

Taxonomic Study on Some Species of the Family Malvaceae from Myothit Township, Magway District, Magway Region

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Abstract

In this research, there is an emphasis on some species from the family Malvaceae. Scientific studies are carried out to find information morphologically. The characters of stems, leaves, flowers, fruits and seeds were observed in 5 selected species of Malvaceae. These plants are collected during the period of 2019-2020. A total of 5 species under 5 genera belonging to the family of Malvaceae were recorded from the study area. The detailed morphological characters of habit, inflorescence, flower and T.S of ovary have been identified and documented by photograph. For each species scientific name with author citation, Vernacular name, flowering period of each plant have been classified in this study. Global Positioning Systems are also provided.

Keywords: Characteristics, flowering period, Malvaceae

Introduction

Floristic study is a taxonomic study of a flora. Flora in its simplest sense is an inventory of the plants of a definite area. The great variety of natural habitats in Myanmar are rich in biodiversity, ranging from the high mountains continuous with the Himalayas in the north to the wet tropical forests in the south (Kress *et al.*, 2003). Twenty-six genera and 161 species were recorded in the checklist of Myanmar by Kress *et al.* (2003).

The present research deals with the taxonomic study on the family Malvaceae from Myothit Township which is located in Central Myanmar in Magway District. It is situated between North Latitude (20° 0' 52.741" to 20° 19' 48.601") and East longitude (95° 11' 45.189" to 95° 49' 52.327").

Malvaceae are a widely distributed family among the angiosperms. Most of the members of the Malvaceae show flowers and fruits in raining season and winter, especially between the months of June and December. The family Malvaceae is placed under the order Malvales. Family Malvaceae consists of about 4230 species and 250 genera with worldwide distribution (Simpson, 2006) and 68 species and 17 genera in Myanmar checklist by Kress *et al.* (2003). In this paper, 5 species belonging to 5 genera of the family Malvaceae were recorded.

Nowadays, the accepted names of each species is checked at Kew Science. Thus, the accepted name of *Bombax malabaricum* is changed to *Bombax ceiba* and *Pavonia odorata* to *Pavonia zeylonica* by Kew Science.

Therefore, it is hoped that the present study is helpful in providing knowledge on species diversity, interaction and relationship of the plants and will help local people understand the importance of the plants in this distinctive region of Myothit Township, Magway District, Magway Region.

The aims and objectives of this present research are to study some plants from the family Malvaceae of Myothit Township and to clarify and identify the selected plants, to get distinguished morphological characters, to record and document the plant diversity of Myothit Township.

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Materials and Methods

Specimens are properly collected from 2019 to 2020. All the collected specimens were recorded in photographs. Field notes were made of detailed plant descriptions, habitat types and precise locations by using GPS. Identification of species was carried out by referring the books of Flora of British India (Hooker 1879), Flora of Java (Baker 1965), Flora of Ceylon (Dassanayake 1997) and Flora of China (2011). All of the nomenclatural studies were finalized by referring to the website of Plants of the World, Kew Science (<http://www.kew.org/science>). Local names were recorded by Hundley & Chit Ko Ko (1987) and Kress *et al.* (2003). Most of the plant specimens have been air dried, pressed and mounted according to reference (Lawrance 1964). The genera and species arrangement under the families were arranged in alphabetical order. All studied species were described using taxonomic descriptions.

Results

During 2019-2020, there were 5 species belonging to 5 genera of the family Malvaceae collected from Myothit Township. Taxonomic studies on this species, interrelationship of orders, families and scientific names are arranged according to classification system of APG IV (2016). as follow:

Superorder	Order	Family	Scientific Name
Rosids	Malvales	Malvaceae	(1) <i>Abutilon indicum</i> (L.) Sweet. (2) <i>Bombax ceiba</i> L. (3) <i>Malachra capitata</i> (L) L. (4) <i>Pavonia zeylonica</i> (L.)Cav. (5) <i>Waltheria indica</i> L.

The General Characteristics of Family Malvaceae

Herbs, shrubs, or less often trees; indumentum usually with peltate scales or stellate hairs. Leaves alternate, stipulate, petiolate; leaf blade usually palmately veined, entire or various lobed. Flowers solitary, less often in small cymes or clusters, axillary or subterminal, often aggregated into terminal racemes or panicles, usually conspicuous, actinomorphic, usually bisexual (unisexual in *Kydia*). Epicalyx often present, forming an involucre around calyx, 3- to many lobed. Sepals 5, valvate, free or connate. Petals 5, free, contorted, or imbricate, basally adnate to base of filament tube. Stamens usually very many, filaments connate into tube; anthers 1-celled. Pollen spiny. Ovary superior, with 2–25 carpels, often separating from one another and from axis; ovules 1 to many per locule; style as many or 2 × as many as pistils, apex branched or capitate. Fruit a loculicidal capsule or a schizocarp, separating into individual mericarps, rarely berrylike when mature (*Malvaviscus*); carpels sometimes with an endoglossum (a crosswise projection from back wall of carpel to make it almost completely septate). Seeds often reniform, glabrous or hairy, sometimes conspicuously so.

Key to the Species of the Family Malvaceae

1. Plants herbaceous----- 2
1. Plants trees and shrubs----- 4
 2. Epicalyx present -----4. *Pavonia zeylonica*
 2. Epicalyx absent-----3
3. Bracts present-----3. *Malachra capitata*
3. Bracts absent-----1. *Abutilon indicum*
 4. Plants tree; leaves palmately compound; ovary pentalocular-----2. *Bombax ceiba*
 4. Plants shrub; leaves simple; ovary unilocular-----5. *Weltheria indica*

Taxonomic Description of Five Species of Malvaceae

(1) *Abutilon indicum* (L.) Sweet, Hort. Brit. Ed. 1. 54. 1826.

Common Name : Country mallow

Vernacular Name : Bauk khway gale

Flowering period : August to December

Annual woody herbs, erect, up to 1.0 m high; stems and branches terete, densely pubescent when young. Leaves simple, alternate; stipules linear, 2.0-2.5 mm long, densely stellate-pubescent; petioles 8.0-12.0 mm long; blades ovate or sub orbicular, 4.0-12.0 cm by 5.0-10.0 cm, green, stellate-pubescent hairy on both surfaces, obtuse to cordate at the base, margin serrate-dentate, acuminate at the apex, palmately 5- to 7-veined, prominent vein or lower surface. Flowers axillary and solitary, bisexual, actinomorphic, hypogynous, pentamerous, 2.0-2.5 cm in diameter, yellow, afternoon bloomer; peduncles longer than the petiole, articulate near the apex, shortly stellate-pubescent; pedicels 2.0-5.0 cm long, stout, jointed above, tomentose. Calyx 5-lobed, campanulate, persistent; lobes broadly triangular, 4.0-5.0 mm long, densely stellate-pubescent without, woolly-hairy within. Petals 5, obovate, yellow, glabrous. Stamens numerous, monadelphous; staminal tube about 3.5 mm long, yellow; anteriferous at the upper half; filament free, filiform; anthers monothealous, reniform dorsifixed. Ovary superior, globoid, 15- to 25- locular, with 2 or 3 ovules in each locule on the axile placentae; style terminal, filiform; stigma capitate, stigmatic branches 15-20, capitate lobe, yellow, pubescent. Fruits schizocarpic, 3 seeded; mericarps 15-20, dehiscent, green, pubescent.

Specimen examined : Lay Own Village, Myothit Township, 2019; Wai Wai Hnin (N Lat 20° 4' 51" and E Lon 95° 15' 23").

(2) *Bombax ceiba* L., Sp. Pl. 511. 1753.

Common Name : Cotton tree

Vernacular Name : Letpan

Flowering period : February to April

Perennial, deciduous, large trees, up to 35.0 m high; stems and branches with large prickles. Leaves palmately compound, alternate; stipules caducous; petioles 7.0-20.0 cm long, pulvinate, glabrescent; leaflets 5-7, elliptic-ovate, 8.0-17.0 cm by 3.0-8.0 cm, coriaceous,

glabrous on both surfaces, obtuse at the base, entire along the margin, acutely acuminate at the apex; petioles 1.0-2.0 cm long. Inflorescences solitary or cluster at defoliate nodes; peduncles short. Flowers bisexual, actinomorphic, hypogynous, pentamerous, showy, brightly red, erect, 7.0-12.0 cm in diameter; young floral buds ovoid, reddish green; pedicel short, thick. Calyx campanulate, 3- to 6- lobed, leathery, thick, 1.0-1.5 cm long, green, glabrous and muricate without, silky villous within. Petals usually 5, connate at the base, twisted, elliptic-obovate to oblong, brightly red, fleshy, recurved, adnate to the staminal tube. Stamens numerous, monadelphous, sub-exserted; bundles 6, opposite the petals, connate at the base to form a common tube; filaments filiform, reddish towards the apex, dilated at the base; anthers mono or diitecous, blackish. Ovary superior, conical, about 1.0 mm long, pinkish, densely pubescent, pentalocular, with many ovules on the axile placentae; style filiform, thicken upwards, reddish, glabrous; stigma 5-fid, red. Capsules loculicidally 5-valved, many-seeded, elliptic-oblongoid, dark brown, slightly angular, woody inside, valve wooly, silky tomentose within.

Specimen examined : Lay Own Village, Myothit Township, 2019; Wai Wai Hnin (N Lat 20° 6' 51" and E Lon 95° 30' 23").

(3) *Malachra capitata* (L) L., Syst ed. 12.2: 456.1767.

Common Name : Malva
 Vernacular Name : Sin ma hmwe sok
 Flowering period : August to November

Annual herbs: stem and branches hispid or prickly. Leaves simple, alternate, stipulate, petiolate; stipules green, linear 0.8-2.0 cm long bristle, often bifid: petioles reddish green, 2.7 cm long, densely pubescent stellate-hairy and bristly: lamina ovoid, 7-8 cm by 2.8-9.0 cm. cordate at the base, crenate along the margin, obtuse at the apex, bristly and stellate-hairy. Inflorescences terminal or axillary clustered cymes. Flowers yellow, bisexual, actinomorphic, pentamerous, hypogynous, 2.0-2.5 cm across at anthesis, bracteate, pedicellate: bracts 3, large, ovate, 1.5-2.0 cm by 1.7-2.2 cm stellate hairy and bristly; pedicel about 2 mm long pubescent. Calyx 5-lobed campanulate, glabrous within, bristellate hairs without and along the apex, tube cupular, about 3 mm long lobes 5, ovate, about 3 mm long. Petals 5, yellow, ovate. 0.8-1.2 cm; stamens numerous, monadelphous: staminal tube 0.7-1.0 cm long, glandular-hairy. by 0.4-1.1 cm, pubescent and glandular-hairy, antheriferous throughout free filaments linear, about mm long, ciliate; anthers monothealous, dorsifixed, uppressed, subreniform (sigmoid), about 0.5 mm long. Ovary superior. 10-carpellary, syncarpous, pentalocular with one ovule in each locule on axile placentae depressed globose, about 2 mm long; glabrous style terminal, conical, 5-8 mm long, glandular hairy, stigmatic branches 10, each capitate, glandular-hairy, Fruits simple, depressed globoid.

Specimen examined: Lay Own Village, Myothit Township, 2019; Wai Wai Hnin (N Lat 20° 6' 51" and E Lon 95° 41' 23").

(4) *Pavonia zeylonica* (L.)Cav. Sp. Pl. 3: 8371800 Plate 38.

Common Name : Ceylon swamp mallow
 Vernacular Name : Not known
 Flowering period : July to November

Annual erect herbs. 1.0-2.0 m high stem and branches terete, light green, glandular-pubescent, internodes terete, 0.5-1.5 cm long light. Leaves simple, alternate; stipules line, 20-3.0mm long, green, glandular-pubescent, petioles terete, 0.7-2.5 cm long, caducous, green

glandular-pubescent. Inflorescences terminal or axillary uniflorous. Flowers morning bloomer, bisexual, actinomorphic, hypogynous, pink or white, complete, about 1.5 cm across at anthesis, ebracteate, pedicellate, bracteolate; pedicels filiform, 2.0-3.0 cm long, green, glandular-pubescent; bracteoles of epicalyx 8 to 10, subulate with a nectary gland on the midrib beneath, connate at the base, scabrous, 7.0-10.0 mm long, green, glandular-pubescent. Calyx campanulate, deeply 5-lobed, lobes ovate with acute apex, about 3.0 mm by 10.0 mm, pale green, villus, Petals 5, obovate, obtuse, about 1.0 cm by 0.6 cm, pink or white, glabrous. Stamens numerous, monadelphous; staminal tubes slender, about 1.0 mm long, white, glabrous: antheriferous throughout; free filaments linear, about 1.0 mm long, yellowish-green, glabrous: anthers dorsifixed, reniform, about 0.5 mm long, white, glabrous. Ovary superior, pentalocular with 1 ovule in the locule on axile placentae, globose, about 1.0 mm by 2.0 mm, pale green, glabrescent, style terminal about 1.0 mm long, yellow, glabrous; stigmatic branches 10, each stigma branch bears a stigma; each stigma capitate, about 1.0 mm long, yellow. Fruits schizocarpic, discoid to globular, trigonous mericarps; each mericarp 1-seeded, muricate on the outer surface, prominently-veined, brown, pubescent.

Specimen examined: Lay Own Village, Myothit Township, 2019; Wai Wai Hnin (N Lat 20° 8' 51" and E Lon 95° 40' 23").

(5) *Waltheria indica* L., Sp. PL. 1: 673.1753.

Common Name : Monkey Bush, Sleepy Morning

Vernacular Name : Bauk mya, Khwe tayaw

Flowering period : September to November

Annual erect shrubs, 0.5-1.0 m tall; young shoot and branches covered with densely stellately tomentose. Leaves simple, alternate; stipules subulate and caduceous: petiole 0.5-3.3 cm long; blades ovate-oblong to oblong, 2.5-9.0 cm long, 1.5-3.5 cm wide, obtuse or subacute at the apex, rounded at the base, serrate-dentate margin, venation more or less impressed above, prominent beneath: margins. Inflorescence axillary or terminal dense cymose clusters or sometimes spike-like or branched: peduncle short or developed. Flowers pale yellow, small, bisexual actinomorphic, pentamerous, hypogynous: bracts and bracteoles linear to linear lanceolate, withering and persistent after anthesis. Calyx 2.0-3.0 mm long. Petals 5, yellow, ovate-oblong, 2.0-3.0 mm long, shortly clawed, glabrous. Stamens 5, opposite the petals; filaments white, united into a tube; anthers dithecal, parallel, basifixed, dehiscing by longitudinal slit. Ovary sessile, unilocular, obovoid, 2 ovules in each locules and ovule ascending; styles excentric; stigma clavate, fimbriate above. Capsules within the withered calyx, obovoid, hairy above-2 seeded.

Specimen examined: Lay Own Village, Myothit Township, 2019; Wai Wai Hnin (N Lat 20° 8' 51" and E Lon 95° 35' 23").



Habit



Inflorescence



Flower



T.S of ovary

Abutilon indicum (L.) Sweet



Habit



Inflorescence



L.S of Flower



T.S of ovary

Bombax ceiba L.



Habit



Inflorescence



L.S of Flower



T.S of ovary

Malachra capitata L.



Habit



Inflorescence



L.S of Flower



T.S of ovary

Pavonia zeylonica (L.) Cav.



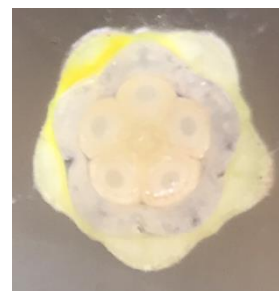
Habit



Inflorescence



L.S of Flower



T.S of ovary

Waltheria indica L.

Discussion and Conclusion

In this research, some species from the family Malvaceae growing in Myothit Township are described. There are 5 species, 5 genera from the family Malvaceae in this paper. Among them, most species are herbs, *Bombax ceiba* is a tree and *Waltheria indica* is shrub. In the present work, the leaf arrangements are found to alternate in all species. The types of simple leaves are found in 4 species and palmately compound in *Bombax ceiba*. In the species of *Pavonia zeylonica*, epicalyx is present and another 4 species are absent. Bracts present in 2 species and absent in 3 species. All species are bisexual. The stamens of 4 species are numerous and 1 species is few. The anther of monothealous in 4 species and dithealous in 1 species. All species are ovary superior. *Abutilon indicum* has multilocular, another 4 species have pentalocular and placentation types of all species are axile. The characters examined in the present research were in agreement with those described by the Flora of British India (Hooker 1879), Flora of Java (Baker 1965), Flora of Ceylon (Dassanayake 1997) and Flora of China (2011), Flora of Hong Kong (2007-2009).

Malvaceae family is commonly called the cotton family or the marrow family. The plants are almost cosmopolitan in distribution but many of them are confined to tropics and sub-tropics. Economically this family is of much importance because there are a number of fibre-yielding plants. According to certain authorities nearly all genera can produce some or other kinds of fibres. *Malachra capitata* also produces a strong silky fiber like jute and is used as a substitute.

Malvaceae is related to Sterculiaceae and Tiliaceae in having mucilaginous sap, simple alternate and stipulate leaves. According to Bentham and Hooker, it differs from them in having monothealous anthers, a monadelphous condition and presence of involucre or epicalyx. Hutchinson placed the single family under Malvales. Engler and Prantl put this family together with Tiliaceae, Bombacaceae and Sterculiaceae in the order Malvales.

According to APG III (2011) and APG IV (2016), some families were absolutely changed to new accepted families. This system merged Sterculiaceae, Tiliaceae, Bombacaceae with Malvaceae and subdivided this enlarged family Malvaceae into nine subfamilies based on molecular, morphological and biogeographical data: (1) Byttnerioideae, (2) Grewioideae, (3) Tilioideae, (4) Helicteroideae, (5) Sterculioideae, (6) Brownlowioideae, (7) Dombeyoideae, (8) Bombacoideae, (9) Malvoideae. There are *Bombax* in Bombacaceae transferred to Malvaceae as subfamily Bombacoideae.

The present research work can provide valuable information and beneficial knowledge for the students, other researchers and local people in various ways. This research will also be a partial fulfillment of the systematic Botany of Myothit Township and its surrounding area.

Acknowledgements

Firstly, I would like to thank Dr Thida Oo, Professor and Head, Yangon University, for her encouragement and permission to carry out the research work. I would like to thank Dr. Ko Tin, Professor and Head, Department of Botany, West Yangon University, for his encouragement and permission to under-take this research by providing the department facilities throughout the study period. I would like to express my special thanks to my supervisor, Dr. Thet Thet Mar Win, Professor of Botany Department, Yangon University, for her guidance and supervision, valuable advice and constant encouragement during this research.

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