

Comparative Three Subfamilies Of Leguminosae From Mawlamyine Vicinities

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ABSTRACT

The present study deals with the comparative of Morphological characters on three subfamilies of family Leguminosae in Mawlamyine Vicinities, which is situated in Mon State. In the present research, total of 16 species belonging to 9 genera and 16 species under three subfamilies of family Leguminosae. These species were collected, preserved and identified from December, 2017 to August, 2018. The detailed morphological characters of the habits, leaves, inflorescences, flowers, calyx, corolla, stamens, ovaries, fruits and seeds have been studied and compared. The characteristics of the family Leguminosae compared of subfamilies of Mimosoideae, Caesalpinioideae and Faboideae (Papilionoideae), the morphological characters of the genera and species were presented.

Keywords: Leguminosae, Mimosoideae, Caesalpinioideae, Faboideae

INTRODUCTION

Angiosperms or flowering plants are the largest group in Plant Kingdom, including about 411 families, 8,000 genera and 3,00,000 species. They are considered to be the highest evolved plants on the surface of the earth. Angiosperms are annuals or perennial herbs, shrubs, trees, climbers, twiners and lianes. They are characterised by their seeds enclosed within the mature ovary. Flowers are modified by reproductive shoots. Flowers of Angiosperms are either unisexual or bisexual and either naked or with perianth (Subrahmanyam, 1999). The science of classifying the plant is said to be plant Taxonomy and lays emphasis upon the phylogenetic relationship. The naming of the plant is known as nomenclature and provides each plant with a name (Pandey, 1999). Myanmar is exceptionally rich in plant biodiversity. About 7,000 species are included in the Checklist of Myanmar by Hundley and Chit Ko Ko (1987). Recently, Kress *et al.* (2003) had recorded 273 families, 2,371 genera and over 11,800 species in the checklist of Myanmar.

The aim of the research is to verify the names, affinities, geographical distribution and morphological characteristics of apopetalous and sympetalous flowering plants of Mawlamyine Vicinities. The accumulated information from this research is to know the scientific knowledge of the inventory of plant resources, and the aims and objectives are to identify and classify the angiosperms, to record the list of collected plants and to compare the morphological characters of apopetalous and sympetalous flowering plants from the study area.

MATERIALS AND METHODS

The families of the collected specimens were determined by using key to the families of Flowering Plants of the world (Hutchinson, 1967). Identification of genera and species were carried out by referring to the available literature such as Flora of Java (Backer & Brink, 1963-1968), Flora of Ceylon (Dassanayake, 1980-2001), Taxonomy of Angiosperms (Pandey, 1999) and Laboratory Manual of Plant Taxonomy (Sumrahmanyam, 1996). The index for nomenclature data was referred in Index Kewensis (Jackson, 1885) by which the names and synonyms of plant up to the rank of species being confirmed. The families of these species were arranged according to Angiosperm Phylogeny Group (APG) II System. Myanmar names were referred to

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-10 -10 -(5+5)
 -apostemonous -apostemonous -monadelphous

-linear, straight to slightly twisted -linear-oblong flattened -oblongoid

Figure. A1.1-6.3 Morphological characters of *Adenanthera pavonina* L., *Leucaena glauca* Benth and *Xylocarpa xylocarpa* (Roxb.) Taub.

Subfamily Mimosoideae

Trees, shrubs or lianas, are very rarely herbs (*Mimosa* and *Neptunia*). Leaves alternate, usually bipinnate (always in the indigenous species), stipulate. Flowers are in axillary or terminal inflorescences, actinomorphic, bisexual or more rarely unisexual or asexual, subtended by small bracts. Sepals usually 5 (rarely 4), valvate or imbricate, usually united forming a toothed or lobed calyx. Petals as many as the sepals, are valvate, free or united into a lobed corolla, hypogynous to slightly perigynous. Stamens are few to numerous, free or monadelphous; anthers small, dorsifixed, sometimes with a small stipitate gland at the apex of the connective. Ovary 1 (in mainland Asia), 1-locular, style filiform; stigma small and terminal; ovules numerous. Fruit a pod, dehiscent or indehiscent, sometimes breaking into 1-seeded segments. seeds mostly ovate or orbicular, often compressed; funicle rarely developed in to an aril; testa mostly a hard sclerotesta with a ± peripheral furrow, the pleurogram (linear fissural), enclosing the central area of the seed, the areole (Flora of Thailand, 1985).

Comparison of morphological characters on three species in genus *Acacia* of Mimosoideae

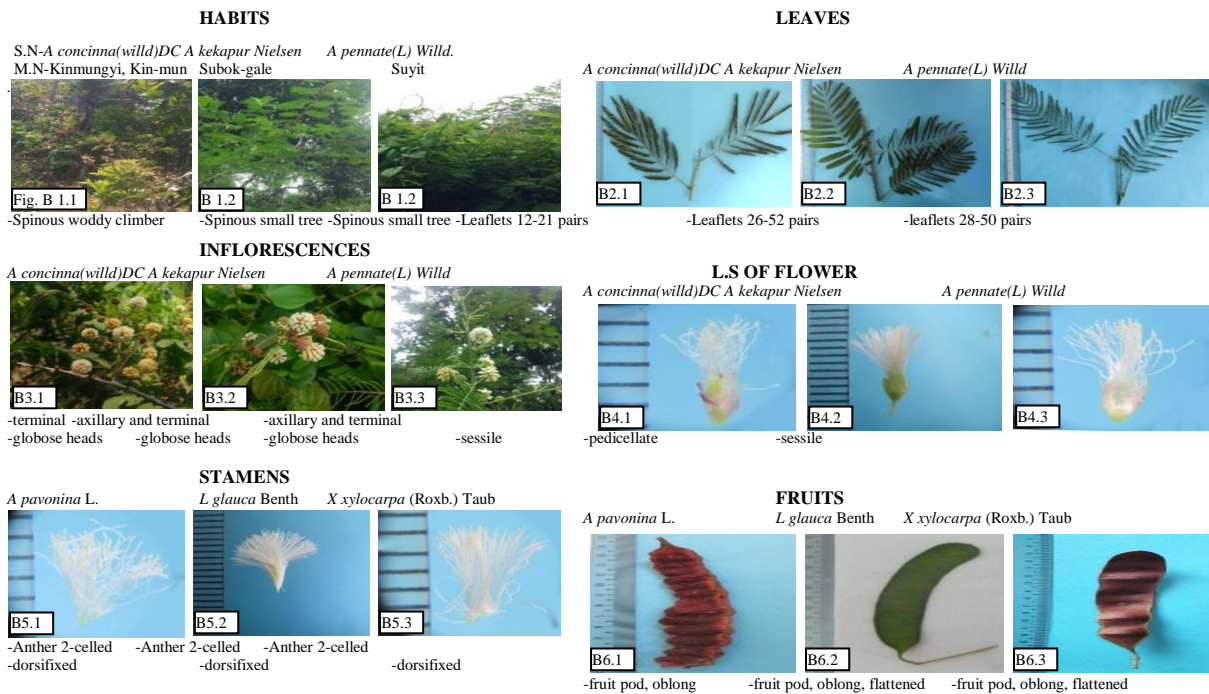
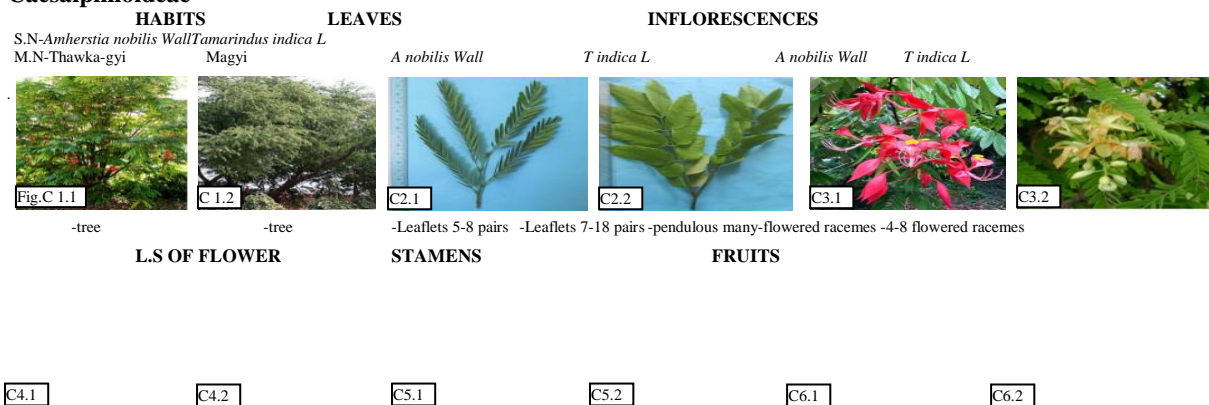


Figure. B 1.1-6.3 Morphological characters of *Acacia concinna* (Willd.) DC., *Acacia kekapur* Nielsen., *Acacia pennata* (L.) Willd.,

Comparison of morphological characters on two species in genus *Amherstia* and *Tamarindus* of Caesalpinoideae



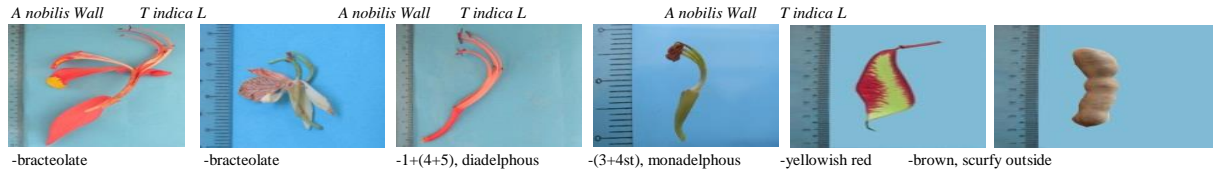


Figure. C1.1-6.2 Morphological characters of *Amherstia nobilis* Wall and *Tamarindus indica* L.

Subfamily Caesalpinioideae

Trees or shrubs, sometimes herbaceous, armed or unarmed; leaves usually alternate, pinnate, sometimes bipinnate, rarely simple or unifoliolate; stipules in pairs, usually caducous; inflorescences, racemose, or paniculate, rarely capitate, terminal or axillary, rarely leaf-opposed, sometimes cauliflorate; flowers usually zygomorphic, sometimes actinomorphic, 5-merous, sometimes large and showy, sometimes small; calyx with sepals usually imbricate, rarely valvate, free or somewhat connate; corolla with petals usually 5, sometimes fewer, or absent, imbricate in bud with the uppermost (adaxial) petal enveloped by the others, the bases free or sometimes connate; stamens 10, sometimes fewer, sometimes many, the filaments free or somewhat united; anthers various, dehiscent or indehiscent; seeds bilaterally symmetrical, sometimes with pleurograms and areoles, sometimes fracture lines, rarely winged, occasionally arillate; the hilum basal, small, the seed coat lignified to coriaceous, rarely thin, the embryo straight, endosperm usually absent but present in some genera, the cotyledons fleshy or foliaceous (Dassanayake, 1991).

Comparison of morphological characters on four species in genus *Senna* of Caesalpinioideae

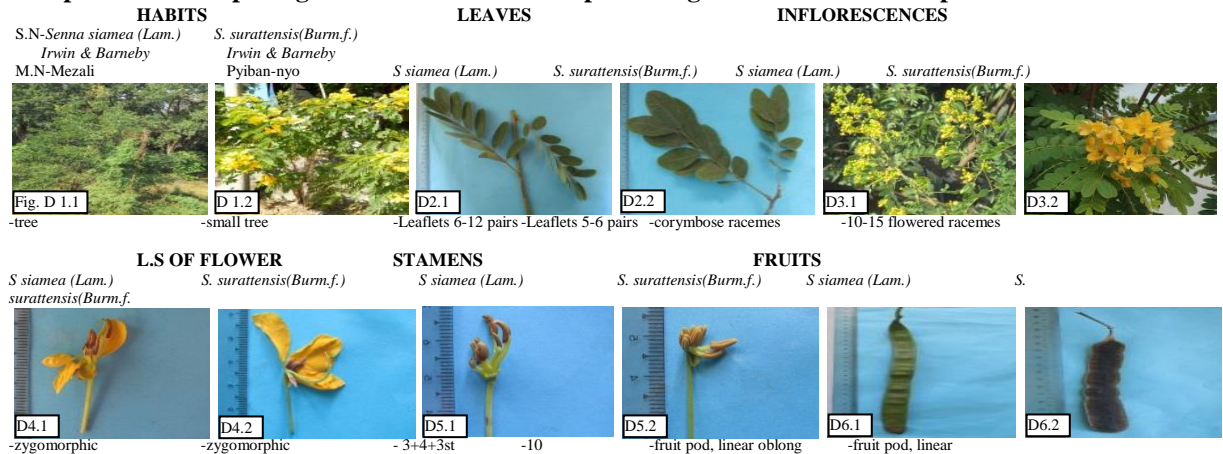


Figure. D 1.1-6.2 Morphological characters of *Senna siamea* (Lam.) Irwin & Barneby., *Senna surattensis* (Burm.f.) Irwin & Barneby.,

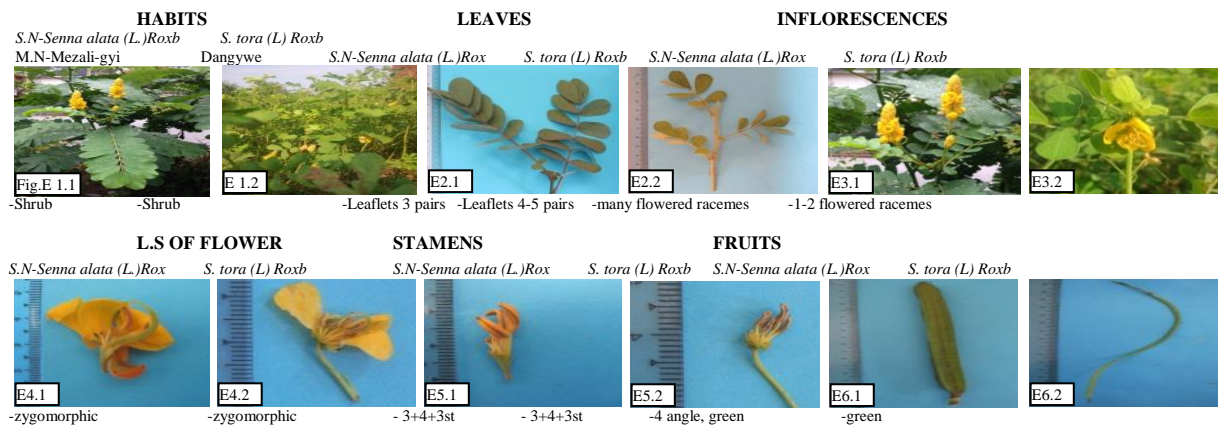


Figure. E1.1-6.2 Morphological characters of *Senna alata* (L.) Roxb., *Senna tora* (L.) Roxb.

Comparison of morphological characters on two species in genus *Clitoria* of Faboideae

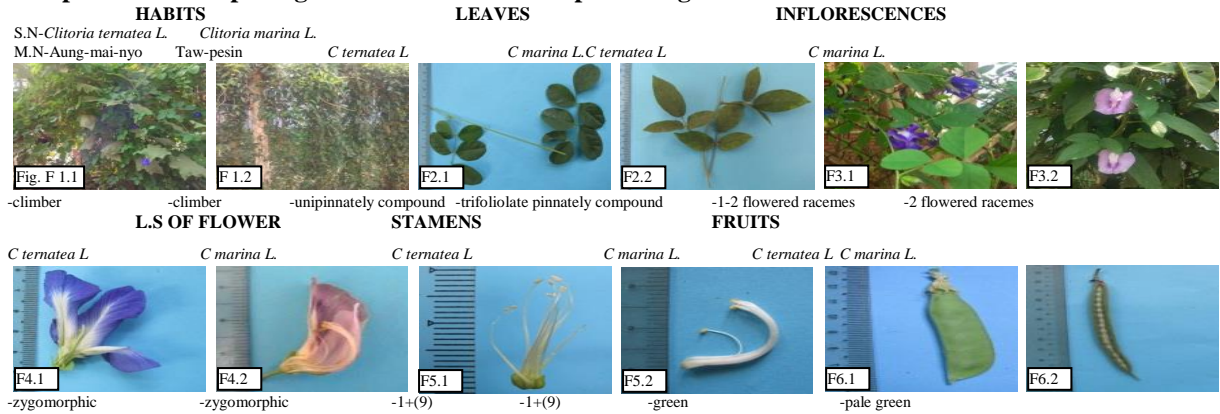


Figure. F 1.1-6.2 Morphological characters of *Clitoria ternatea* L. and *Clitoria marina* L.

Subfamily Faboideae (Papilionoideae)

Herbs, shrubs or trees, the stems are sometimes twining. Leaves commonly alternate, rarely opposite, compound, sometimes simple, usually stipulate, sometimes stipellate. Flowers are commonly bisexual, 5-merous, solitary or in compound inflorescences, axillary or terminal. Sepals free or united, 4 or 5, rarely 1, then spathaceous. Petals commonly 5-many, sometimes reduced to only one fertile member, the sterile members may be present or sometimes reduced to staminodes, the filaments free or united, the anthers 2-celled, dehiscent lengthwise or by terminal pores. Pistil usually 1, the ovary superior, 1-locular, 1-many-ovulate. Fruit a legume, dehiscent or indehiscent, 1-many seeded, 2-valved, but may be modified as a drupe, somara, follicle, or loments. Seed, commonly with a coriaceous testa, reniform, lenticular, or spherical, sometimes alate sometimes orillete, the hilum orbicular to linear, the endosperm little or none (Dassanayake, 1980).

Comparison of morphological characters on two species in genus *Millettia* of Faboideae

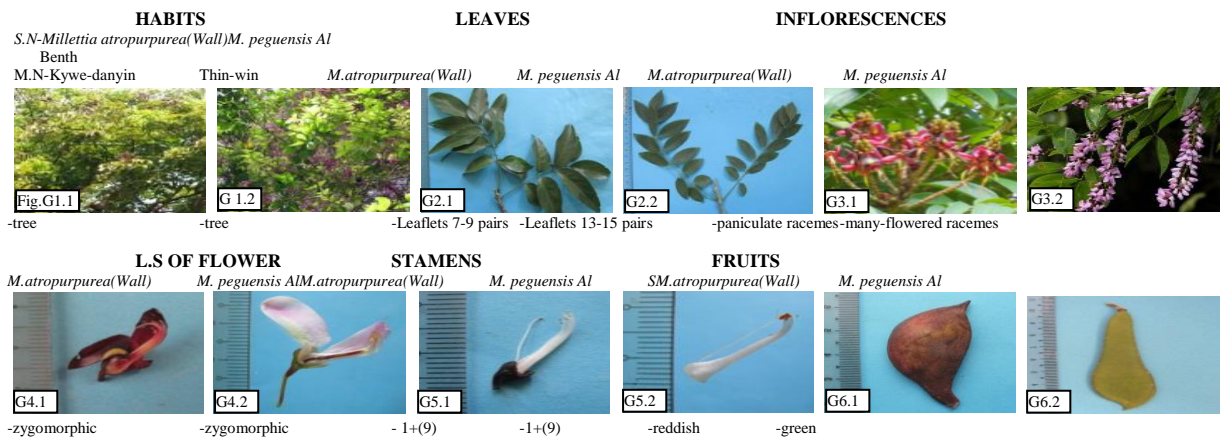


Figure. G1.1-6.3 Morphological characters of *Millettia atropurpurea* (Wall.) Benth., *Millettia peguensis* Ali

DISCUSSION AND CONCLUSION

The present research work deals with the taxonomy study on family Leguminosae (Fabaceae) in Mawlamyine Vicinities. The study is observed on the 6 species belonging to 4 genera of subfamily Mimosoideae, 6 species belonging to 3 genera of subfamily

Caesalpinioideae and 4 species belonging to 2 genera subfamily Faboideae (Papilionoideae) respectively. The discussion will be emphasized only on the most distinguishing and easily recognizable characters.

In subfamily Mimosoideae, *Adenanthera pavonina*, *Leucaena glauca* and *Xylocarpus xylocarpa* are compared in (Fig. A1.1-6.3). These species are trees whereas the leaves are bipinnately compound but *A. pavonina* is imparipinnate leaflets and paripinnate leaflets in *L. glauca*, *X. xylocarpa*. The leaf tips is mucronulate in *A. pavonina* but acute in *L. glauca* and *X. xylocarpa*. The inflorescences in *A. pavonina* is many-flowered racemes but it is globose heads in *L. glauca* and *X. xylocarpa*. The shape of sepals are infundibuliform and the number of petals are five in these three species. The flowers colour of *A. pavonina* and *X. xylocarpa* have pale yellow whereas white in *L. glauca*. The number of stamens are 10 and apostemonous found in *A. pavonina* and *L. glauca* but (5+5) monadelphous stamens in *X. xylocarpa*. These characters are agreement with those stated by Backer (1963), Dassanyake (1980) and Subrahmanyam (1999).

Acacia concinna, *Acacia kekapur* and *Acacia pennata* are compared in (Fig. B 1.1-6.3). *A. concinna* is spinous woody climber whereas spinous trees in *A. kekapur* and *A. pennata*. *A. pennata* are bipinnately compound leaves. The inflorescences are globose heads in *A. concinna*, *A. kekapur*, *A. pennata*. The shape of corolla is infundibuliform in *A. concinna*, *A. kekapur* and *A. pennata*. All species have stamens numerous. The shape of fruits are oblong in *A. concinna*, *A. kekapur* and *A. pennata*. These characters are in agreement with those mentioned by Backer (1963) and Dassanayake (1980).

In subfamily Caesalpinioideae, *Amherstia nobilis* and *Tamarindus indica* are compared in (Fig. C 1.1-6.2). These two species are trees and unipinnately compound leaves with paripinnate. The leaflets of *A. nobilis* has 5-8 pairs and 7-18 pairs in *T. indica*. The shape of leaves are ovate to oblong-elliptic and tips acuminate in *A. nobilis*, whereas oblong to obovate and tips retuse in *T. indica*. The inflorescences of *A. nobilis* is terminal, pendulous many-flowered racemes and terminal, 4-8 flowered racemes in *T. indica*. The flowers colour of *A. nobilis* is red but the flower of *T. indica* is creamish with reddish stripes. The number of petals is 4 (the two lower are setaceous, lateral one spatulate and upper one obcordate) in *A. nobilis* whereas number of petals is 5 (the three upper large and two lower are reduced to scale) in *T. indica*. The number of stamens are 1+(4+5), diadelphous in *A. nobilis* but (3+4st), monadelphous in *T. indica*. These characters are similar to those mentioned by Backer (1963) and Dassanayake (1991).

Senna siamea, *Senna surattensis*, *Senna alata* and *Senna tora* are compared in (Fig. D 1.1-6.2 and E 1.1-6.2). *S. siamea* and *S. surattensis* are trees but shrubs in *S. alata* and *S. tora*. The arrangement of leaves are unipinnately compound and paripinnate in those four species but the number of leaflets are remarkable different. The colour of the petals are also the same as in flowers. The number of stamens are 7 fertiles and 3 staminodes in *S. siamea*, *S. alata* *S. tora* where as 10 fertiles stamens are *S. surattensis*. Anther basifixed and porous dehiscences are found in above species. These characters are agreement with those stated by Backer (1963) and Dassanayake (1991).

In subfamily Faboideae (Papilionoideae), *Clitoria ternatea* and *Clitoria marina* are compared in (Fig. F 1.1-6.2). The arrangement of leaves are unipinnately compound in *C. ternatea* and trifoliolate pinnately compound in *C. marina*. The colour of the petals are white to deeper of bluish in *C. ternatea* but violet with streaked white in *C. marina*. These characters are mentioned by Backer (1963) and Dassanayake (1996).

Millettia atropurpurea and *Millettia peguensis* are compared in (Fig.G 1.1-6.2). These species are trees and unipinnately compound with imparipinnate leaflets. The inflorescences of *M. atropurpurea* is terminal paniculate racemes but axillary many-flowered racemes in *M. peguensis*. The colour of petals are dark purple in *M. atropurpurea*, pink in *M. peguensis*. Stamens of these species are 1+(9) and diadelphous. These characters are similar this stated by Backer (1963) and Dassanayake (1996).

In conclusion, subfamilies Mimosoideae and Faboideae contain trees, shrubs, herbs and climbers. Caesalpinioideae contains trees and shrubs. In Mimosoideae, leaves are pinnate compounds, inflorescences are head, spike and racemes. All species of flowers are actinomorphic and petals aestivation are valvate or imbricate. The number of stamens are 4-numerous, apostemonous and monadelphous, anthers dorsifixed and longitudinal dehiscences. In Caesalpinioideae, leaves are bifoliolate and pinnate compounds whereas inflorescences are racemes. Flowers are actinomorphic or zygomorphic, imbricate and ascending petals. The number of stamens are 1-10, apostemonous, monadelphous and diadelphous, fertiles and staminodes. Anthers have dorsifixed or basifixed, porous or longitudinal dehiscences. In Faboideae, leaves are simple, pinnate and palmate compounds. The inflorescences are racemes. Zygomorphic flowers and papilionaceous (standard, wings and keels) petals are found in all species. The number of stamens have (5+5), (5)+(5), 1+(9), monadelphous and diadelphous stamens whereas dorsifixed and dimorphic anthers, longitudinal dehiscences are found in all species. Fruits are pods and samaroid.

The present research work deals with the valuable taxonomic information and beneficial knowledge for the students, other researchers and local people in various ways.

This research will also be partial fulfillment for systematic Botany of Mon State.

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