Study on the Morphological Characters and Medicinal Uses of Six Selected Species in Hinthada University Campus

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Abstract

In this paper, 5 genus of 6 species were collected during their flowering and fruiting season in Hinthada University Campus. The specimens were used for the morphological characters and medicinal uses of each specimens were carried out by referring literature from Indian Medicinal Plants (1918), Hooker (1872), Backer (1965) and Heywood (1978). Natural habit, leaves, inflorescences, flowers and ovaries of each specimens have been photographed. Identification and classification of these plants have been studied by referring literature from Judd *et. al* (2002).

Keywords : angiosperm, morphology, medicinal

INTRODUCTION

The present study deals with the taxonomic studies of Hinthada University Campus is located in Hinthada Township, between 17^{o} 38′ 20″ North Latitude and 95^{o} 26′ 20″ East Longitude. Angiosperms also comprise the vast majority of all plant foods we eat, including grains, beans, fruits, vegetables and most nuts. Angiosperms can grow as trees, shrubs, bushes, as well as herbs. Angiosperms have a distinctive underground root, as well as aerial shoot system. Angiosperms represent approximately 80 percent of all the known green plants now living. The angiosperms were traditionally divided into monocotyledons and dicotyledons; however, this division is no longer supported by recent systematic studies.

In this study, the plant species to be studied were collected from Hinthada University Campus. Hinthada University is situated between Lelte kwin and Myawaddy Ward. It is widely distributed about 91.45 Acre. All the species were collected during their flowering and fruiting period in Hinthada University Campus. The plant species were collected from December (2021) to September (2022). These specimens were thoroughly studied and identified. Some are wild plants and other are cultivated and then these collected species are also medicinal plants and dicotyledonous.

The aim of the research is to knowledge medicinal plants in Hinthada University Campus, to understand the morphological characters of collected plants species and to document for other taxonomic research. (https://en.m.wikipedia.org) (https://www.researchgate.net)

MATERIALS AND METHODS

Collection and Identification of Plants

Study site

Hinthada University is located in Hinthada Township, Ayeyarwady Region and between 17^{o} 38′ 20″ North Latitude and 95^{o} 26′ 20″ East Longitude.

Study period

Field collection of plants was conducted from December (2021) to September (2022).

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Identification and classification

The collected specimens were examined their morphological characters. These specimens were identified by key and description from taxonomic literatures, such as Hooker (1872), Backer (1965), Pandey (1999) and Judd *et. al* (2002). The classification system of plants in Hinthada University was followed by Judd *et. al* APG III (2002).

RESULTS

In this study, 6 species belong to 5 genera of 5 families were arranged by Judd *et. al* APG III (2002). An artificial parallel key to the studied species were also constructed. The detailed morphological characters of the habit, leaves, inflorescences, flowers, calyx, corolla, stamens, ovaries, fruits and seed were presented. The medicinal uses of each specimens were carried out by Indian Medicinal Plants (1918).

List of the collected species

Kingdom - Plantae

Phylum - Trachaeophyta

Class - Magnoliopsida

Core eudicot (core Tricolpates)

Clade - Rosid

Clade - Eurosids I

Order - Fabales

Family - Fabaceae

Subfamily - Caesalpinoideae

Core eudicot (core Tricolpates)

Clade - Eurosids II

Order - Spindales

Family - Rutaceae

Family - Meliaceae

Clade – Asterid (= Synpetalae)

Clade - Euasterids I

Order - Lamiales

Family - Acanthaceae

Family - Lamiaceae

Taxonomic description of the collected specimens

1. Scientific name - *Senna alata* (L.) Roxb., Fl.Ind.2:349.1832.

Synonym - *Cassia alata* L., Sp.Pl.1.378.1753.

Myanmar name - Pawe-say-mezali

English name - Candle bush or Ringworm bush

Family - Fabaceae

Subfamily - Caesalpinoideae

Flowering and fruiting period - December to March

Deciduous shrubs or small trees 3.0-4.0 m high. Leaves unipinnately and paripinnately compound, 7-14 pairs of leaflets, entire margin, obovate, base rounded. Inflorescences about 11.9 cm long, axillary and terminal racemes. Flowers about 2.4 cm across at anthesis, bracteate, pedicellate, bisexual, zygomorphic, hypogynous. Sepals 5, aposepalous, about 1.2 cm long, curved, (orange colour), petaloid. Petals 5, apopetalous, bright yellow, petaloid, inferior. Stamens 10, apostemonous, 2 large, 5 medium, 3 small; anther dithecous, introrse, basifixed, longitudinal dehiscence, inferior. Monocarpellary, unilocular, one ovule in the locule in TS, marginal placentation; style curved; stigma simple, ovary superior. Fruits tetragonal straight pods, membranous winged. Seeds about 0.6 cm, deltoid.

Medicinal uses

This plant is traditionally used in the treatment of diabetes, tinea infections and blotch. The leaves are sour; cure itching, cough and asthma; are considered most effective against herpes.


Habit


Inflorescence


Flower


Ovary

Figure 1. *Senna alata* (L.) Roxb.

2. Scientific name - *Senna tora* (L.) Roxb.,Fl. Ind. 2:340.1832.

Synonym - *Cassia tora* L.,Sp.Pl.1:376.1753.

Myanmar name - Dangywe

English name - Sickle pod

Family - Fabaceae

Subfamily - Caesalpinoideae

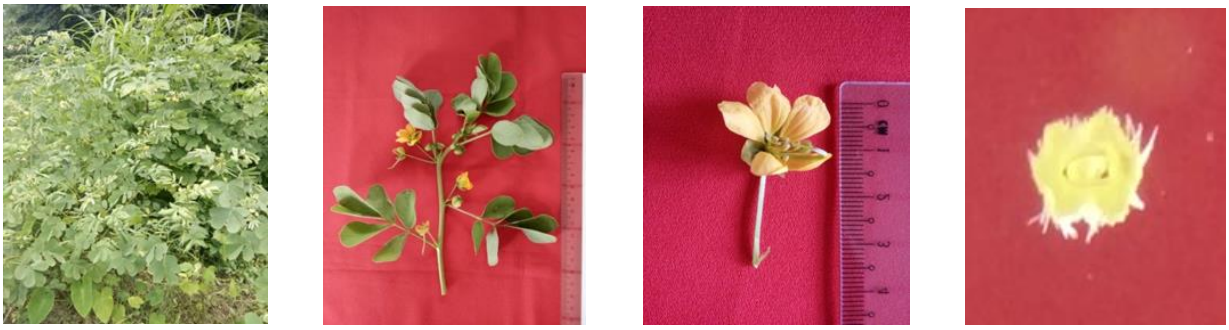
Flowering and fruiting period - July to October

Annual or short-lived perennial shrubs, about 1.0 m high; stem cylindrical; branchlets pale grey-brown, glabrous, longitudinally ridged when young, terete in ages. Leaves petiole eglandular; rachis with a prominent cylindrical gland between each of the 1-2 lower pairs of leaflets, stipule linear or filiform, leaflets in three pairs, obovate. Inflorescences racemes 1-2 flowered. Flowers about 2.1 cm across at anthesis, bracteate, pedicellate, bisexual, irregular, zygomorphic, hypogynous. Sepals 5, aposepalous, two small, three large, imbricate, ovate, sepaloid (green), inferior. Petals 5, apopetalous, elliptic to obovate, petaloid (yellow). Stamens 10, apostemonous, 3 lower largest, 4 stamens somewhat smaller; 3 very small and reduced; filament unequal; anther dithecous, introrse, basifixed, porous dehiscence. Monocarpellary,

unilocular, one ovule in the locule in TS, marginal placentation; style very short; stigma is oblique with an acute, gynophore present, ovary curved, tomentose, superior. Fruits pod linear.

Medicinal uses

The leaves are used as a laxative in the form of a decoction and antiperiodic. Both leaves and seeds constitute a valuable remedy in skin diseases, chiefly for ringworm and itch.



Habit Inflorescence Flower Ovary

Figure 2. *Senna tora* (L.) Roxb.

3. Scientific name - *Murraya koenigii* (L.)Spreng.,Syst.Veg.(ed.15bis)2:315.1817.

Synonym - *Bexgera koenigii* L., Mant.Pl.2:555, 563.1771.

Myanmar name - Pyin-taw-thein

English name - Curry leaf-tree

Family - Rutaceae

Flowering and fruiting period - February to April

Shrubs about 4.0-6.0 m high. Leaves unipinnately compound, crowded at twig-end, exstipulate. Leaflets 5-25, gland-dots pellucid; the petiolate slightly swollen at base, not winged. Inflorescences terminal, dense, corymbose paniculate, many flowered. Flowers about 0.6 cm across at anthesis, bracteate, complete, bisexual, actinomorphic, pungent, pentamerous, hypogynous, white, small, fragrant. Sepals 5, cup-shaped. Petals 5, apopetalous, lanceolate. Stamens 10, polyandrous; filament long; anther dithecous, introrse, dorsifixed, longitudinal dehiscence, inferior. Bicarpellary, syncarpous, bilocular, one ovule in each locule, axile placentation; style short stout; ovary superior, disc green. Fruits subglobose berry, globular-ovoid.

Medicinal uses

The leaves are used in treating piles, inflammation, itching and bruises. The bark and root are used as stimulants. The root is slightly purgative. They are used for common body aches. They are used to cure eruptions and the bites of poisonous animals.

Habit Inflorescence Flower Ovary

Figure 3. *Murraya koenigii* (L.)Spreng.

4. Scientific name - *Azadirachta indica* A. Juss., Mem.Mus. Hist.Nat.19:221,pl.2,f.5.1830.

Myanmar name - Tamar

English name - Neem tree

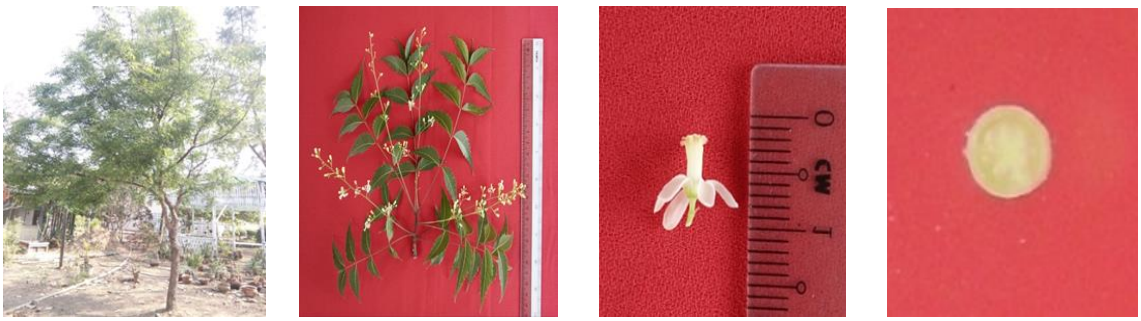
Family - Meliaceae

Flowering and fruiting period - March to August

Evergreen perennial trees 15.0-20.0 m high, much branched. Leaves unipinnately and imparipinnately compound, alternate, falcate-lanceolate, serrate along the margin, acute at the base, acuminate at the tips, exstipulate, petiolate. Inflorescences about 19.2 cm long, panicles to many-flowered thyrse. Flowers about 0.7 cm across at anthesis, the bract minute, fragrant, bisexual, actinomorphic, hypogynous. Sepals (basally connate), sepaloid. Petals 5, apopetalous, corolla tube present, oblong, imbricate, an annular disc present. Stamens 10, filaments united to form a staminal tube enclosing the ovary, tube cylindric, anther dithecous, introrse, basifixed, longitudinal dehiscence. Tricarpellary, syncarpous, axile placentation; stigma trifid, ovary superior. Fruits drupe, oval and one seeded.

Medicinal uses

The bark is bitter; refrigerant, anthelmintic, maturant, astringent, fever; cures ulcers and inflammations; good for leprosy. The tender young leaves are astringent; good for eye and skin diseases. The old leaves cure ulcers quickly. A strong decoction of the fresh leaves is useful like a weak carbolic lotion in washing wounds and ulcers.



Habit Inflorescence Flower Ovary

Figure 4. *Azadirachta indica* A. Juss.

5. Scientific name - *Andrographis paniculata* (Burm.f.) Wall., Pl.Asiat.Rar.3(12):116.1832.

Myanmar name - Se-khar-gyi, Nga-yoke-kha

English name - King of bitters

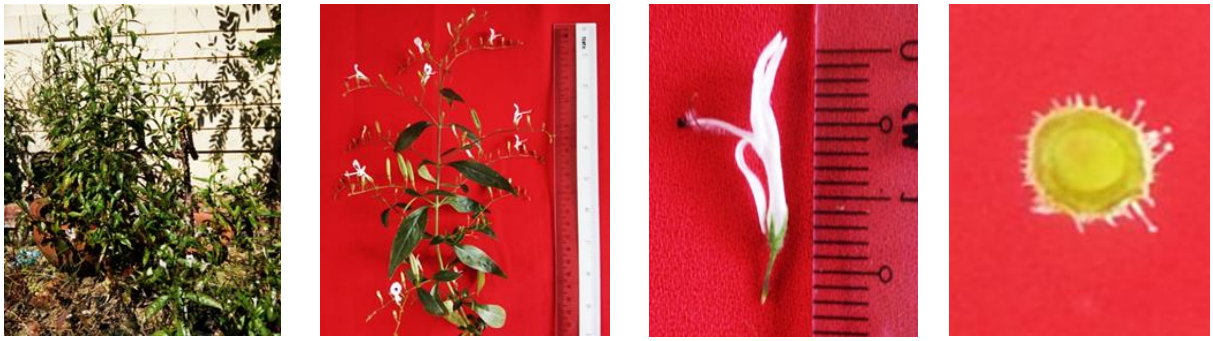
Family - Acanthaceae

Flowering and fruiting period - September to December

An annual herb about 35.0 cm high, stem quadrangular, glabrous. Leaves simple, opposite and decussate, exstipulate, shortly petiolate, laminae lanceolate, entire along the margin, acute at the tip and base, glabrous on surfaces. Inflorescences about 23.0 cm long, terminal and axillary paniculate racemes. Flowers about 0.7 cm across at anthesis, bisexual, zygomorphic, hypogynous. Sepals campanulate, 5-lobed, inferior. Petals bilabiate; tube funnel form at the base, petaloid, inferior. Stamens 2, apostemonous, exserted; filament equal; anther dithecous, introrse, basifixed, longitudinal dehiscence, inferior. Bicarpellary, syncarpous, bilocular, 2-many ovules in each locule on axile placentae, style filiform, disc present, ovary superior. Fruit 2.5 cm, capsule.

Medicinal uses

The leaves are acrid, pungent; good for the eyes; useful in pain, leukoderma, bronchitis and swollen testicles. The fruit is emmenagogue. The root is tonic, expectorant, febrifuge. Its dried ripe fruits are documented in Traditional Chinese Medicine to treat ailments like rhinitis and dizziness.



Habit Inflorescence Flower Ovary

Figure 5. *Andrographis paniculata* (Burm.f.) Wall.

6. Scientific name - *Vitex trifolia* L., Sp.Pl.2:638[as “938”].1753.

Myanmar name - Kyaung-pan

English name - Indian wild pepper

Family - Lamiaceae

Flowering and fruiting period - Throughout the year

Shrub or small tree about 5.0 m high, younger stems tomentose and quadrangular. Leaves trifoliate palmately compound, opposite and decussate, exstipulate, shortly petiolate, leaflet elliptic, entire along the margin. Inflorescences about 22.6 cm long, paniculate cyme. Flowers about 0.7 cm across at anthesis, pedicellate, zygomorphic, hypogynous. Sepals 5-teeth, campanulate, sepaloid, persistent. Petals bilabiate, purplish blue. Stamens 4, apostemonous, epipetalous, filament long, anther dithecous, introrse, dorsifixed, longitudinal

dehiscence. Bicarpellary, syncarpous, bilocular, axile placentation, one ovule in each locule, style filiform, stigma bifid, ovary globose superior. Fruit drupe, globose.

Medicinal uses

This plant are used traditionally for the treatment of array of diseases such as ulcer, leprosy, bronchitis, skin diseases, flatulenoe, colic, dysentery, dyspepsia and malaria. The plant is very useful in general debility and certain forms of dyspepsia.

Habit Inflorescence Flower Ovary

Figure 6. *Vitex trifolia* L.

An artificial key to the species

1. Placentation marginal----------2
1. Placentation axile----------2
2. Ovary monocarpellary----------3
2. Ovary bicarpellary or tricarpellary----------4
3. Raceme many flower----------*Senna alata*(L.)Roxb.
3. Raceme 1-2 flower----------*Senna tora*(L.)Roxb.
4.Leaves simple, herbs----------*Andrographis paniculata*(Burm.f.) Wall.
4.Leaves compound, shrubs or small tree----------5
5. Fruit berry----------*Murraya koenigii*(L.)Spreng.
5. Fruit capsule, drupe----------6
6. Leaves pinnately compound----------*Azadirachta indica* A. Juss.
6. Leaves palmately compound----------*Vitex trifolia* L.

DISCUSSION AND CONCLUSION

The present research work deal with the taxonomic study and medicinal uses of six selected species in Hinthada University Campus. Altogether 6 species belonging 5 genera of 5 families and 3 order have been studied. The name of the families are found in Fabaceae (sub-family Caesalpinoideae), Rutaceae, Meliaceae, Acanthaceae and Lamiaceae.

The morphological study of the shrub were found in *Murraya koenigii, Vitex trifolia, Senna alata* and *Senna tora*. The herbs is found in *Andrographis paniculata*, and the tree was found in *Azadirachta indica*. The leaves of *Murraya koenigii, Azadirachta indica*, *Senna alata* and *Senna tora* were found in unipinnately compound and trifoliolate palmately compound was found in *Vitex trifolia*. Simple, opposite and decussate types was found in *Andrographis paniculata*.

Axillary and paniculate raceme types of inflorescences were found in *Senna alata, Senna tora, Andrographis paniculata* and *Murraya koenigii.* Paniculate cyme is only found in *Vitex trifolia* and *Azadirachta indica* is also found in many flower thyrse. All of the flowers

types are found in hypogynous. The axile placentation types were found in *Murraya koenigii, Azadirachta indica, Vitex trifolia,* and *Andrographis paniculata*. The marginal placentation types were found in *Senna alata* and *Senna tora*. The drupe fruit types were found in *Azadirachta indica* and *Vitex trifolia* and the pod fruit types were found in *Senna alata* and *Senna tora*. The capsule fruit type was found in *Andrographis paniculata* and the berry fruit type was found in *Murraya koenigii*.

These morphological characters of selected plants are in agreement with those given by Backer (1965), Hooker (1872), Dassanayake (1981) and Judd *et. al* (2002). The medicinal uses of plants were found in six species of this research paper. In *Azadirachta indica* (Ta-mar), the leaves are biliousness and various skin disease and a strong decoction of the fresh leaves is useful in washing wound and ulcers. In *Vitex trifolia* (Kyaung-pan), the leaves are flavour, the growth of hair, fever and inflammation. In *Murraya koenigii* (Pyin-taw-thein), the leaves are used in treating dysentery and edema. In *Senna alata* (Pawe-say-mezali), the plant is traditionally used in the treatment of typhoid, malaria, scabies, ringworm and skin diseases. A strong decoction of the flowers and the leaves are the most effective in against herps.

In *Andrographis paniculata* (Se-kha-kyi) is one of the most popular medicinally plants used traditionally for the treatment of cancer, diabetes, high blood pressure and influenza. In *Senna tora* (Dan- gywe), the leaves are used as a laxative and the seeds are used to treat internally or externally for all sorts of eye disease. These medicinally plant information resources are agreements with those given by Indian Medicinal Plants (1918).

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