Taxonomic Study on Some Members of Angiosperms From Natma Taung National Park, Southern Chin State

Yee Yee Win[1], Tin Tin Maw[2]

Abstract

Taxonomic study on some members of Angiosperms from Natma Taung National Park, Southern Chin State was conducted. Natma Taung National Park is mostly covering with various types of forests and distributing with many flowering plants. Altogether, 54 species of Angiosperms in study area, were collected, identified, and classified. Of these, 12 species belonging to 12 genera of 12 families were presented in accordance with taxonomic characters. Among them, *Begonia hirtella* Link, *Buddleja davidii* Franch, *Lithocarpus aggregatus* Karth, *Lobelia nicotianaefolia* Heyne, and *Primula denticulata* Smith are not recorded in Checklist of Myanmar. An artificial key to these species was also constructed. Moreover, preferential photographic figures concerning with these species were also presented. This research can contribute the valuable information of some species of flowering plants from Natma Taung National Park for future scientific research.

Key words: Angiosperms, Taxonomic characters, National Park, Identified

Introduction

Natma Taung or Khaw Nu M'Cong National Park is located in Kanpetlet, Mindat and Matupi townships of Southern Chin State. It is situated between 93°44' and 93°47' E. longitude and 22°12' and 22°25' N. latitude. This area covers 72,300 hectares of the Chin Hill. The study area is not only Chin plateau but also deep valley. Thus, its elevation varies ranging from 3880-10020 ft (1182-3054 m) above sea level. The climate of this region favours wide variety of useful plants that grow mostly wild. The natural vegetation of the area is the occurrence of tropical, subtropical and temperate plants, especially a variety of timber, medicinal herbs, and other useful species. The study area of Natma Taung National Park in Myanmar is one of the interesting areas for floristic studies. Peak is unique for the presence of trees, shrubs and herbs, which have adapted to the environment. According to the elevation, Natma Taung falls within the temperate climate. The various types of natural vegetation found in this area are evergreen forest, semi evergreen forest, mountain forest, moist mixed deciduous forests and oak forests. And then, many oak (*Lithocarpus*), epiphytes (*Loranthus*, orchid) and many *Rododendron* which are widely distributed in study area. Therefore, the study area is very interesting for its various natural plant resources and it will be evaluated the resources of raw materials possible suited to man's needs. Thus, the Natma Taung is also an important site for wildlife conservation.

The aims of this research are to identify and classify the plants of Angiosperms from Natma Taung National Park , to contribute floristic information and to know valuable natural resources for future researchers.

Materials and Methods

The members of Angiosperms were properly collected from Natma Taung National Park during the 2019. All the collected specimens were recorded by GPS and photographed while the specimens is fresh, flowering and fruting. The detailed plants description, classification and identification of the collected specimens were made by using fresh specimens.

[1] Associate Professor, Dr., Botany Department, Banmaw University
[2] Lecturer, Dr., Botany Department, Myingyan University

Identification of collected specimens was carried out by referring to flora of British India (Hooker 1881-87). Flora of Java (Backer 1965), Flora of Ceylon (Dassanayake 1980-2001), and Flora of Hong Kong (Qi-ming 2009). Myanmar names were finished in Hundley (1987) and Kress *et al.* (2003). All the resulting species were systematically arranged into families according to the APG IV classification System (Byng *et al.* 2016). An artificial key of these species was constructed by using their contrast characters.

Results

An Artificial Key to the Species:

1. Plants woody ---------- 2
1. Plants shrubby or herbaceous ---------- 5
   2. Flowers hexamerous ---------- 3
   2. Flowers pentermerous ---------- 4
3. Leaves alternate; stamens 6; ovary inferior ------ *Lithocarpus aggregatus*
3. Leaves opposite; stamens numerous; ovary superior ---------- ---------- *Duabanga sonneratioides*
   4. Calyx fleshy; anthers longitudinal slit; ----*Pterospermum acerifolium*
   4. Calyx not fleshy; anthers apical pore -----*Rhododendron arboreum*
5. Plants spinescent; leaves compound---------- *Rubus ellipticus*
5. Plants non spinescent; leaves simple---------- 6
   6. Ovary superior----------7
   6. Ovary inferior ---------- 8
7. Exstipulate; stamens 5; ovary unilocular; ---------- *Primula denticulata*
7. Stipulate; stamens 4; ovary bilocular; ----------*Buddleja davidii*
   8. Flowers zygomorphic ----------9
   8. Flowers actinomorphic ----------11
9. Flowers unisexual---------- *Begonia hirtella*
9. Flowers bisexual ---------- 10
   10. Plants partially parasites; stamens not syngenesiou---------- ---------- *Loranthus pulverlentus*
   10. Plants not parasites; stamens syngenesious ---------- ---------- *Lobelia nicotianaefolia*
11. Leaves alternate, exstipulate ---------- *Oenothera rosea*
11. Leaves opposite, stipulate ---------- *Luculia intermedia*

Taxonomic Description

1. *Rubus ellipticus* Smith in Rees, Cyclop. 30:n. 16. 1819. (Figure 1.A)

Spinescent shrubs. Stems terete, with red-brown hair; prickles stout, hooked, scattered. Leaves pinnately trifoliate compound, alternate; stipules subulate; leaflets obcordate, unequal, base cuneate, margin serrate, apex emarginate. Inflorescences terminal, paniculate cymes. Flowers bisexual, actinomorphic, pentamerous, white; bracteoles linear. Sepals 5, ovate, persistent, densely white bristiles. Petals 5, obovate, caducous. Stamens numerous, attached at the mouth of hypanthium; filaments unequal; anthers dithecous, dorsifixed. Ovary inferior, reniform, unilocular, one ovule per locule in basal placentae; style curved and short; stigma persistant. Fruits aggregate of druplets, globoid, succulent, orange-yellow. Seeds minute.

2. ***Lithocarpus aggregatus*** Korh.Verh. Nat. Gesch. Bot. 215. t. 47. 1832. (Fig. 1.B)

Evergreen, monoecious trees; stems and branches woody. Leaves simple, alternate; stipules lanceolate; blades elliptic-oblong, base truncate, margins entire, apex acuminate. Inflorescences terminal, erect spikes. Flowers unisexual, actinomorphic, hexamerous, pale yellow, apetalous; bracteoles linear. Perianth segments 6, elliptic. Staminate flowers 6 stamens, free, included; anthers dithecous, dorsifixed; pistillodes present. Pistillate flowers involucre cup accrescent, persistent. Ovary inferior, globoid, tetralocular, one ovule in each locule on the axile placentae; styles short; stigma discoid. Fertile fruits in groups; nuts globoid, not sunken at the top; cup saucer-shaped, covering one half of nut with triangular scales. Seeds ovoid.

3. ***Begonia hirtella*** Link., Enum. Pl. Hort. Berol. 2 : 396. 1822. (Fig. 1. C)

Perennial, monoecious, succulent herbs; stems and branches pinkish, semihyaline, multicellular hairs. Leaves simple, alternate; stipules hyaline; blades ovate, strongly asymmetric, base cordate, margin crenate-serrate, apex acute, pilose on both surfaces. Inflorescences axillary few-flowered cymes. Flowers unisexual, zygomorphic, tetramerous, pale pink; bracts subspatulate. Perianth segments 2-seriate in male flower, inner two linear-oblong; outer two orbicular. Stamens 7-12, monadelphous, exserted; anthers dithecous, confluent, basifixed. Perianth segments 5, unequal, oblong in female flowers. Ovary inferior, deltoid, trilocular, with numerous ovules in each locule; styles slender; stigma trifid,.Fruits loculicidal capsule, deltoid. Seeds numerous, orbicular.

4. ***Duabanga sonneratioides*** Buch.-Ham., Trans Linn Soc.17:178.1834.(Fig. 1.D)

Deciduous trees. Branches spreading. Leaves simple, opposite and distichous; stipules small; blades oblong , base cordate, margin entire, apex obtuse. Inflorescences terminal, corymbose, racemes. Flowers bisexual, actinomorphic, hexamerous, creamy white. Sepals 6, free, triangular, fleshy, thick. Petals 6, free, obovate, crumpled, early falling with the stamens, white. Stamens numerous, free, exserted; filaments inflexed in bud; anthers dithecous, dorsifixed. Ovary superior, globoid, hexalocular, many ovules per locule in axile placentae; style slender; stigma capitate. Fruits capsular, broadly ovate, with large star-shaped at base, minute thread like seeds.

5. ***Oenothera rosea*** W. Ait., Hart. Kew. 1.2;3.1789. (Figure 1. E)

Annual, acaulescent ascending herbs. Stems and branches solid, pilose. Leaves simple, alternate, exstipulate; blades elliptic-lanceolate, base cuneate, margin entire, apex acute. Inflorescences axillary, solitary flowers, bisexual, actinomorphic, purplish pink. Calyx funnel shaped, 4-lobed; tube densely hairy; lobes lanceolate, caduceus. Petals 4; limbs obovate, puplish pink. Stamens 8, free, exserted; filaments filiform; anther dithecous, dorsifixed. Ovary inferior, ellipsoid, tetralocular, many ovules per locule in axile placentae; style filiform; stigmas 4-fid. Fruits loculicidal capsular, clavate, 8-angled; with basal stipe. Seed numerous, oblongoid.

6. ***Pterospermum acerifolium*** Willd. In DC. Prod. 1:500. 1824. (Fig. 1. F)

Large, evergreen trees. Stems and branches stellate tomentose. Leaves simple, alternate and distichous, stipulate; blades polymorphorous, round or peltate, base cordate, margin lobulated-toothed, apex mucronate, stellate pubescent. Inflorescences axillary few-flowered cymes. Flowers bisexual, actinomorphic, pentamerous, white, fragrant; bracteoles laciniate. Sepals 5, linear-lanceolate, fleshy. Petals 5, oblong, reflexed. Stamens 5, connate into the stamina column, exserted; anthers dithecous, dorsifixed. Gyandrophore slender. Ovary superior, oblongoid, pentalocular, many ovules in each locules on the axile placentae; styles simple; stigma clavate.

7. *Loranthus pulverlentus* Wall. in., Roxb., Fl. Ind. 2:221. 1824.(Fig. 1. G)

Parasitic, everygreen shrubs. Stems and branches solid, stout, with soft fugacious tomentose when young. Leaves simple, opposite, exstipulate; blades ovate-oblong, base cuneate, margin entire, apex acute. Inflorescences axillary fasciculate racemes. Flower bisexual, zygomorphic, tetramerous, white or creamy; bracts caducous. Calyx tubular, calyx limb absent. Corolla tubular, 4-lobed; lobes linear, reflexed at anthesis, splitting down on one side; tubes slender, curved. Stamens 4; filaments filiform, red or crimson; anthers dithecous basifixed. Ovary inferior, unilocular, pyriform; style slender, curved; stigma subglobose. Fruit baccate, clavate, 1 seeded.

8. *Primula denticulata* Smith, Rev. Gen.Pl. 1. 326. 1891. (Fig. 1. H)

Perennial rhizomatous herbs; stems cauline. Leaves simple, blasal rosette, exstipulate; petioles broadly wing; blades oblong-oblanceolate, base attenuate, margin dentate, apex obtue. Inflorescences terminal, scapebose, umbles. Flowers bisexual, actinomorphic, pentamerous, purple; bracts lanceolate, pinkish. Calyx tubular, 5-lobed; lobes linear, pale pink. Corolla rotate, 5-lobed, purple; tubes cylindric; lobes obovate, deeply emarginated, with yellow eye. Stamens 5, included, epipetalous; filaments filiform; anthers dithecous, basifixed. Ovary superior, oblongoid, unilocular, numerous ovules in the free central placentae; styles short; stigma capitate. Fruits capsular, oblongoid.

9. *Rhododendron arboreum* Sm., Exot. Bot. 1:9. 1805. (Figure 1. I)

Evergreen, small trees. Stems woody thickening at the base. Leaves simple, whorl, cluster at the end of branches, leathery; blades oblong or lanceolate, base cuneate, margin entire, apex acuminate, silvery with rustly tomentose beneath. Inflorescences axillary, heads, many-flowered. Flowers bisexual, actinomorphic, pentamerous, red; bracts ovate, with dense appressed silky hairs. Calyx 5-lobed; lobes widely ovate. Corolla 5-lobed, red or pink, crimson; lobes obovate. Stamens 10; filaments filiform; anthers dithecous, basifixed, opening by apical pores. Ovary superior, 7-9 locular, many ovules per locule in axile placentae, densely, wooly. Fruits capsular, narrowly cylindrical, wooly, slightly curved. Seeds numerous, ellipsoid.

10. *Luculia intermedia* Hutch., Brit. Fl, Gard, 2. 145.1826. (Fig. 1. J)

Perennial shrubs. Stems and branches terete. Leaves simple, opposite and decussate; interpetiolar stipules triangular, caduceus; blades elliptic oblong, base cuneate, margin entire, apex acute. Inflorescences terminal in axile of uppermost leaves, corymbiform cymes. Flowers bisexual, actinomorphic, white. Calyx tubular, deeply 5-lobed, caducous. Corolla salverform, 5-lobed, white; tubes short; lobes orbicular, crisped. Stamens 5, included; filaments short; anthers dithecous, dorsifixed. Ovary inferior, bilocular, numerous ovules in each locule on the axile placentae; style exserted; stigma bifid. Fruits capsule, ellipsoid, deflexed with small and fusiform seeds.

11. *Buddleja davidii* Franch. *et*, Nouv. Arch. Mus. Hist. Nat., Ser.2,10:65. 1887. (Fig. 1.K)

Perennial shrub. Stems and branches quadrangular. Leaves simple, opposite; stipules subobicular ; blades narrowly ovate-elliptic, base cuneate, margin serrate, apex acuminate, dark green above, pale green beneath, densely white tomentose beneath. Inflorescences terminal, racemose. Flowers bisexual, actinomorphic, tetramerous, purple with orange yellow throat, fragrant; bracts leafy, linear. Calyx

campanulate, 4-lobed, violet; lobes suborbicular. Corolla tubular, 4-lobed; tube cylindrical, orange yellow throat, with glandular hairy. Stamens 4, epipetalous; filament very short; anthers dithecous, oblongoid, basifixed. Ovary superior, ovoid, bilocular, many ovules per locule in axile placentae; style terminal, short, stigma clavate. Fruits capsular, ovoid, many- seeded, sparsely stellate pubescent.

12. ***Lobelia nicotianaefolia*** Heyne in Roth, Nov. Sp. 143. 1821. (Fig. 1.L)

Perennial erect herbs. Stems with milkly juice, stout, fistular. Leaves simple, alternate, exstipulate; blades linear oblong, tapering towards the apex, the lower larger and the upper gradually smaller, smooth, base cauline, margin serrulate, apex acute. Inflorescences racemes into panicles, with densely flowers. Flowers bisexual, showy, zygomorphic, white; bracts linear. Calyx campanulate, 5-lobed; lobes linear. Corolla bilipped, 5-lobed, white, deeply splitting on the lower sides during anthesis, slightly villous above and more densely villous below within. Stamens 5, coherent; staminal tube enclosing the style, with basally free filaments, equal length to the corolla; anthers dithecous, syngenesious, basifixed. Ovary inferior, obovoid, bilocular, many ovules per locules in axile placentae, style filiform; stigma bifid. Fruits capsular, loculicidal, 2-valved, with persistent calyx, with many ellipsoid seeded.

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

No.	Scientific name	Local name	Family	Flowering Peroid	Latitudes (N)	Longitudes (E)	Elevation (m)	Status in Myanmar
1	*Rubus ellipticus* Smith	Sumwe	Rosaceae	Jan-Jun	22°18'27"	93°44' 52"	1224	+
2	*Lithocarpus aggregatus* Karth.	Thit-e	Fagaceae	Jan-May	22°24'08"	93°46' 12"	1860	-
3	*Begonia hirtella* Link.	Unknown	Begoniaceae	Aug-Feb	22°24'18"	93°46' 33"	2436	-
4	*Duabanga sonneratioides* Buch.	Thitkazaw	Lythraceae	Feb-Mar	22°24'47"	93°46' 56"	1918	+
5	*Oenothera rosea* W. Ait	Unknown	Onagraceae	Throught year	22°21'57"	93°45' 49"	2785	+
6	*Pterospermum acerifolium* Willd.	Taw kalamet	Malvaceae	Jan-May	22°19'29"	93°44' 27"	1486	+
7	*Loranthus pulverlentus* Wall.	Kyi baung	Loranthaceae	Aug-Mar	22°22'27"	93°45' 332"	1860	+
8	*Primula denticulata* Smith	Taung kya pan	Primulaceae	Dec-Feb	22°24'39"	93°46' 58"	3054	-
9	*Rhododendron arboreum* Sm.	Taungzalat ni	Rhododendronaceae	Dec-Mar	22°23'43"	93°46' 50"	3054	+
10	*Luculia intermedia* Hutch.	Unknown	Rubiaceae	Oct-Feb	22°19'37"	93°44' 52"	3021	+
11	*Buddleja davidii* Franch	Unknown	Scrophulariaceae	Dec-Feb	22°24'51"	93°46' 58"	2785	-
12	*Lobelia nicotianaefolia* Heyne	Kyu gyi	Campanulaceae	Dec-Feb	22°25'06"	93°47' 11"	3054	-

+ Recorded in Checklist of Myanmar
- Unrecorded in Checklist of Myanmar

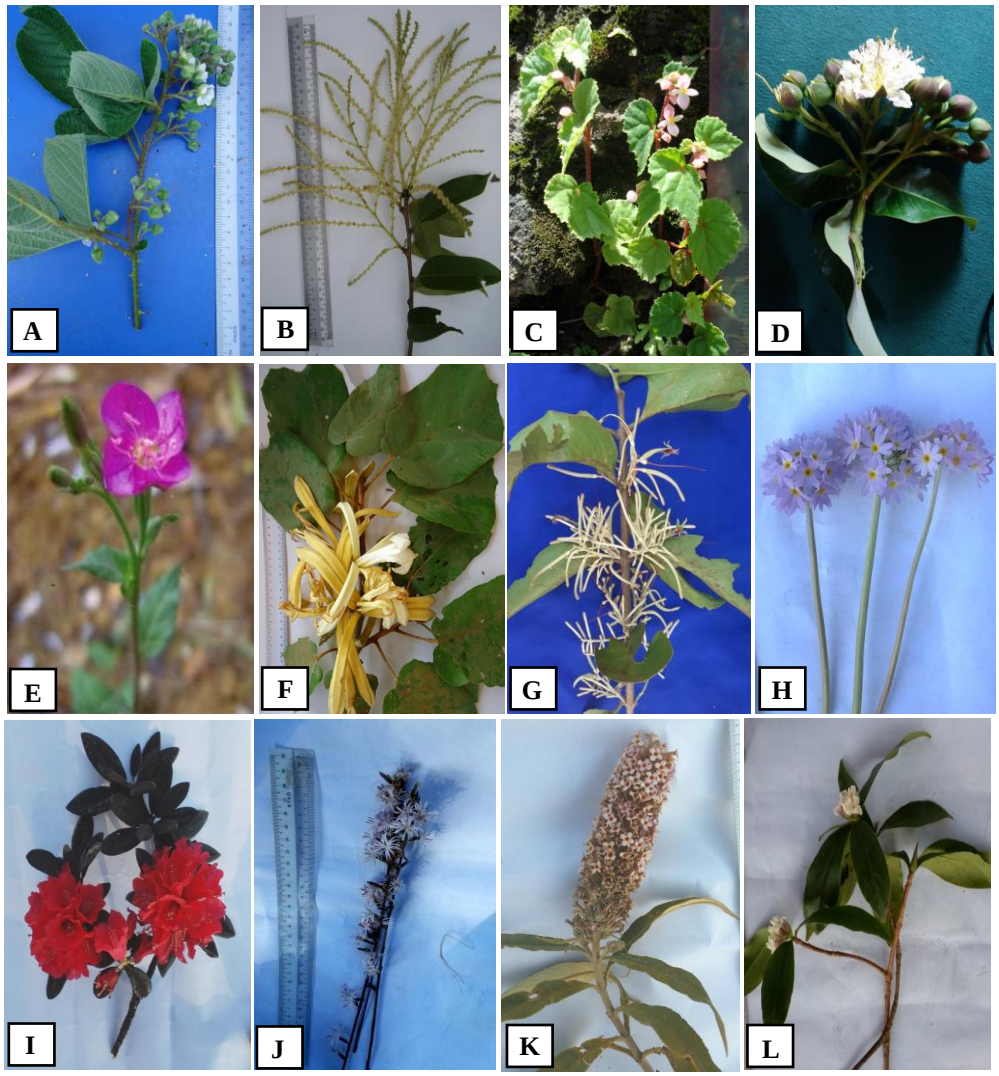

Figure 1. A. ***Rubus ellipticus*** Smith
B. ***Lithocarpus aggregatus*** Karth.
C. ***Begonia hirtella*** Link.
D. ***Duabanga sonneratioides*** Buch.
E. ***Oenothera rosea*** W. Ait
F. ***Pterospermum acerifolium*** Willd.
G. ***Loranthus pulverlentus*** Wall.
H. ***Primula denticulata*** Smith
I. ***Rhododendron arboreum*** Sm.
J. ***Luculia intermedia*** Hutch.
K. ***Buddleja davidii*** Franch
L. ***Lobelia nicotianaefolia*** Heyne

Discussion and Conclusion

The taxonomic study on some species of Angiosperm from Natma Taung National Park were collected, identified, and classified. In this study, 12 species belonging to 12 genera of 12 families from Angiospermae have been presented. It was noticed that some members of Angiosperms such as *Begonia hirtella*, *Buddleja davidii*, *Duabanga sonneratioides*, *Lithocarpus aggregatus*, *Lobelia nicotianaefolia*, *Loranthus pulverulentus*, *Luculia intermedia*, *Oenothera rosea*, *Primula denticulata*, *Pterospermum acerifolium*, *Rhododendron arboretum*, and *Rubus ellipticus* are common in their natural habitat.

Although the study site is mountainous area and in temperate zone, the distribution of plants is not only woody but also dominated by herbs and shrubs. As a result, 4 tree species were found as trees and only one species as epiphyte in four

shrubs species and the other species are herbs. Amog them, the distribution of woody plants are not only evergreen trees but also dominated by deciduous plants (*D. sonneratioides*).

The majority of the studied species are autotropic plants but partially parasitic plants of *L. pulverulentus* Wall. is also fairly abundant below 1185 m above sea level. The distinct characters of *R. arboreum* are a large tree with red flowers and distributed throughout the Natma Taung. In Sterculiaceae, *P. acerifolium* is growing mostly on the slope of mountain. The heart wood can be produced from this plant and local people cut the stem and extracted illegally. Previously Sterculiaceae and Malvaceae were treated as separated families. According to the recent APG IV system of classification, they are treated as the member of Malvaceae. *Begonia hirtella*, *Rubus ellipticus*, and *Oenothera rosea* are a famous medicinal plant in traditional medicine. This species is commonly found in throughout the Natma Taung.

Duabanga sonneratioides and *Lithocarpus aggregatus Buddleja davidii*, *Lobelia nicotianaefolia*, *Luculia intermedia*, and *Primula denticulata* are very interesting species in Southern Chin State for beautiful flowers and these species have not been found in everywhere in Myanmar. It was found that *B. hirtella*, *L. davidii*, *L. aggregatus*, *L. nicotianaefolia*, and *P. denticulate*, are not listed in Checklist of Myanmar (Kress *et al*. 2003).

During the field trip in this area, it has been noticed that some members of Angiosperms had become rare due to deforestation and human activities. Therefore, all citizens should maintainvaluable species for natural resources of Myanmar. In conclusion, the present study provides the valuable taxonomic information for identification of naturally distributed wild species.

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