ovoid, 1.5 mm by 1.5 mm, unilocular with 1-to 4 ovules on pendulous placentae, glabrous; style slender, 1-2.5 cm long, dilated at the apex, lemon-yellow, glabrous; stigma rhomboid-ovoid, 1 mm long, thick, greenish-yellow. Fruits follicular, compressed-ovoid, 1.5-2 cm by about 1 cm, 2-seeded, dehiscent, silver grey to olive green, glabrous. Seeds ovate, 1-1.5 cm by 0.5-1 cm, broadly winged, thin. (Figure. 2. A)

**Specimen examined** : Northern Shan State, Lashio area, Tharthanar-2500 Hillock, N 22° 57' 58.4", E 97° 44' 54.3", 869 meter, Dr. Tin Tin Maw, March 16, 2020, collected no. 3.

## 2. Fabaceae (Lindl. 1836)

### 2.1. *Acrocarpus fraxinifolius* Whight & Arn., Mag. Zool. Bot. 2: 547. 1838.

Myanmar name : Ye-tama  
 English name : Pink cedar, Australian ash, Indian ash  
 Flowering period : January to February

Deciduous trees, upto 40 m high; bole buttressed; bark thin light-grey or yellowish-grey; blaze dull red. Leaves bipinnate compound, alternate; stipules triangular, free lateral, caducous; rachis 13-15 cm long, stout, glabrous, pulvinate; 3-5 pairs, paripinnate, 20-30 cm long, slender, glabrous; leaflets 10-16 per pinnae, opposite; petiolules upto 4 mm long, slender, glabrous; blades elliptic, elliptic-lanceolate or elliptic-oblong, 3.5-17 cm by 1.5-7.5 cm, oblique and acute or obtuse at the base, entire along the margin, acuminate at the apex, glabrous, coriaceous; lateral nerves 7-15 pairs, pinnae slender, prominent, intercostae reticulate, faint. Inflorescences dense, axillary racemes, erect, many-flowered; peduncles 15 cm long. Flowers red, 1-1.5 cm in diameter, actinomorphic, deflexed; bracts small, caducous; pedicels 4-10 mm long. Calyx campanulate, 5-lobed; tube 3-4 mm by 3-4 mm, lobes ovate or triangular, 2.5-5 mm long, equal, short-hairy outside. Petal 5, free, oblong, narrow subequal, 5-10 mm by 3-4 mm, short-hairy. Stamens 5, free, exserted, crimson coloured; filaments 1.5-1.8 cm long, anthers ditheous. Ovary superior, oblong to linear, 1.2-1.5 cm long, stipitate, unilocular, with many ovules on the marginal placentae, hairy; style short, incurved; stigma minute. Pods flat, ligulate, 8-17 cm by 1.5-2.5 cm, 5 to 15-seeded, dehiscent, narrowly winged. Seeds obovate, oblique, 6.5 mm by 5 mm, smooth, compressed, brownish. (Figure. 2. B)

**Specimen examined** : Northern Shan State, Lashio area, Tharthanar-2500 Hillock, N 22° 56' 54.7", E 97° 44' 46.7", 829 meter, Dr. Tin Tin Maw, February 28, 2020, collected no. 2.

### 2.2. *Adenanthera pavonina* L., Sp. Pl. 384. 1753. Hance, J. Bot. 22: 365. 1884.

Myanmar name : Ywe-gye, Ywe-ni  
 English name : Bead tree, Chek-long, Coral wood, Red sandalwood  
 Flowering period : May to July

Small to medium-sized trees, up to 40 m high; stems and branches terete, glabrous. Leaves bipinnate compound, paripinnate, alternate, to 38 cm long; stipules filiform, about 0.5 mm long, caducous; petioles 1.5-2.5 cm long; rachis 20-38 cm long; glabrous, pinnae 3-5 pairs; leaflets 5-9 on each side of pinnae, alternate, elliptic to ovate or obovate-elliptic, 1.5-4 cm by 1.4-2.4 cm, broadly cuneate at the base, entire along the margin, rounded to truncate at the apex, thinly chartaceous, glabrous or slightly puberulous on both surfaces. Inflorescences axillary racemes, 14-22 cm long, many-flowered, glabrous or slightly puberulous, often with a few scattered glandular hairs; peduncles 3-4 cm long. Flowers white to yellow, 7-10 mm in diameter, actinomorphic; bracts lanceolate, about 0.5 mm long, puberulous; pedicels 5-7 mm long. Calyx subcordate to broadly cup-shaped, 5-teethed, glabrous or sparsely appressed puberulous; tube about 1 mm long; teeth rounded. Petals 5, free, oblong, 3-5 mm by 1-1.2 mm, acute at the apex, glabrous or sparsely appressed puberulous. Stamens 10, free, exserted; filaments filiform 3-4 mm long; anthers ditheous, with a stipitate gland. Ovary superior, linear, 2.5-3 mm by 1 mm, unilocular, with many ovules on the marginal placentae, glabrous or few scattered hairy; style filiform, 2.5-3 mm long; stigma simple. Pods linear-falcate, 22-25 cm by 1-1.5 cm, 15 to 25-seeded,

brown, contorted to spirally twisted after dehiscence. Seeds ellipsoid, uniformly bright scarlet, 8-9 mm by 7-9 mm. (Figure. 2. C)

**Specimen examined** : Northern Shan State, Lashio area, Tharthanar-2500 Hillock, N 22° 57' 11.6", E 97° 44' 34.4", 830 meter, Dr. Tin Tin Maw, June 5, 2020, collected no. 5.

### 2.3. *Biancaea sappan* (L.) Tod., Hort. Bot. Panorm. 1: 3. 1875.

*Caesalpinia sappan* L., Sp. Pl. 381.1753.

Myanmar name : Tein-nyet; Sun-the

English name : Sappan Wood, Indian redwood

Flowering period : December to February

Small trees or shrubs, up to 10 m high; stems terete, minutely tomentose, glabrescent, sparsely armed with short, straight or recurved prickles. Leaves bipinnate compound, paripinnate, alternate; stipules spiniform, about 3-5 mm long, usually recurved; petioles 1.5-2.5 cm long; rachae 25-40 cm long; with prickles, pinnae 9-14 pairs; leaflets 10-20 paired, opposite, asymmetrically oblong with excentric costa, 1-2.5 cm by 3-8 mm, obliquely truncate or obtuse at the base, entire along the margin, obtuse at the apex, glabrous on both surfaces. Inflorescences supra-axillary or terminal racemes, many-flowered; peduncles 12-40 cm long. Flowers yellow, 2-2.5 cm in diameter, zygomorphic; bracts lanceolate, about 5-12 mm long, puberulous, caducous; pedicels 1-2 cm long. Sepals 5, free, cucullate, the lowest one about 10 mm long, the others 7 mm long, leathery, ciliate or glabrous. Petals 5, free, suborbicular, 9-11 mm by 7-10 mm, clawed, yellow, tinged with pinkish at base. Stamens 10, free, exserted; filaments 1.5 cm long, densely pubescent in lower part; anthers dithecal, glabrous. Ovary superior, obliquely oblong, 7-10 mm by 3-4 mm, stipitate, unilocular, with 3-6 ovules on the marginal placentae, greyish tomentose; style filiform, 1.5 cm long, hairy; stigma truncate. Pods obliquely oblong, 7-10 cm by 3-4 cm, 2 to 4-seeded, beaked, black at maturity, puberulent when young but essentially glabrous. Seeds oblong to elliptic, 15-18 mm by 8-11 mm, slightly compressed, brown to black. (Figure. 2. D)

**Specimen examined** : Northern Shan State, Lashio area, Tharthanar-2500 Hillock, N 22° 56' 51.6", E 97° 45' 53.8", 869 meter, Dr. Tin Tin Maw, December 25, 2019, collected no.1.

### 2.4. *Caesalpinia minax* Hance, J. Bot. 22: 365. 1884.

Myanmar name : Unknown

English name : Unknown

Flowering period : April to July

Climbers, prickly, puberulent, throughout up to 8 m high; stems terete, puberulent, spiny. Leaves bipinnate compound, paripinnate, alternate, to 65 cm long; stipules subulate, hard; about 5-7 mm long; petioles 1-1.2 cm long; rachae 25-48 cm long; with prickles, pinnae 5-10 pairs; leaflets 6-12 paired, opposite, elliptic or oblong, 2-4.5 cm by 1.2-2 cm, puberulent on midvein, rounded and slightly oblique at the base, entire along the margin, obtuse-rounded or acute at the apex, glabrous on both surfaces. Inflorescences terminal racemes or panicles, many-flowered; peduncles 9-30 cm long. Flowers White, 2-3 cm in diameter, zygomorphic; bracts ovate-lanceolate, about 1.5-2 cm by 0.8-1 cm, puberulous, shortly acuminate at the apex; pedicels 1.5-2 cm long. Sepals 5, free, oblong, about 1.5-2 cm long, densely yellowish velutinous. Petals 5, free, obovate, about 1.8-11 cm by 1.2 cm, contiguous at base, obtuse-rounded at apex, white, tinged with purple spots, hairy beneath and marginally. Stamens 10, free, inserted; densely pubescent in lower part, filaments linear, 1.7-2 cm long; anthers dithecal, 2 mm long, glabrous. Ovary superior, oblong, 3-4 mm by 1-1.5 mm, unilocular, with 5-8 ovules on the marginal placentae, dense small spines;

style filiform, 2-2.5 mm long, slightly longer than stamens, glabrous; stigma truncate. Pods oblong, 7.5-13 cm by 4-4.5 cm, 3 to 8-seeded, obtuse-rounded at apex, with 0.5-2.5 cm beak, densely needle-like spiny. Seeds elliptic, slightly concave on one side, about 1.8 cm by 1 cm, with cyclic veins. (Figure. 2. E)

**Specimen examined** : Northern Shan State; Lashio area, Tharthanar-2500 Hillock, N 22° 56' 55.1", E 97° 44' 53.4", 872 meter, Dr. Tin Tin Maw, June 12, 2020, collected no. 7.

### 3. Rosaceae (Juss. 1789)

#### 3.1. *Rubus alceifolius* Poiret in Lamarck, Encycl. Meth. 6: 247. 1804. 1897.

Myanmar name : Unknown  
English name : Giant bramble, Wild raspberry  
Flowering period : June to August

Shrubs scandent, to 5 m high, with arching or climbing branches; branchlets brown or reddish brown, densely spreading straight tomentose-villous, with sparsely recurved prickles to 5 mm. Leaves simple, alternate; stipules oblong to orbicular, 1-1.7 cm long, deeply digitately or pinnately divided margin, with linear or linear-lanceolate lobes, hairy; petioles 2.5-4.5 cm long, yellowish gray to rusty tomentose-villous, with sparsely minute prickles; blades suborbicular or broadly ovate, 6-15 cm by 6.5-18 cm, palmately 5 veined, thinly leathery, cordate with incision to 3 or 4 cm deep at the base, shallowly 5-7-lobed and unevenly coarsely serrate along the margin, obtuse or acute at the apex, sparsely villous and distinctly bullate between veins above, yellowish-gray to rusty tomentose and villous along vein beneath. Inflorescences terminal, narrow cymose panicles or subracemes, 3-7-flowered, 6-11 cm long, sometimes flowers few in axillary clusters; peduncles 1-2 cm long, tomentose-villous, with minute recurved prickles. Flowers white, about 2-3 cm in diameter, actinomorphic; bracts 1-2 cm long, pinnatifid to pinnatipartite, with linear or lanceolate lobes; bracteoles 2, oblong, 1.5-2 cm long, pinnately divided margin; pedicels slender, 0.5-2 cm long, tomentose-villous, with minute recurved prickles. Calyx campanulate, 5-lobed, tomentose-villous; tube cupular, 0.5 cm by 1 cm; lobes broadly ovate to triangular-ovate, 1.2-1.5 cm by 5-8 mm, apex and margin of outer sepals palmately or pinnately lacinate, inner sepals entire and shortly pointed. Petals 5, free, suborbicular to broadly obovate, 5-9 mm by 5-9 mm, clawed. Stamens many, free, shorter than petals; filaments flattened, about 5 mm long, hairy; anthers dithecal, linear, about 1 mm long, with few long hairs. Pistils numerous, longer than stamens. Ovary inferior, ellipsoid, 1-1.5 mm by 1 mm, unilocular, with two ovules on the basal placenta, glabrous; style filiform, 7-9 mm long, glabrous; stigma capitate. Fruits aggregate berry, subglobose, 1.5 cm by 1.8 cm, 1-seeded drupelets, red when ripe; drupelets small, subglobular, black, rugose. (Figure. 2. F)

**Specimen examined** : Northern Shan State, Lashio area, Tharthanar-2500 Hillock, N 22° 57' 03.8", E 97° 45' 0.8", 863 meter, Dr. Tin Tin Maw, June 30, 2020, collected no. 12.

### 4. Moraceae (Link. 1831)

#### 4.1. *Broussonetia papyrifera* (L.) L'Herit. ex Vent., Tabl. Reg. Veg. 3: 547. 1799.

*Morus papyrifera* L., Sp. Pl. 2: 986. 1753.

Myanmar name : Hmaing-kan-setku, The-le  
English name : Paper mulberry, Tapa cloth tree  
Flowering period : February to April

Deciduous, medium sized trees, 10-20 m tall, dioecious; bole small buttresses; bark smooth, dark grey; branchlets 1.5-3 mm thick, short, soft hairy. Leaves simple, alternate or

opposite or whorled; stipules ovate, 5-15 mm by 4-10 mm, acuminate, membranous, slightly ribbed, densely hairy, caducous; petioles 2-12 cm long, hairy; blades obliquely broad ovate to ovate-elliptic or oblong, 4-18 cm by 3-12 cm, rounded or cordate and asymmetric at the base, entire or serrulate to finely dentate, unlobed or palmately 3-lobed along the margin, acuminate at the apex, scabrous and sparsely pubescent above, densely soft hairy beneath especially along the veins. Male catkins axillary or crowded at terminal of young shoots, cylindrical, 3-9 cm long, many-flowered, pale yellow; peduncles 1-2.5 cm long, hairy; bracts lanceolate, pubescent. Male flowers: minute, actinomorphic, sessile; calyx triangular-ovate, 1.5-2 mm by about 1 mm, 4-lobed, whitish hairy outside; stamens 4, 3-3.5 mm long, anthers ditheous, globose. Female heads globose, 1-1.5 cm in diameter, solitary, many-flowered, greenish; peduncles 0.5-2 cm long, hairy, bracts clavate, apically pubescent. Female flowers: minute, actinomorphic; calyx tubular, 4-lobed, apically connate with style, about 2 mm long; ovary superior, ovoid, about 0.5 mm long, unilocular, with one ovule on the pendulous placentae, stipitate; styles filiform, about 5-6 mm long, pink; stigma linear, pubescent. Etaerio of drupes, globose, 2-3 cm in diameter, orange-red, drupelets oblongoid, 2- 2.5 mm long, 1-seeded. (Figure. 2. G & H)

**Specimen examined:** Northern Shan State, Lashio area, Tharthanar-2500 Hillock, N 22° 57' 02.3", E 97° 44' 54.5", 881 meter, Dr. Tin Tin Maw, March 27, 2020, collected no. 4.

## 5. Cucurbitaceae (Juss. 1789)

### 5.1. *Momordia dioica* Roxb. ex. Willd. Sp. Pl. 4: 605.1805.

Myanmar name : Kyet-hin-kha-cho, Hinga-baung  
 English name : Spiny gourd, bristly balsam pear, prickly carolaho  
 Flowering period : Jun to October

Perennial, climbing herbs, dioecious, with tuberous roots; stems slender, much branched, furrowed, glabrous and shining; tendrils simple, elongate, striate, glabrous. Leaves simple, alternate, petioles slender, 2.5-5 cm long, puberulous, channelled above; blades ovate-cordate, 5-15 cm by 5-12 cm, deeply cordate at the base, shortly denticulate along the margin, acuminate at the apex, minutely punctate, especially beneath. Male flowers axillary, solitary, pale yellow or white, 3-6 cm in diameter, actinomorphic; bracts cupuliform, 1.5-2.5 cm by 2.5-3.5 cm, foliaceous, enclosing the flowers bud, strongly nerved, corrugate, oblique, emarginate at the apex, pubescent; peduncles 5-10 cm long, finely patent-pubescent. Calyx 5-lobed, distinct, linear-lanceolate, 1-1.3 cm by 7-9 mm, pubescent. Petals 5, basally connate, oblong lanceolate, 4-6 cm by 2.5-3 cm, pale yellow with black spots at the base, finely pubescent. Stamens 5, inserted; filaments short, slender, black; anthers ditheous, one monothecous, yellow above and black beneath. Female flowers axillary, solitary, pale yellow or white, 3-6 cm in diameter, actinomorphic; peduncles 5-23 cm long, finely patent-pubescent. Calyx and petals similar to male flowers. Ovary inferior, oblong-ovoid, unilocular, with many ovules on the parietal placentae, densely long soft-papillose; style very short; stigma bifid. Fruits baccate, ellipsoid or oblong-ovoid, 2.5-7 cm by 3.5-4.5 cm, shortly beaked, densely soft spines, orange or yellow, splitting into 3 valves when ripe. Seeds many, broadly ellipsoid, 1 cm long, slightly compressed, enclosed in a red pulp, irregularly corrugated, black. (Figure. 2. I & J)

**Specimen examined:** Northern Shan State, Lashio area, Tharthanar-2500 Hillock, N 22° 56' 58.8", E 97° 44' 54.7", 879 meter, Dr. Tin Tin Maw, Jun 8, 2020, collected no. 6.

## 6. Elaeocarpaceae (Juss. ex DC. 1824)

### 6.1. *Elaeocarpus robustus* Roxb., Fl. Ind. ed. 2, 2: 597. 1832.

Myanmar name : Kaya-hmwe, Taw-magyi  
 English name : Cylon olive, India olive  
 Flowering period : Jun to July

Trees, 15-25 m high; barks lenticellate, warty on mature one, greenish grey; stem and branches terete, glabrescent. Leaves simple, alternate; stipules triangular, 5 mm by 3 mm, pubescent; petioles 1-3 cm long, thickened at both ends, often with 2 glands near apex, grey puberulous; blades elliptic-oblong to ovate-oblong, 5-24 cm by 3-10 cm, broadly cuneate to rounded at the base, repand-serrate along the margin, acute to acuminate at the apex, rusty pubescent when young, glabrous, coriaceous. Inflorescences axillary racemes, many-flowered, 4-14 cm long; peduncles 0.5-2 cm long, pubescent; flower buds oblong-ovoid, acute at apex. Flowers white, 5-7 mm in diameter, actinomorphic, fragrant; pedicels about 5-7 mm long, grey puberulous. Sepals 5, free, lanceolate or ovate, 5-6 mm long, acute at the apex, greenish yellow, densely villous along the margin. Petals 5, free, cuneate-oblong or obtriangular, lacinate at the apex, ciliate along the margin, 4-8 mm by 5 mm. Stamens 25-40, free; filaments filiform, about 1-3.5 mm long, glabrous or minutely puberulous; anthers ditheous, oblong, about 1 mm long; disc thick, 5-lobed, yellow, tomentose. Ovary superior, oblong to ovoid, 1-1.5 mm by 1.5 mm, trilocular, with one ovule in each locule on the axile placentae; style slender, about 2 mm long, hairy; stigma simple. Fruits drupaceous, ovoid-ellipsoid or oblong-ovoid, 3.5 cm by 3 cm, 1-seeded, greenish-yellow; pyrenes 2-3 locular, with 2 longitudinal grooves prominently rugose. (Figure. 2. K)

**Specimen examined** : Northern Shan State, Lashio area, Tharthanar-2500 Hillock, N 22° 56' 54.7", E 97° 44' 46.7", 829 meter, Dr. Tin Tin Maw, June 28, 2020, collected no. 11.

## 7. Cornaceae (Dumort. 1829)

### 7.1. *Alangium chinese* (Lour.) Harms, Ber. Deutsch. Bot. Ges. 15: 24. 1897.

*Stylidium chinese* Lour., Fl. Cochinch. 221.1790.

Myanmar name : Taw-posa, Saga-thein, Letkadon, Tabuya  
 English name : Alangi, Chinese Alangium  
 Flowering period : May to July

Shrubs or small trees, 3-5 m high; branchlets pubescent when young, glabrescent. Leaves simple, alternate, exstipulate; petioles 1.5-3.5 cm long, reddish, puberulous; blades ovate or orbicular to cordate, 10-22 cm by 5-14 cm, papery, usually oblique and often rounded or subrounded or triangular at the base, entire or with few shallow lobes along the margin, acuminate at the apex, glabrous above, tufted pubescent at axil of vein beneath. Inflorescences axillary cymes, 3-15-flowered, 5-6 cm long; peduncles 2-3 cm long, pubescent. Flowers creamy-white to pale yellow, 2 cm in diameter, actinomorphic, sweetly scented, golden hairy; bracts linear, 3 mm long; pedicels slender, 3-4 mm long, pubescent. Calyx cup-shaped, 6-8-lobed; tube 2 mm by 2 mm; lobes shortly dentate. Petals 6-8, free, lanceolate, 1-1.5 cm by 1 mm, roll backwards. Stamens 6-8, about as many as petals, free; filaments flattened, short, 2-3 mm long, pubescent inside; anthers ditheous, linear-oblong with a long connective, 8-9 mm long; disk cushion-like. Ovary inferior, ovoid, 1 mm by 1.5 mm, uni-bilocular, with one ovule in each locule on the pendulous placentae; style slender, 8-9 mm long, pale-yellow, glabrous; stigma capitate, 2-4-lobed, 1-1.5 mm long, pale-yellow. Fruits drupaceous, ovoid ellipsoid, 5-13 mm by 5-7 mm, 1-seeded, longitudinally grooved, crowned by a persistent disk and cup-shaped calyx, dark violet. Seeds compressed. (Figure. 2. L)



**Specimen examined** : Northern Shan State, Lashio area, Tharthanar-2500 Hillock, N 22° 27' 05.5", E 97° 44' 58.8", 872 meter, Dr. Tin Tin Maw, June 23, 2020, collected no. 10.

## 8. Rubiaceae (Juss. 1789)

### 8.1. *Pavetta indica* L., Sp. Pl. 110. 1753.

Myanmar name : Myet-hna-pan, Za-gwe-pan  
 English name : White pavetta, Hill pavetta, Indian pavetta  
 Flowering period : April to Jun

Perennial erect shrubs to small trees, up to 3 m high; stems and branches terete, glabrous, usually with pallid peeling bark. Leaves simple, opposite and decussate; stipules cupular to broadly triangular, 3-6 mm long, glabrous; petioles 1-2 cm long; blades elliptic to broadly elliptic, 11-15 cm by 5-7.5 cm, acute at the base, entire along the margin, obtuse or subacute at the apex, glabrous above, soft hairy beneath. Inflorescences terminal or axillary corymbose cymes; peduncles 3-5 cm long, glabrous. Flowers white, 1-1.5 cm in diameter, actinomorphic, fragrant; bracts often fused in pair; pedicels slender, 3-10 mm long. Calyx short, tubular, 4-lobed; tube tubular, 1-1.5 mm long; lobes triangular, 5 mm long. Corolla salverform; 4-lobed, tube 1.5-1.7 cm long, glabrous outside, pilose inside; lobes oblong, 5-9 mm by 2-3 mm, acute to mucronate at apex. Stamens 4, free, exserted, at the throat of corolla-tube; filaments filiform, about 1 mm long; anther ditheous, linear-oblong, 4-5 mm long, sagittate at base, often twisted, cream turning to black. Ovary inferior, ovoid, about 1 mm long, bilocular, with solitary ovule in each locule on the axile placentae, glabrous; style filiform, 2-3 cm long, glabrous; stigma oblong, greenish. Fruits baccate, globoid, 7-10 mm in diameter, 2-seeded, black. Seeds subgloboid, plano-convex. (Figure. 2. M)

**Specimen examined** : Northern Shan State, Lashio area, Tharthanar-2500 Hillock, N 22° 57' 04.8", E 97° 44' 59.8", 874 meter, Dr. Tin Tin Maw, June 15, 2020, collected no. 8.

## 9. Apocynaceae (Juss. 1789)

### 9.1. *Telosma pallida* (Roxb.) Craib, Bull. Misc. Inform. Kew. 1911: 418. 1911.

*Asclepias pallida* Roxb., Fl. Ind. 2: 49. 1824.

Myanmar name : Gwedauk-thein, Taw-daung-da-late, Swe-daw-nwe  
 English name : Telosma vine  
 Flowering period : June to September

Perennial, herbaceous, high-climbing vines; latex watery; stems slender, slightly tumid at the nodes, pale green with velvety hairs. Leaves simple, opposite and decussate, exstipulate; petioles 1.5-2.5 cm long, with velvety hairs; blades ovate, 4-9 cm by 2.5-6.5 cm; cordate at the base, entire along the margin, acuminate at the apex, membranous, sparsely hairy above, glabrous beneath except on the veins. Inflorescences axillary, erect or pendulous subumbelliform cyme, single or in pair, 10-16 flowered; peduncles 8-10 mm long. Flowers pale green, 2-2.5 cm in diameter, actinomorphic, slightly fragrant; bracts lanceolate, 5 mm by 2 mm, sparsely velutinous on both surfaces; pedicels filiform, 8-10 mm long, with velvety hairs. Calyx campanulate, 5-lobed, hirsute; lobes ovate-lanceolate or oblong, 4-5 mm by 1.5 mm, membranous with distinct veins, imbricate, obtuse at the apex. Corolla salver-shaped, 5-lobed, greenish, sparsely hairy both inside and outside; tubes very short, swollen at the base; lobes oblong, 9 mm by 3 mm, membranous, with outwardly rolled margin, obtuse at the apex, overlapping to the right in bud, rotate and twisted near the tip in bloom. Corona staminal, 4.5 mm by 2.5 mm, exserted above corolla tube; coronal scales 5, flattened, adnate to the back of anthers, not proceeding above anthers tip, erect, transversely bifid, swollen at the base with constriction just above it. Stamens 5, free, inserted, adnate to the

base of corolla tube; filaments connate into a tube; anthers ditheous, basifixed, the tips fleshy, scale-like, applied against the stigma; pollinia solitary in each cell, subcylindric-clavate, with a narrow hyaline margin, much larger than corpusculum, yellow, erect, waxy; corpusculum oblong-ovate, reddish brown; caudicles simple, membranous, shorter than the corpusculum. Ovary superior, composed of 2 distinct carpel, bilocular, with many ovules on the axile placentae; styles 2; stigma capitate-globose, protruding above the anthers tip. Follicles solitary, lanceolate, 10-16 cm by 1.5-2 cm, echinate with long soft bristles. Seeds 8 mm by 4 mm, comose, with thin membranous wings. (Figure. 2. N)

**Specimen examined :** Northern Shan State, Lashio area, Tharthanar-2500 Hillock, N 22° 57' 06", E 97° 44' 55.5", 875 meter, Dr. Tin Tin Maw, June 23, 2020, collected no. 9.

#### An artificial key to the studied species:

1. Ovary superior ----- 2
1. Ovary inferior ----- 9
  2. Leaves simple ----- 3
  2. Leaves compound ----- 6
3. Placentation pendulous ----- 4
3. Placentation axile ----- 5
  4. Plants monoecious; flowers zygomorphic; fruits follicular ----- 1. *Grevillea robusta*
  4. Plants dioecious; flowers actinomorphic; fruits etaerio of drupe ----- 7. *Broussonetia papyrifera*
5. Trees; leaves alternate; inflorescences racemes; flowers white; petals laciniate; stamens many; fruits drupaceous ----- 9. *Elaeocarpus robustus*
5. Climbing vines; leaves opposite and decussate; inflorescences subumbelliform cymes; flowers pale green; petals not laciniate; stamens 5; fruits follicular ----- 12. *Telosma pallida*
  6. Plants without prickles; flowers actinomorphic ----- 7
  6. Plants with prickles; flowers zygomorphic ----- 8
7. Flowers red; stamens 5; pods ligulate ----- 2. *Acrocarpus fraxinifolius*
7. Flowers white to yellow; stamens 10; pods linear-falcate ----- 3. *Adenanthera pavonina*
  8. Climbers; petal white, tinged with purple spots; pods densely needle-like spiny ----- 4. *Caesalpinia minax*
  8. Small trees or shrubs; petals yellow, tinged with pinkish base; pods glabrous ----- 5. *Biancaea sappan*
9. Leaves opposite and decussate; stamens 4, turning to black ----- 11. *Pavetta indica*
9. Leaves alternate; stamens 5 or 6-8 or many, not turning to black ----- 10
  10. Plants dioecious ; placentation parietal; fruits densely soft spines ----- 8. *Momordia dioca*
  10. Plants monoecious; placentation basal or pendulous; fruits glabrous ----- 11
11. Plants with prickles; petals not roll backwards; fruits aggregate berry ----- 6. *Rubus alceifolius*
11. Plants without prickles; petals roll backwards; fruits drupaceous ----- 10. *Alangium Chinese*

## Discussion and Conclusion

The present study deals with the plants growing in Tharthanar 2500 Hillock, Lashio area. Totally, twelve species belonging to twelve genera of nine families under subclass Magnoliidae had been studied in the present paper. All the species presented in this study are dicotyledonous plants.

The families in this research paper are Proteaceae, Fabaceae, Rosaceae, Moraceae, Cucurbitaceae, Elaeocarpaceae, Cornaceae, Rubiaceae and Apocynaceae under the subclass Magnoliidae. They are arranged according to the classification of APG IV system, 2016. Among the species in the present study, the species of *Broussonetia papyrifera* (L.) L' Herit and *Momordia dioica* Roxb. are commonly found in this area. The species of *Acrocarpus fraxinifolius* Whight & Arn. and *Alangium chinese* (Lour.) Harms are rarely found.

Among the twelve species, *Rubus alceifolius* Poiret is shrub; *Caesalpinia minax* Hance, *Momordia dioica* Roxb. and *Telosma pallida* (Roxb.) Craib are climbers and the rest species are trees. Except *Acrocarpus fraxinifolius* Whight & Arn., *Adenanthera pavonina* L., *Biancaea sappan* (L.) Tod., and *Caesalpinia minax* Hance are compound leaves and others are simple. Flowers of *Grevillea robusta* A. Curn., *Biancaea sappan* (L.) Tod., and *Caesalpinia minax* Hance are zygomorphic, but the rest species are actinomorphic. Except *Rubus alceifolius* Poiret, *Momordia dioica* Roxb., *Alangium chinese* (Lour.) Harms and *Pavetta indica* L. are inferior ovaries, others are superior ovaries. *Momordia dioica* Roxb. is parietal and *Rubus alceifolius* Poiret is basal placentation, *Grevillea robusta* A. Curn, *Broussonetia papyrifera* (L.) L' Herit and *Alangium chinese* (Lour.) Harms are pendulous placentation, *Elaeocarpus robustus* Roxb., *Pavetta indica* L. and *Telosma pallida* (Roxb.) Craib are axile placentation while the others are marginal placentation. Fruits of *Grevillea robusta* A. Curn and *Telosma pallida* (Roxb.) Craib are follicular, *Rubus alceifolius* Poiret, *Momordia dioica* Roxb. and *Pavetta indica* L. are baccate, *Broussonetia papyrifera* (L.) L' Herit, *Elaeocarpus robustus* Roxb. and *Alangium chinese* (Lour.) Harms are drupaceous, but those of others species are pods.

*Momordia dioica* Roxb. is found in the study area used for edible. *Grevillea robusta* A. Curn, *Acrocarpus fraxinifolius* Whight & Arn., and *Elaeocarpus robustus* Roxb. are used for timber production plants. *Broussonetia papyrifera* (L.) L' Herit is used for quality paper making plants. All twelve species are also medicinally important plants. *Biancaea sappan* (L.) Tod. included the IUCN (International Union for the Conservation of Nature) Red list of threatened species (2011).

According to the data collected, it can be noted that twelve species from twelve genera are distributing. The collected species are identified and described with comments on their scientific names, Myanmar names and coloured plates. It is hoped that this research of present investigation have contributed towards a better understanding of twelve species distributed in Tharthanar 2500 Hillock for its paper utilization in the other researchers in various field of study. Finally, it is also hoped that this research paper will provide invaluable taxonomic data and information to be used for learning in botany.

**Figure 2**

A. *Grevillea robusta* A. Curn.

B. *Acrocarpus fraxinifolius* Whight & Arn.

C. *Adenanthera pavonina* L.

D. *Biancaea sappan* (L.) Tod.

E. *Caesalpinia minax* Hance

F. *Rubus alceifolius* Poit

G. & H. *Broussonetia papyrifera* (L.) L' Herit.

I. & J. *Momordia dioica* Roxb.

K. *Elaeocarpus robustus* Roxb.

L. *Alangium chinese* (Lour.) Harms

M. *Pavetta indica* L.

N. *Telosma pallida* (Roxb.) Craib.

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