

Study on Morphological Characters of Some Hydrophytic Plants Species in Hinthada Township

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Abstract

A preliminary study has been undertaken on ten species of hydrophytic plants which belong to ten species, ten genera, eight families. Each species was described as scientific name, common name, family, and Myanmar name, flowering period, morphological character and artificial key. Colored photograph plates of each species were also presented.

Keywords: Scientific names of ten species and their morphological characters, artificial key.

Introduction

The present study area is located in Hinthada Township in the northern portion of Ayeyarwady Region. It is situated between Ayeyarwady River and Ngawun River. Hinthada Township lies between North latitudes 17° 26' and 17° 48' and also between East longitudes 95° 11' and 95° 33'. It is situated on the deltaic plain of Ayeyarwady Region and southern part of the Hinthada District. In this study, ten species belonging to ten genera in eight families were collected, identified and recorded. They are *Nymphaea stellata* Willd, *Nelumbo nucifer* Gaertn. *Boottia cordata* Wall. *Monochoria vaginalis* (Burm.f) presl, Rel. *Commelina nudiflora* Linn., *Eichhornia crassipes* (Mart) Solms. *Canna coccinea* Millk, *Canna glauca* Linn., *Jussiaea repens* Linn., *Polygonum glabrum* Willd. The aim and objectives are to identify the ten collected species, to know the morphological character of ten species and to describe the family, artificial key of ten species.

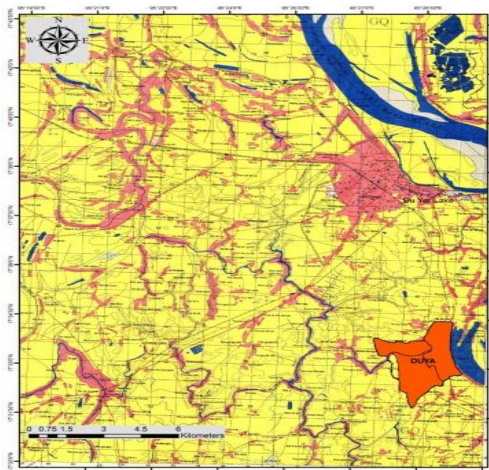


Figure (1). Location map of study area in Hinthada District

Materials and Methods

Some species of hydrophytic plants were described in this study. Samples collection were carried out within the flowering periods. Available flora of Java by Backer (1963), Flora of British India by Hooker (1881-1887) and Flora of Ceylon by Dassanayake (1980-1996)

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and the book of John Kress *et.al* (2003) were used. In addition to the present publication of internet website, in this study, morphological characters of ten species have been described and recorded with photograph. The specimens were carefully pressed, thoroughly dried, poisoned with spirits and finally mounted on the herbarium sheets. The specimens have been studied systematically and identified.

Results

Ten species belonging to ten genera, eight families were found in Hinthada Township. The morphological characters, artificial key of ten species were described.

Table (1). List of collected species from Hinthada Township

No.	Scientific Name	Family	Myanmar Name
1.	<i>Nymphaea stellata</i> Willd.	Nymphaeaceae	Kyabya
2.	<i>Nelumbo nucifer</i> Gaertn.	Nelumbonaceae	Padonmarkya
3.	<i>Boottia cordata</i> Wall.	Hydrocharitaceae	Hin-nyant
4.	<i>Monochoria vaginalis</i> (Burm.f) presl,Rel.	Pontederiaceae	Le pa dauk
5.	<i>Eichhornia crassipes</i> (Mart)Solms.	Pontederiaceae	Be-da
6.	<i>Commelina nudiflora</i> Linn	Commelinaceae	Myetcho
7.	<i>Canna coccinea</i> Mill.	Cannaceae	Buddhatharanaani
8.	<i>Canna glauca</i> Linn.	Cannaceae	Buddhatharanaawa
9.	<i>Jussiaea repens</i> Linn.	Omagraceae	Yekanyut
10.	<i>Polygonum glabrum</i> Willd.	Polygonaceae	Wetkyeinni

1. Scientific Name - *Nymphaea stellata* Willd
- Family - Nymphaeaceae
- Myanmar Name - Kyabya
- Flowering period - From July to November

Morphological character

Perennial herbs, rhizomatous, nonstoloniferous, anchored with floating leaves, rhizomes, erect. Leaves simple, alternate, arising from the rhizomes, suborbicular orbicular, pseudopeltate, rounded, at the tips, irregular dentate at the margins, deeply cordate at the bases, dark green above, purplish-brown beneath, glabrous on both surfaces, exstipulate, petioles as long as the depth of water, with many air chambers. Inflorescences axillary and solitary, peduncles as long as the depth of water, pale green to purplish green. Flowers bisexual, actinomorphic, polymeric, hypogynous, purplish blue, fragrant, ebractate, pedicels as in petioles and peduncles, ebracteolate. Sepals 4, free, oblong, lanceolate, greenish-white; petals 12-16, free, spirally arranged, purplish blue, with whitish base; Stamens- numerous, free, spirally arranged, inserted, filaments flattened, unequal in length; anther dithecal, introrse, longitudinal dehiscence, connective protrude from the tip of two anther sacs; ovary superior, multilocular, with numerous ovules in each locule, superficial placenta, style absent, stigma radiate. Fruits are not available in this study.



Figure 2)(A). Habit of *Nymphaea stellata* Willd



Figure 2)(B). Inflorescence of *Nymphaea stellata* Willd

2. Scientific Name - *Nelumbo nucifera* Gaertn.
 Family - Nelumbonaceae
 Myanmar Name - Padonmarkya
 Flowering period - From June to January

Morphological character

Perennial herbs, rhizomatous, non-stoloniferous, anchored with floating leaf blade lactiferous, creeping vegetative rhizomes, rooting at the node. Leaves simple, arising from the nodes of the rhizomes, floating, orbicular, peltate, entire at the margin, green or reddish-purple, glabrous on the surface, exstipulate; petioles as long as the depth of water, with many air chambers. Inflorescences axillary and solitary; peduncles as long as the depth of water. Flowers ebractate, ebracteolate, pedicels when anthesis much longer than the depth of water, bisexual, actinomorphic, polymerous, hypogynous, pink with whitish base, fragrant. Sepals 4-5, free, oblong, lanceolate, pale green to green. Petals numerous, free, spirally arranged, broadly obovate to obovate-oblong, unequal, pink, with whitish base. Stamens numerous, free, spirally arranged, inserted; filaments filiform, unequal, in length; anther ditheous, extrorse, dehisching longitudinally connective prolonged into an apical appendage. Ovary numerous, sunk in the receptacle, free, unilocular, with solitary pendulous ovules; style terminal, short, persistent, stigma peltate. Achenes oblong. Seeds ovate-oblong.



Figure 3)(A). Habit of *Nelumbo nucifera* Gaertn

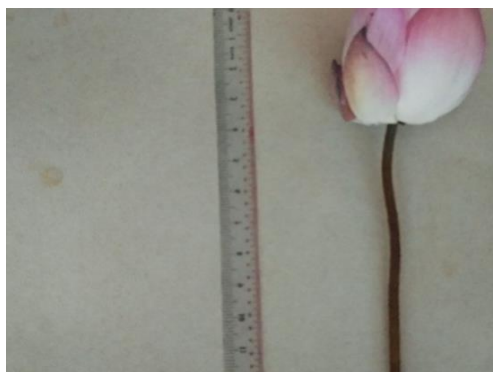


Figure 3)(B) Inflorescence of *Nelumbo nucifera* Gaertn.

3. Scientific Name - *Boottia cordata* Wall.
 Family - Hydrocharitaceae
 Myanmar Name - Hin-nyant
 Flowering period - From June to February

Morphological character

Perennial herbs, non-rhizomatous, non-stoloniferous, with the dense fibrous roots. Leaves simple, radical, crowded, dimorphic; floating leaves simple, radical, crowded, dimorphic; floating leaves ovate, ovate-oblong to ovate-elliptic, obtuse at the tips, entire at the margins, cordate at the base, pale green to green, glabrous on both surfaces, exstipulate, petiole trigonous, sheathing at the base. Inflorescences axillary, many flowers, umbellate fascicles in staminate plants and solitary in pistillate ones, spatheous, usually emerged; peduncles as long as the depth of water. Flowers unisexual, actinomorphic, trimerous, epigynous, white, ebracteate, shortly pedicels or sessile, ebracteolate, staminate flower within the spathes before and exceeding during anthesis, Sepals 3, free. Petals 3, free. Stamens usually 12, with 3 staminodes; filaments liguliform; anther dithecous, dehiscing longitudinally, pistillate flower, slight bigger than the staminate ones, usually exceeding the spathes. Ovaries many syncarpous, inferior, enclosed by the spathes, each ovary unilocular with many ovules in each locule on the parietal placenta, style flat, stigma bifid. Capsules many seeded Seeds elliptic.



Figure (4)(A). Habit of *Boottia cordata* Wall



Figure (4)(B). Inflorescence of *Boottia cordata* Wall.

4. Scientific Name - *Monochoria vaginalis* (Burm.f) presl, Rel.
 Family - Pontederiaceae
 Myanmar Name - Le pa dauk
 Flowering period - From June to November

Morphological character

Perennial herbs, non-rhizomatous, non-stoloniferous, with the dense fibrous roots, arising from the rhizomes, rooting in the mud. Leaves very variable, vegetative leaves simple, radical broadly ovate to obovate-oblong, acute to acuminate at the tips, entire at the margins, cordate or rounded at the bases, dark green above, green beneath, sheathing at the base, ligulate, exstipulate, leafless, sheath few, floral leaves simple, acute to acuminate at the tips, entire at the margins, cordate or rounded at the base. Inflorescences terminal racemes or sub-umbelliform cymes, basally opposite the sheath of floral leaves, which at first hidden within the sheath, spathes dimorphous. Flowers bisexual, zygomorphic, trimerous, hypogynous,

ebractate, ebracteolate. Perianth 6, violet or lilac-blue with a green median nerve. Stamens 6, adnate to the base of tepals, inserted, filament flattened, anther dithecous, dehiscent by vertical slits. Ovary superior, trilobular, with many ovules in each locule on the axile placenta, style filiform, stigma subglobose. Capsules loculicidal, many seeds. Seeds elliptic.



Figure (5)(A). Habit of *Monochoria vaginalis* (Burm.f)



Figure (5)(B). Inflorescence of *Monochoria vaginalis* (Burm.f) presl, Rel.

5. Scientific Name - *Commelina nudiflora* Linn.
 Family - Commelinaceae
 Myanmar Name - Myetcho
 Flowering period - From June to January

Morphological character

Perennials herbs, non-rhizomatous, non-stoloniferous, diffusely branched, ascending with creeping base. Stem terete, solid, tumid at the nodes, rooting at the nature joints, succulent, glabrous. Leaves simple, alternate, ovate-lanceolate to lanceolate, acute at the tips, obtuse or rounded at the base, dark green above, green beneath, glabrous on both surfaces, distinctly mid-rib and lateral parallel nerves, exstipulate, with sheathing petioles. Inflorescences leaf-opposed, helicoid cymes. Flowers purplish, ebractate, bisexual, zygomorphic, trimerous, hypogynous. Sepals 3, free, two anterior ones, basally connate, the posterior one free; petals 3, free, unequal, posterior ones bigger, anterior ones smaller. Stamens 5, 3 fertile and 2 staminodes, filaments filiform, anther dithecous, dorsifixed, introrse, longitudinal desiccence; ovary superior, trilobular, with 1-2 ovules in each locule on the axile placenta, style terminal, filiform, curved, stigma simple or capitate. Capsule 3 seeded, loculicidal Seeds oblong.



Figure (6)(A).Habit of *Commelina nudiflora* Linn.



Figure (6)(B). inflorescence of *Commelina nudiflora* Linn.

6. Scientific Name - *Eichhornia crassipes* (Mart)Solms
 Family - Pontederiaceae
 Myanmar Name - Be-da
 Flowering period - throughtout the year

Morphological character

Perennials herbs, non-rhizomatous, non-stoloniferous. Perennials herbs, non-rhizomatous, non-stoloniferous. Stem very short, erect main stems, producing a cluster of many fibrous roots, vegetative propagation by stonlons. Leaves simple, broadly ovate, sub or orbicular, rounded or broadly at the tips, entire at the margins, cordate or truncate at the base, green to greenish-green, glabrous and cutinized on both surfaces; exstipulate, petioles. Spongy tapering towards apex. Inflorescences terminal, spikes, peduncles long. Flowers ebractate, ebracteolate, sessile, bisexual, zygomorphic, trimerous, hypogynous, purple or violet. Perianth segments 6, tube long, curved, lobes (3+3), posterior lobe ovoate with bright yellow blotch at center; stamens 6, in two series, adnate to the throat of perianth tube, filament filiform. unequal in length, anther dithecos, longitudinal dehiscence; ovary superior, trilocular, with many ovules in each locule on the axile placenta, style filiform, stigma shortly lobed. Capsules loculicidal, many seeds. Seeds minute, obovate.



Figure (7)(A). Habit of *Eichhornia crassipes* (Mart)Solms



Figure (7)(B). Inflorescence of *Eichhornia crassipes* (Mart)Solms

7. Scientific Name - *Canna coccinea* Millk.
 Family - Cannaceae
 Myanmar Name - Buddhatharanaani
 Flowering period - throughtout the year

Morphological character

Perennials herbs, non-rhizomatous, non-stoloniferous, erect, rhizomes thick, creeping, false stems subterete, solid, tumid at the nodes, not rooting at the lower joints, unbranched, pale purple. Leaves simple, alternate, elliptic or elliptic oblong, acute to acuminate at the tips, entire at the margins. Inflorescences terminal raceme, spathaceous, spathe linear- oblong, shorter than the inflorescences, purple to dark purple, perisistent, peduncles purple to reddish purple. Flowers bracteates, ebracteolate, bisexual, zygomorphic, trimerous, epigynous. Sepals 3, free, purple to reddish purple, persistent; petals segments 3, united, red, fused to stamina tube; stamens 5, 1 fertile, 4 staminodes, filament bright red, anther monotheous, dehiscing longitudinally; ovary inferior, trilocular, with many ovules in each locule on the axile placenta, style linear, adnate to the filament, bright red, stigma simple. Capsules many seeds. Seeds globose.

Figure (8)(A).Habit of *Canna coccinea* Mill.Figure (8)(B). Inflorescence of *Canna coccinea* Mill.

8. Scientific Name - *Canna glauca* Linn.
 Family - Cannaceae
 Myanmar Name - Buddhatharanaawa
 Flowering period - throughtout the year

Morphological character

Perennials herbs, non-rhizomatous, non-stoloniferous, erect, rhizomes thick, creeping, false stems subterete, solid, tumid at the nodes, not rooting at the lower joints, unbranched, pale green. Leaves simple, alternate, elliptic or elliptic lanceolate or elliptic oblong, acute to acuminate at the tips, entire and hyaline at the margins. Inflorescences terminal raceme, spathaceous, spathe linear oblong, shorter than the inflorescences, green, perisistent, peduncles green. Flowers bracteates, ebracteolate, bisexual, zygomorphic, trimerous, epigynous, yellow showy. Sepals 3, free, pale green, persistent; petals segments 3, united, yellow, fused to staminal tube; stamens 5, 1 fertile and 4 staminodes, filament yellow, anther monotheous, dehiscing longitudinally; ovary inferior, trilocular, with many ovule in each locule on the axile placenta, style linear, basally adnate to the filament yellow, stigma simple. Capsules many seeds. Seeds globose.

Figure (9)(A). Habit of *Canna glauca* Linn.Figure (9)(B).Inflorescence of *Canna glauca* Linn.

9. Scientific Name - *Jussiaea repens* Linn.
 Family - Omagraceae
 Myanmar Name - Yekanyut
 Flowering period - throughtout the year

Morphological character

Perennials herbs, non-rhizomatous, non-stoloniferous, profusely branched, floating or creeping, erect portion. Stem terete, succulent, respiratory roots formed in whorls at the nodes. Leaves simple, alternate, obovate, oblanceolate or elliptic oblong, terminal leaves rounded at the tips and basal leaves obtuse at the tips, entire at the margins, lateral veins prominent, dark green above, pale green beneath, glabrous on both surfaces, stipule minute,. Inflorescences axillary and solitary. Flowers bracteates, bracteolate, bisexual, actinomorphic, pentamerous, epigynous, pale yellowish white. Sepals 5, free, slightly connate at the base, green persistent; petals 5, free, pale yellow with bright yellow base, caducous; Stamens 10, free, inserted, filaments filiform, anther ditheous, dehiscing longitudinally; ovary inferior, pentalocular, with many ovules in each locule on the axile placenta, style terminal, stout, stigma discoid. Septicidal capsules many seeds. Seeds quadrangular, minute.



Figure (10)(A). Habit of *Jussiaea repens* Linn.



Figure (10)(B). Inflorescence of *Jussiaea repens* Linn.

10. Scientific Name - *Polygonum glabrum* Willd.
 Family - Polygonaceae
 Myanmar Name - Wetkyeinni
 Flowering period - From September to June

Morphological character

Perennials herbs, non-rhizomatous, non-stoloniferous, unbranched, floating or sparse branched, erect, stems stout, terete, fistular, tumid at the nodes, rooting at the lower joints. Leaves simple, alternate, linear lanceolate to lanceolate, acuminate at the tips, entire at the margins, attenuate at the base, green to dark green, glabrous on both surfaces, ochreate stipule. Inflorescences terminal, panicles, densely numerous flowers, peduncles reddish, ebracteates, ebracteolate, bisexual, apetalous, actinomorphic, pentamerous, hypogynous, white or pink, bracteate, ebracteolate. Calyx 5, partite, synsepalous, white or pink, persistent, segments ovate or orbicular, equal. Petal 5, synpetalous, pink persistent. Stamens 6-8 free, filaments filiform, unequal in length, anther ditheous, dehiscence longitudinally. Ovary superior, unilocular, with solitary basal ovules, style 2, terminal, connate at the base, stigma 2, capitates. Nut 1-seeded, broadly ovate to sublocular.



Figure (11)(A). Habit of *Polygonum glabrum* Willd



Figure (11)(B). Inflorescence of *Polygonum glabrum* Willd.

Artificial key to the species

- 1. Plants dicotyledon ----- 2
- 1. Plant monocotyledon ----- 5
 - 2. Flowers pentamerous ----- 3
 - 2. Flowers polymerous ----- 4
- 3. Flowers white or pink; ovary superior ----- *Polygonum glabrum*.
- 3. Flowers pale yellowish – white; ovary inferior ----- *Jussiaea repens*.
 - 4. Petal 12 - 16; ovary multilocular with numerous ovule ----- *Nymphaea stellata*
 - 4. Petal numerous; ovary unilocular with solitary pendulous ovule --- *Nelumbo nucifera*
- 5. Stems rhizomatous ----- 6
- 5. Stems non-rhizomatous ----- 8
 - 6. Flowers hypogynous; ovary superior ----- *Monochoria vaginalis*
 - 6. Flowers epigynous; ovary inferior ----- 7
- 7. Flowers yellow ----- *Canna glauca*.
- 7. Flowers red ----- *Canna coccinea*.
 - 8. Placentation parietal ----- *Boottia cordata*
 - 8. Placentation axile ----- 9
- 9. Inflorescences spikes ----- *Eichhornia crassipes*
- 9. Inflorescences helicoids cymes ----- *Commelina nudiflora*

Discussion and Conclusion

In this study ten species were collected. They were *Nymphaea stellata* Willd, *Nelumbo nucifer* Gaertn. *Boottia cordata* Wall. *Monochoria vaginalis* (Burm.f) presl, Rel. *Commelina nudiflora* Linn. *Eichhornia crassipes* (Mart) Solms, *Canna coccinea* Millk. *Canna glauca* Linn. *Jussiaea repens* Linn. *Polygonum glabrum* Willd.

The distinctive characters of tenspecies were described. These were *Nymphaea stellata* Willd, (Kya bya) has solitary flower, pink whitish base, peltate leaves, many air chambers within petioles and numerous ovules in each locule, *Nelumbo nucifer* Gaertn (pa don mar kya) has solitary flower, pink whitish base, peltate leaves, many air chambers within petioles, single ovule in each ovule. *Boottia cordata* Wall., (hin-nyant) possesses unisexual flower, dimorphic leaves and parietal placentation ovary. *Monochoria vaginalis* (Burm.f) presl, Rel. has variable leaves, dimorphic spathes, violet or lilac flowers and many ovules in each locule. *Commelina nudiflora* Linn., (Myet cho) has helicoid cymes, purplish blue flowers, 1-2 ovule in each locule, *Eichhornia crassipes* (Mart) Solms, (Beda) has spongy petioles, one tepal with yellow blotch at the center and many ovules in each locule, *Canna*

coccinea Mill., (Buddha-tha-ra-na-a-ni) has thick rhizome, creeping and false stem, pale purple, stout midrib leaves, red flowers and many ovules in each locule. *Canna glauca* Linn., (Buddha-tha-ra-na-a-wa) has thick rhizomes, creeping and false stem, pale green, strong midrib leaves, yellow flowers and many ovules in each locule. *Jussiaea repens* Linn., (Ye ka nyut) has respiratory roots in whorls at the nodes, solitary flower, axile placentation, and many ovule in each locule. *Polygonum glabrum* Willd., (Wet-kyein ni) has tumid at the nodes, panicle, densely numerous flowered, white or pink and leaves are simple, ochreate stipules, apetalous and it has single ovule in each locule.

It is concluded that this paper will fulfill some knowledge, to understand the nature of hydrophytic plants and will provide useful information for further studies of various researchers.

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