# TAXONOMIC STUDY ON ELEVEN SPECIES FROM MOUNT POPA AREA, KYAUKPADAUNG TOWNSHIP IN MANDALAY REGION

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## Abstract

The present research deals with floristic study of Mount Popa Area in Kyaukpadaung Township, Mandalay Region of Myanmar was undertaken since 2022. The total of 11 species under 11 genera belonging to 9 families were studied. The morphological characters of detailed taxonomic description of an individual species were described with their photographs. An artificial key to the studied species were also constructed. Among them, *Butea monosperma* (Lam.) Kunt, *Chukrasia tabularis* A. Juss, *Indigofera tinchoria* L., and *Leea asiatica* (L.) Ridsdale. were common species of the study area. In Mount Popa, *Magnolia champaca* (L.) Baill. ex Pierre. was the characteristic species of this area. Moreover, *Leea asiatica* (L.) Ridsdale., *Chukrasia tabularis* A. Juss, *Martynia annua* L. and *Aeginetia indica* L. were used as medicinal plants in the study area. Moreover, the near threatened species, critically endangered possibly extinct species, vulnerable species and endangered species were also recorded. In National Red List of Sri Lanka, *Chukrasia tabularis* A. Juss. is near threatened species, *Aeginetia indica* L. as critically endangered possibly extinct species, *Butea monoaperma* (Lam.) Kunt as vulnerable species and *Abelmoschus ficulneus* (L.) Wight & Arn. as near threatened and *Pittosporum napaulense* (D.C) Rehder & E.H Wilson are as endangered species. The floristic study of Mount Popa Area showed a relatively high diversity of wild plant species. For that reason, the study areas can be considered as important areas for the conservation of the floral diversity and it has been designated as Geopark recently.

**Keywords:** Taxonomic, Angiosperm

## Introduction

The floristic research was conducted in Mount Popa area in Kyaukpadaung Township, Nyaung Oo District, Mandalay Region from the year 2022 to 2023. This area is located between 20º.50’ 0” and 20º.58’ 0” North Latitude and 95º4’02” and 95º24’02” East longitude. Mount Popa is an extinct volcano 1518 MASL, and located in central Myanmar about 50 km southeast of Bagan. There are various kinds of soil texture especially black clay soil and alluvial soil. Mount Popa contains six separate forest types, including Than-Dahat Forests, Low Indaing Forest, Upper Mixed Deciduous Forests, Hill Evergreen Forests, Pine Forests and Hill Grassland. The sandalwood Forest in Myanmar is not native. Flora on the mountain includes the yellow, white and green bloom of the Sagawa tree, as well as shrubs, and bamboo forests. Mount Popa has known medicinal plants such as *Leea asiatica* (L.) Ridsdale., *Chukrasia tabularis* A. Juss, *Martynia annua* L. and *Aeginetia indica* L., *Dolichandrone spathacea* (L.f.) K. Schum. and *Withania somnifera* bark. The major forest type is dry deciduous and semi-desert scrub forest. (Yin Yin Kyi,1992)

In Myanmar, many taxonomic had recorded the taxonomic and floristic information on many flora, there are still needed to search for many flowering plants. Taxonomic studies on Angiosperm flora of some area in Mandalay Region are mentioned by previous workers. In 1991, Daw Aye Aye Than did MSc Thesis in Mount Popa area, but no one has done a PhD Thesis in the area. Therefore, the valuable flowering plant that grow naturally in Mount Popa area of Mandalay region are studied in the research. To get complete information of local floristic area, it is needed to do the research work in every place and every situation. Therefore, the present research work focus on Mount Popa area.

The aim and objectives of the present research work are to identify and inventory the plants of Angiosperms of Mount Popa, to provide valuable taxonomic information for further researchers and to fulfill the compilation of the Flora of Myanmar.

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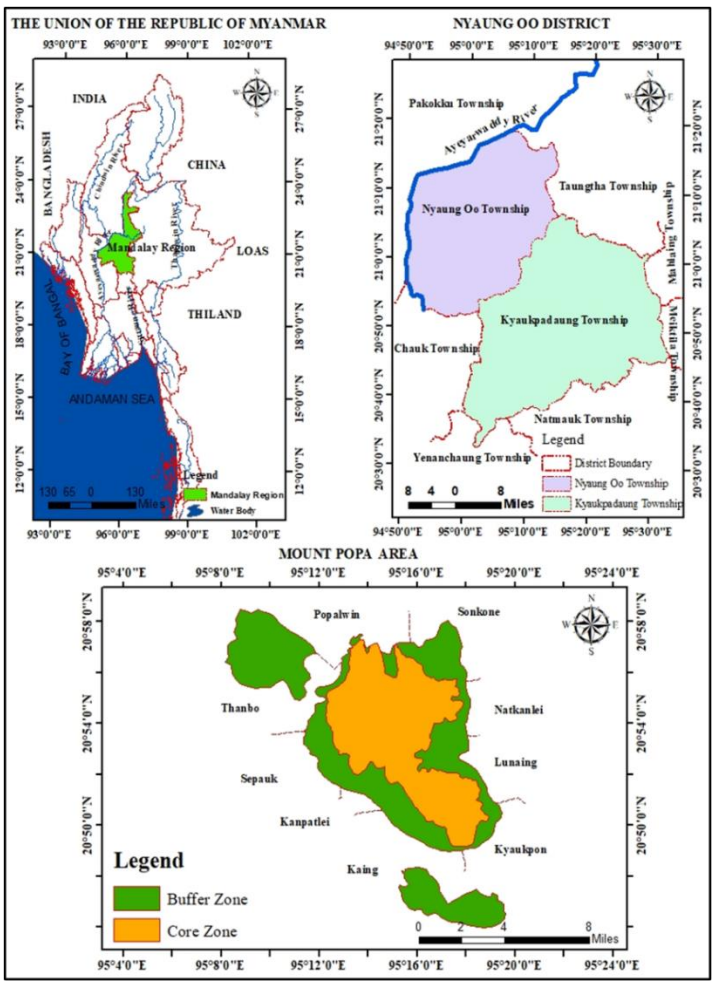
## Materials and Methods

The flowering plant specimens found in Mount Popa area were collected and studied during the 2022 to 2023. The inflorescences and flowers of all the collected specimens were recorded by taking photographs at their flowering time and labeled by collection numbers, field notes were made on the natural habitat, taxonomical characters and precise location by using the GPS (Global positioning system). The morphological characteristics of all collected specimens were recorded by using a dissecting microscope.

The families of the collected specimens were determined by using Hutchinson (1967). The taxonomic identifications of the collected specimens were carried out by referring to Backer & Brick (1963), Brandis (1971), Dassanayake (1968). All of the nomenclatural studies were checked in the websites of International Plant Name Index (IPNI) and online Botanical Database of Tropical Plants (TROPICOS). Myanmar names and distributions of the collected specimens were referred to Hundley & Chit Ko Ko (1987) and Kress *et al.* (2003). The groups, orders and families were systematically arranged according to Angiosperm Phylogeny Group (APG IV) system of Byng *et al*. (2016). The arrangements of the genera and species under the families were placed alphabetically in Table 1. All the collected species were prepared for herbarium specimens and deposited at the Herbarium of Botany Department, University of Mandalay for the references.




**Source:** Myanmar Information Management Unit (MIMU) and Ministry of Natural Resources & Environmental Conservation; Forest Department; Popa Mountain Park
Figure 3.1 Location Map of the Study Area in Mount Popa

## Results

Totally 11 species under 11 genera belong to belonging to 9 families from Mount Popa Area were collected, identified and studied their taxonomic characteristics. The list of the collected species were described in Table 1.

**Table 1** List of the collected species from Mount Popa area of Kyaukpadaung Township, Nyaung Oo District, Mandalay Region

| Group | Order | Family | No. | Scientific name |
|---|---|---|---|---|
| Magnolids | Magnoliales | Magnoliaceae | 1. | *Magnolia champaca* (L.) Baill. ex Pierre |
| Rosids | Vitales | Vitaceae | 2. | *Leea asiatica* (L.) Ridsdale |
| | Fabales | Fabaceae | 3. | *Butea monosperma* (Lam.) Kuntze. |
| | | | 4. | *Indigofera tinctoria* L. |
| | Spindales | Meliaceae | 5. | *Chukrasia tabularis* A. Juss. |
| | Malvales | Malvaceae | 6. | *Abelmoschus ficulneus* (L.) Wight & Arn. |
| | Solanales | Convolvaceae | 7. | *Argyria barbigera* Choisy. |
| | | | 8. | *Ipomoea alba* L. |
| | Lamiales | Martyniaceae | 9. | *Martynia annua* L. |
| Asterids | Lamiales | Orabanchaceae | 10. | *Aeginetia indica* L. |
| Campanulids | Apiales | Pittosporaceae | 11. | *Pittosporum napaulense* (D.C) Rehder & E.H Wilson |

**An artificial key to the studied species**

1. Flowers actinomorphic ---------- 2.
1. Flowers zygomorphic ---------- 8.
2. Leaves simple; ---------- 3.
2. Leaves compound ---------- 6.
3. Tepals 16, stamens ∞; carpels ∞; basal placentation ---------- 1. *Magnolia champaca*
3. Calyx 5; corolla 5; stamens 5; carpels 1 or 2; axile placentation ---------- 4.
4. Trees, leaf cuneate at the base; flowers color yellow ----------11. *Pittosporum napaulense*
4. Herbs, leaf cordate at the base; flowers color purpulish white or white ---------- 5.
5. Carpels 2, bilocular; fruits baccate ----------7. *Argyria barbigera*
5. Carpels 1, unilocular; fruits capsule ---------- 8. *Ipomoea alba*
6. Herbs; inflorescences raceme; anthers monothecous ----------6. *Abelmoschus ficulneus*
6. Trees or shrubs; inflorescences cyme; anthers dithecous ---------- 7.
7. Trees; stamens 5; carpels 5; locules 5; basal placentation; fruits baccate ----------2. *Leea asiatica*
7. Shrubs; stamens 10; carpels 5; locules 5; basal placentation; fruits capsule ------- 5. *Chukrasia tabularis*
8. Placentation marginal ---------- 9.
8. Placentation parietal---------- 10.
9. Trees; leaves trifoliate; flowers colour orange; seeds flat ---------- 3. *Butea monosperma*
9. Shrubs;leaves unipennate; flowers colour white; seeds cylindric ----------4. *Indigofera tinctoria*
10. Leaves present; inflorescences raceme; carpels 2; fruits drupe ---------- 9. *Martynia annua*
10. Leaves absent; inflorescences cyme; carpels 4; fruits capsule ---------- 10. *Aeginetia indica*

**1. *Magnolia champaca*** (L.) Baill.ex Pierre Fl. Forest. Cochinch.: t. 3. 1880 (Figure 1)

*Michelia champaca* L., Sp. Pl. 536. 1753.

Family : Magnoliaceae
Myanmar name : Sagawa
Flowering Period : March to September

Perennial, deciduous trees. Leaves simple, alternate; stipules sheathing the young foliage, fall off as the leaf expand, caducous; leaf blades elliptic or ovate lanceolate, obtuse at the base, entire along the margin, acuminate at the apex, glabrous on both surfaces. Inflorescences axillary, solitary cymes. Flowers bisexual, actinomorphic, spiral, hypogynous, tetramerous, yellow firstly, becoming orange-yellow at maturity. Tepals 16, linear-lanceolate, pubescent. Stamens numerous, in several series, free, exserted, spirally arranged on the receptacle, filaments linear, yellow; anthers dithecous, basifixed, dehiscing by longitudinal slits. Carpels numerous, free; ovary numerous, superior; unilocular, two ovules on the basal placenta; style short; stigma simple. Fruits aggregate of follicles. Seeds oblongoid, bright red, covered with thin pink pulp, endospermic.

**Specimens examined**: Mandalay Region, Nyaung Oo District, Kyaukpadaung Township, Mount Popa area, N 20° 55' 04.982" and E 95°13' 22.120"; elevation 350 m; 11 August, 2022; Khin Khin Lay, collection no.13.


**Figure 1** *Magnolia champaca* (L.) Baill.ex Pierre Fl
A. Habit B. Inflorescence C. L.S of flower D. T.S of ovary

**2. *Leea asiatica*** (L.) Ridsdale, K.S. Manilal, Bot. Hist. Hort. Malabaricus:189.1980 (Figure 2)

*Phytolacca asiatica* L. Sp. Pl.:441.1753.

Family : Vitaceae
Myanmar names : Naga mauk ni; Kya petthein
English name : Unknown
Flowering Period : May to September

Perennial shrubs; subquadrangular. Leaves trifoliolate compound, alternate; stipules caducous; leaf blades oblong-ovate, obtuse at the base, dentate along the margin, acuminate at the apex, bright green above, pale green beneath, glabrous on both surfaces. Inflorescences leaf-opposed corymbose cyme, many-flowered. Flowers bisexual, actinomorphic, hypogynous, pentamerous, pale green. Calyx cup-shaped, 5-lobed; tubes short, green, glabrous; lobes obtusely dentate, glabrous, persistent. Petals 5, free, ovate, glabrous. Stamens 5, free, exserted; filaments short, glabrous; anthers dithecous, dorsifixed, oblong, dehiscing by longitudinal slit.Carpels 5, fused; ovary superior, ovoid, pentalocular, with one ovule in the locule on the basal placenta; styles stout; stigmas simple. Fruits baccate, glabrous, 5-seeded. Seeds triangular, endospermic.

**Specimens examined**: Mandalay Region, Nyaung Oo District, Kyaukpadaung Township, Mount Popa area, N 20° 55' 04.982" and E 95°13' 22.120"; elevation 350 m; 17 October, 2022; Khin Khin Lay, collection no. 20.

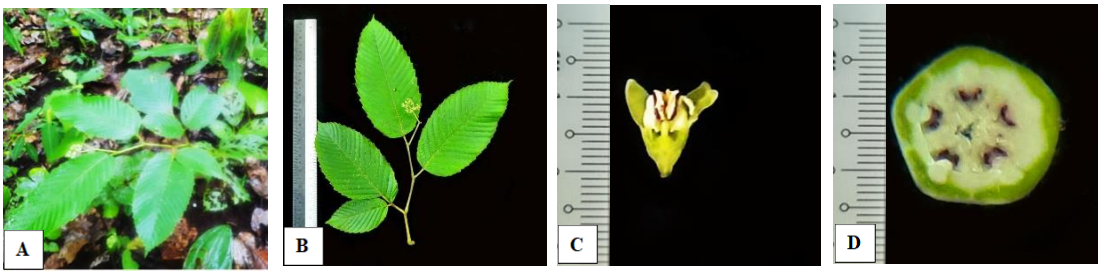



**Figure 2** *Leea asiatica* (L.) Ridsdale.
**A. Habit B. Inflorescence C. L.S of flower D. T.S of ovary**

**3. *Butea monosperma*** (Lam.) Taub., Engl. Nat. Pflanzenfam. 3 (3): 366, f. 131 M. N. 1894.
*Erythrina monosperma* Lam. Encycl. 2(1): 391-392. 1786. (Figure 3)
Family : Fabaceae
Myanmar name : Pauk
English name : Frame of the forest
Flowering Period : January to April

Perennial deciduous trees. Leaves trifoliate compound, alternate; stipules linear-lanceolate, pubescent; leaf blades obovate, terminal leaflets larger than two lateral leaflets, oblique at the base, entire along the margin, obtuse at the apex, rough on both surfaces, pubescent beneath, caducous. Inflorescences axillary or terminal raceme, many-flowered. Flowers bisexual, zygomorphic, hypogynous, pentamous, orange. Calyx 5-lobed, campanulate; tube short, reddish-brown, pubescent. Corolla papilionaceous, 5-lobed, laterally compressed; standard lanceolate, short claws; wings falcate, glabrous; keels falcate, beaked. Stamens 10, diadelphous; anther dithecous, basifixed, oblong, dehiscing by longitudinal slits. Carpel 1; ovary superior, unilocular with 5-10 ovules in the locule on the marginal placentae; styles terminal, curved, pubescent; stigmas simple. Fruits leguminous, oblongoid, pale yellow few-seeded. Seeds flat, pale brown, non-endospermic.

**Specimens examined**: Mandalay Region, Nyaung Oo District, Kyaukpadaung Township, Mount Popa area, N 20° 52' 16.378" and E 95°52' 51.650"; elevation 200 m; 8 January, 2023; Khin Khin Lay, collection no.45.

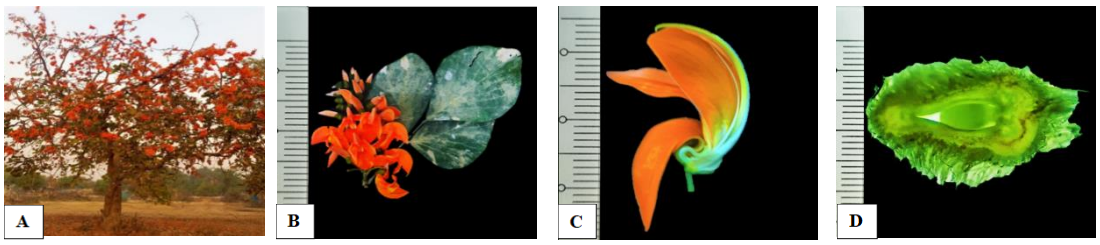



**Figure 3** *Butea monosperma* (Lam.) Taub.
**A. Habit B. Inflorescenc C. L.S of flower D. T.S of ovary**

**4. *Indigofera tinctoria*** L., Sp.Pl. 2: 751. 1753. (Figure 4)
Family : Fabaceae
Myanmar name : Me nai; Me nat
English name : Indigo; Indian indigo
Flowering period : January to May

Perennial, erect shrubs. Leaves unipinnate-compound, imparipinnate, alternate; stipulate; leaflets 5-10 paired, opposite, elliptic to obovate, cuneate at the base, entire along the margin, rounded at the apex, glabrous above, appressed-pubescent beneath. Inflorescences axillary racemose, many-flowered. Flowers bisexual, zygomorphic, hypogynous, pentamerous, pink. Calyx broadly campanulate,

5-lobed; tube long; lobes deltoid, pubescent. Corolla papilonaceous, exserted; standard orbicular-obovate; wings oblong, pinkish; keels. Stamens 10, diadelphous, inserted; anthers uniform, gland tipped. Carpel 1; ovary superior, linear-oblongoid, unilocular, 6-12 ovules in the locule on the marginal placentae; style curved, glabrous; stigma capitate. Fruits leguminous, linear-oblongoid, 8- to 12- seeded. Seeds cylindric, glabrous.

**Specimens examined**: Mandalay Region, Nyaung Oo District, Kyaukpadaung Township, Mount Popa area, N 20° 55' 04.982" and E 95°13' 22.120"; elevation 350 m; 8 January, 2023; Khin Khin Lay, collection no.53.

**5. *Chukrasia tabularis*** A. Juss., Bull. Sci. Nat. Geol. 23 (140): 241. 1830. (Figure 5)

Family : Meliaceae
Myanmar name : Yinma
English name : Golden mahogany
Flowering period : August to September

Perennial, deciduous, large trees. Leaves unipinnate compound, paripinnate, alternate,exstipulate, pulvinate, pubescent; leaflets 8 to 16, sub opposite, ovate-oblong, obtuse at the base, entire along the margin, acute to acuminate at the apex,

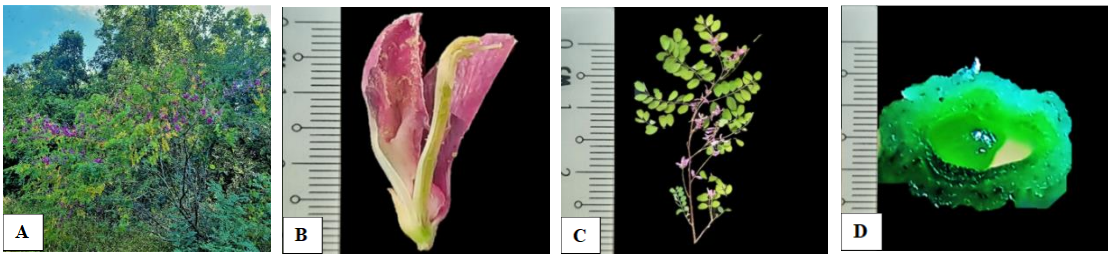



**Figure 4** *Indigofera tinctoria* L.
A. Habit B. Inflorescence C. L.S of flower D. T.S of ovary

pubescent on both surfaces. Inflorescenes terminal, paniculate corymbiform cyme, many-flowered. Flowers bisexual, actinomorphic, pentamerous, hypogynous, creamy or yellowish green, caducous. Calyx campanulate, 5-lobed; tubes long; lobes teeth small, broadly trianglular, pale green or reddish. Petals 5, free, obovate-oblong, glabrous. Stamens 10, monadelpous, inserted; anthers dithecous, basifixed, oblong, yellow, erect, dehiscing by longitudinal slit. Carpels 4, fused; ovary superior, flask-shaped, tetralocular with numerous ovules in the locule on the axile placenta; styles terminal, glabrous; stigma capitate. Fruits capsular, ellipsoid, many-seeded. Seeds compressed, dark brown.

**Specimens examined**: Mandalay Region, Nyaung Oo District, Kyaukpadaung Township, Mount Popa area, N 20° 55' 04.982" and E 95°13' 22.120"; elevation 350 m; 17 September, 2022; Khin Khin Lay, collection no.17.

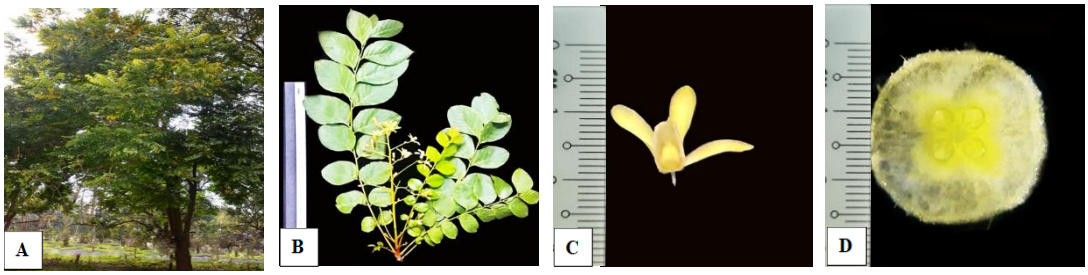



**Figure 5** *Chukrasia tabularis* A. Juss.
**A. Habit B. Inflorescence C. L.S of flower D. T.S of ovary**

**6. *Abelmoschus ficulneus*** (L.) Wight & Arn., Prodr. Fl. Ind. Orient. 1: 53. 1834. (Figure 6)

*Hibiscus ficulneus* L., Sp. Pl. 2: 695. 1753.

Family : Malvaceae
Myanmar name : Taw yon bade
English name : Unknown
Flowering period : September to November

Annual erect herbs. Leaves palmately compound, deeply 3- to 5-lobed, alternate, stellate hairy; stipules linear or filiform, pubescent, caducous; leaf blades orbicular, cordate at the base, serrate along the margin, acute at the apex, scabrous on both surfaces. Inflorescences solitary or terminal racemes. Flowers bisexual, actinomorphic, pentamerous, hypogynous, white; epicalyx 5-6, linear, hairy, caducous. Calyx 5- toothed, green, pubescent; tubes long; lobes lanceolate. Petals 5, obovate, white with purple centre, glabrous. Stamens numerous, monadelphous; filaments united in a column; anthers monothecous. Carpels 5, fused; ovary superior, hispid, pentalocular with many ovules in the locule on the axile placenta, pubescent; styles filiform, glabrous; stigmas 5-fid. Fruits capsular, ellipsoid, pubescent. Seeds globoid, black, glabrous.

**Specimens examined**: Mandalay Region, Nyaung Oo District, Kyaukpadaung Township, Mount Popa area, N 20° 55' 04.982" and E 95°13' 22.128"; elevation 400 m; 11 November, 2022; Khin Khin Lay, collection no.25.


**Figure 6** *Abelmoschus ficulneus* (L.) Wight & Arn.
**A. Habit B. Inflorescence C. L.S of flower D. T.S of ovary**

**7. *Argyreia barbigera*** Choisy, Convol. Or. 42. 1834. (Figure 7)

*Lettsomia burbigera* Clarke. in Hook. f. Fl. Br. Ind. 4. 194. 1883.

Convolvulus burbiger Wall. Cal. 1404.

Family : Convolvaceae
Myanmar name : Min-go-ga; Ok-hmon-nwe
English name : Unknown
Flowering period : July to September

Perennial twining herbs. Leaves simple, alternate, exstipulate; leaf blades broadly ovate or orbicular, green and glabrous above, pale green and sparsely pubescent beneath, cordate at the base, entire along the margin, acute at the apex. Inflorescences axillary cymes, 3-5 flowered. Flowers bisexual, actinomorphic, hypogynous, pentamerous, purplish white. Sepals 5, unequal, the outer two ovate, the inner three orbicular, emarginate at the apex, basally connate, pale green. Corolla infundibuliform, shallowly 5-lobed; tubes cylindric, purplish white, glabrous; lobes triangular-ovate, purple, glabrous. Stamens 5, epipetalous; filaments slender, white, glabrous, adnate at the base of corolla tube; anthers dithecous, oblongoid, basifixed, introrse, white, dehiscing by longitudinal slit. Carpel 2, fused, ovary superior,

oblongoid, glabrous, bilocular, with two ovules in each locule on the axile placenta; styles filiform, white, glabrous; stigma globosed, white. Fruits baccate, ovoid, orange-red, glabrous. Seeds ovoide, brown, glabrous.

**Specimens examined**: Mandalay Region, Nyaung Oo District, Kyaukpadaung Township, Mount Popa area, N 20° 55' 04.982" and E 95°13' 22.120"; elevation 350 m; 11 August, 2022; Khin Khin Lay, collection no.16.

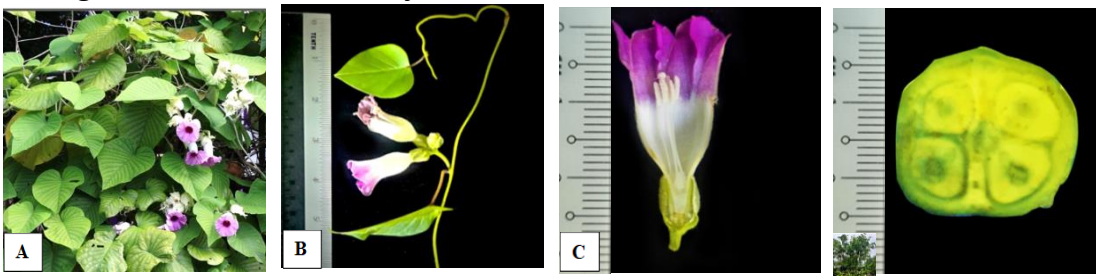



**Figure 7** *Argyreia barbigera* Choisy.
**A. Habit B. Inflorescence C. L.S of flower D. T.S of ovary**

**8. *Ipomoea alba* L**. Sp. Pl. 161. 1753. (Figure 8)

*Convolvulus aculeatus* L. Sp. Pl. 155. 1753.

Family : Convolvaceae
Myanmar name : Nwe-kazun-phyu
English name : Moonflower
Flowering period : September to December

Annual, twining herbs. Leaves simple, alternate, exstipulate leaf blades broadly ovateor suborbicular, 2.0-8.5 cm by 1.0-6.0 cm, green above, pale green beneath, cordate at the base, entire along the margins, acuminate at the apex. Inflorescences axillary cymes, one to several flowered. Flowers bisexual, actinomorphic, hypogynous, pentamerous, white, large, showy. Sepals 5, elliptic-oblong or ovate, coriaceous, acute at the apex, pale green, glabrous, persistent. Corolla funnel-shaped, 5-lobed, white; tubes long; lobes rounded, white, glabrous. Stamens 5, filaments filiform long, white, glabrous, adnate near the middle of corolla tube; anthers dithecous, oblongoid, dorsifixed, introrse, white, dehiscing by longitudinal slit. Carpel 1, ovary superior, oblongoid, pale green, glabrous, unilocular, axile placentae; styles slender, exserted, white, glabrous; stigma globoid, white. Fruits loculicidal capsules, oblongoid, mucronate at the
apex, black, glabrous. Seeds trigonous, pale yellow, glabrous.

**Specimens examined**: Mandalay Region, Nyaung Oo District, Kyaukpadaung Township, Mount Popa area, N 20° 55' 04.982" and E 95°13' 22.128"; elevation 400 m; 3 December, 2022; Khin Khin Lay, collection no.34.

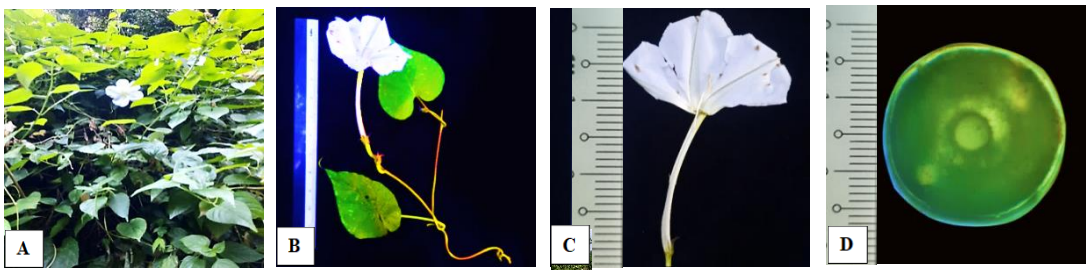



**Figure 8** *Ipomoea alba* L.
**A. Habit B. Inflorescence C. L.S of flower D. T.S of ovary**

**9.** ***Martynia annua*** L., Sp. Pl. 618. 1763. (Figure 9)

*Disteric angulosa* Rof. Fl. Tellur. 4. 68. 1838

Family : Myrtyniaceae
Myanmar name : Say ga lon
English name : Tigers' claws
Flowering period : June to September

Annual, erect fleshy herbs. Leaves simple, opposite and decussate, exstipulate; leaf blades ovate, cordate at the base, acute at the apex, pubescent on the both surfaces. Inflorescences terminal raceme, many-flowered. Flowers bisexual, zygomorphic, hypogynous, pentamerous, reddish pink, showy. Calyx rotate, 5-lobed, greenish-white, unequal, tubes copular; upper lobes3, ovate-oblong, lower lobes 2, ovate. Corolla bilabiate, 5-lobed, glandular; tube long, reddish pink, lower lobes, a larger purple blotch with a yellow blotch; upper lobes smaller, rounded. Stamens 2, free, inserted; filaments filiform, white, glabrous; anther dithecous, widely divergent. Discs annular, shortly hairy. Carpel 1; ovary superior, ovoid, glandular-hairy, unilocular with few ovules on the parietal placentae; styles filiform, white pubescent; stigmas bifid. Fruits durpes, ovoid, few-seeded. Seeds oblong, black, non-endospermic.

**Specimens examined**: Mandalay Region, Nyaung Oo District, Kyaukpadaung Township, Mount Popa area, N 20° 55' 04.980" and E 95°15' 22.126"; elevation 320 m; 8 September 2022; Khin Khin Lay, collection no.38.

**10.** ***Aeginetia indica*** L., Sp. Pl. 632. 1753; Benth., Scroph. Ind. 55. 1835. (Figure 10)

Family : Orbanchaceae
Myanmar name : Kauk-hlaing-ti
English name : Unknown
Flowering period : June to October

Perennial rhizomatic erect herbs, root parasites; stems arising directly from rhizome, slender, stout, unbranched, few scale near the base, pale yellow, glabrous. Leaves absent.

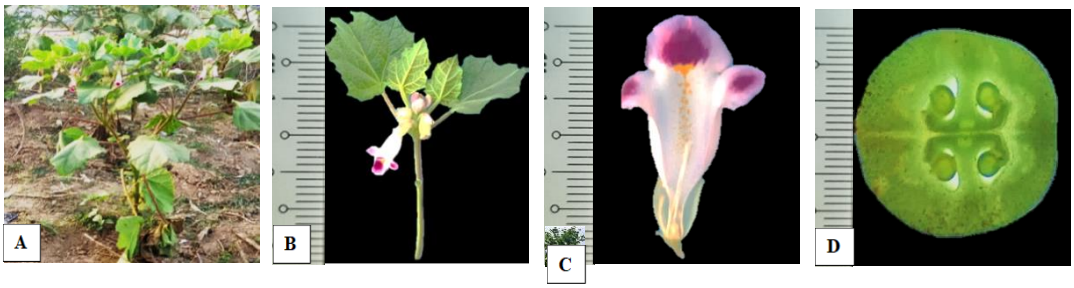



**Figure 9** *Martynia annua* L.
**A. Habit B. Inflorescence C. L.S of flower D. T.S of ovary**

Flowers bisexual, zygomorphic, hypogynous, pentamerous, purplish-red. Calyx spathaceous, 5-lobed, free, ovate, slightly connate at the base, entire along the margin, acuminate at the apex, pale yellow to pinkish, glabrous, closed in bud, persistent. Corolla tubular, 5-lobed; tube cylindrical, curved, pinkish-red, glabrous; lobes ovate, purplish-red, glabrous. Stamens 4, didynamous, epipetalous, included; filaments slender, short, pale yellow, glabrous, adnate near the base of corolla tube; anther dithecous, oblongoid, dorsifixed, introrse, pale yellow, dehiscing by longitudinally slits. Carpel 1, ovary superior, oblongoid, pale yellow, glabrous, unilocular, many ovules in the locule on the parietal placentae; style stout, pale yellow, glabrous, flat at the apex; stigma 2- lobed, glabose, large, yellow. Fruits capsular, ovoid, reddish-

brown, glabrous, enclosed in persistent calyx. Seed ovoid, numerous, minute, yellowish-white, glabrous, reticulate.

**Specimens examined**: Mandalay Region, Nyaung Oo District, Kyaukpadaung Township, Mount Popa area, N 20° 55' 29.985" and E 95°12' 30.961"; elevation 674 m; 17 September, 2022; Khin Khin Lay, collection no.15.

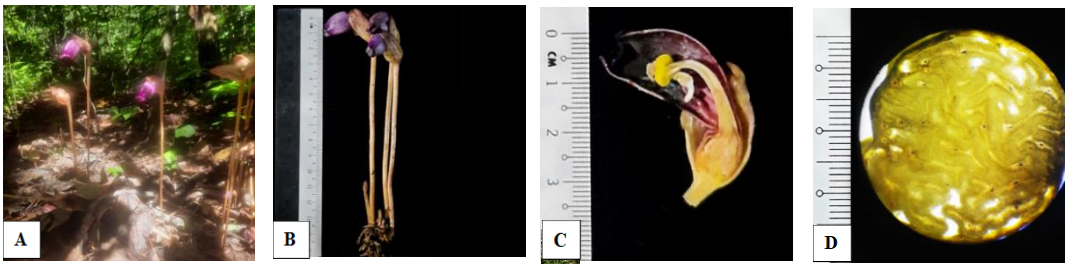



**Figure 10** *Aeginetia indica* L.
**A. Habit B. Inflorescence C. L.S of flower D. T.S of ovary**

**11. *Pittosporum napaulense*** (DC.) Rehder & E.H. Wilson in C.S.Sargent, PI.Wilson. 3: 326. 1916. (Figure 11)

*Senacia napaulensis* DC., Prodr. 1: 347. 1824.

Family : Pittosporaceae
Myanmar names : Mayanin, Ye kadi, Yene
English name : Golden fragrance
Flowering period : May to September

Perennial trees. Leaves simple, alternate, exstipulate; leaf blades oblong-lanceolate, cuneate at the base, entire along the margin, acute or acuminate at the apex, glabrous on both surfaces. Inflorescences terminal, corymbose-paniculate cymes, many-flowered. Flowers bisexual, actinomorphic, pentamerous, hypogynous, yellow, fragrant. Sepals 5, ovate, slightly connate at base, green, glabrous. Petals 5, free, oblong, yellow, glabrous. Stamens 5, free, exserted; filaments filiform, glabrous; anthers dithecous, dorsifixed, sagittate, yellow, dehiscing by longitudinal slit. Carpels 2, united; ovary superior, ovoid, bilocular, with two ovules in each locule on the axile placentae; styles terminal, white, glabrous; stigmas capitate. Fruits capsular, globose, 2-valved, 4- to 8-seeded. Seeds endospermic.

**Specimens examined**: Mandalay Region, Nyaung Oo District, Kyaukpadaung Township, Mount Popa area, N 20° 55' 08.294" and E 95°13' 12.533"; elevation 796 m; 13. June, 2023; Khin Khin Lay, collection no.5.

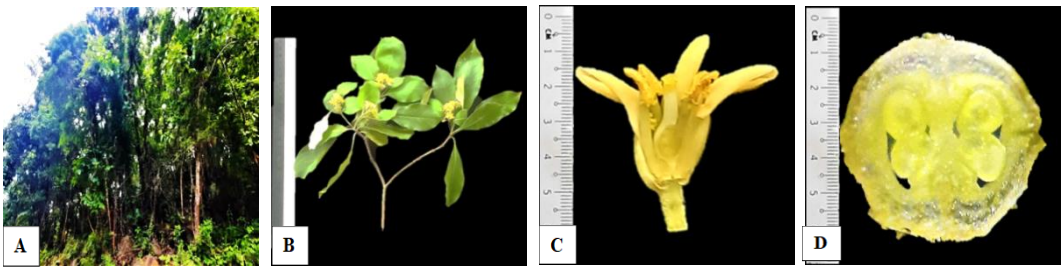



**Figure 11** *Pittosporum napaulense* (DC.) Rehder & E.H.
**A. Habit B. Inflorescence C. L.S of flower D. T.S of ovary**

## Discussion and Conclusion

The floristic study on Angiospermae of Mount Popa area, Kyaukpadaung Township, Mandalay Region were identified and described. A total of 11 species under 11 genera belong to the 9 families were studied. After that, plants that need to be preserved are also found in the IUCN Red List.

The distinctive features of Fabaceae family are the presence of single carpel, superior, unilocular ovary with marginal placentation and leguminous fruits. These characters are in agreement with the statements presented by Dassanayake (1980-2001), Qi-ming and De-lin (2009). The species *Butea monosperma* (Lam.) Kuntze as vulnerable species in the National Red List of Sri Lanka by Weera Koon and Wijesundara (2012).

Malvaceae family can be easily recognized from other families its mucilaginous tissue fibrous stem and branches, presence of stellate hairs and capsular fruits. These findings are in agreement with presented by Dassanayake (1980-2001), Qi-ming and De-lin (2009). In the study area, *Abelmoschus ficulneus*(L.) Wight & Arn. was commonly found but Weera Koon and Wijesundara (2012) recorded that this plant was near threatened species.

In the present study, *Chukrasia tabularis* A. Juss., *Aeginetia indica* L., and *Pittosporum napaulense* (D.C) Rehder & E.H Wilson are commonly distributed throughout the floristic area. However, Weera Koon and Wijesundara (2012) stated that *Chukrasia tabularis* A. Juss. as near threatened species, *Aeginetia indica* L. as critically endangered possibly extinct species and *Pittosporum napaulense* (D.C) Rehder & E.H Wilson are as endangered species. *Magnolia champaca* (L.) Baill. ex Pierre. was the characteristic species of this area.

In the 11 studied species, 4 species are trees, 2 species are shrubs and 5 species are herbs. Among them species, 10 species are autotropic plants and *Aeginetia indica* L. is a parasite plant. In this study, 6 species are simple leaves, compound leaves can be seen in 4 species and *Aeginetia indica* L. is leaves absent. Stipulate leaves are found in 5 species, the remaining species are exstipulate. The flowers of all species are bisexual. Actinomorphic flowers can be seen in 7 species while the remaining 4 species are zygomorphic flowers. All species are superior ovary. These findings are in agreement with the statements of Dassanayake (1968) and Qi-ming & De-lin (2009).

In conclusion, these taxonomic and floristic information of Mount Popa area will be provided for further researchers. It is hoped that these valuable natural plant resources should be conserved as the long-term programme of natural vegetation of Mount Popa area, Mandalay Region. Plants in need of conservation which are described in the IUCN Red List were abundantly found in this study. The flowering plants in Mount Popa area of Mandalay Region is partially accomplished the Flora of Myanmar, contributing it to be designated as Geopark in very near future.

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