

Taxonomic Study on Selected species of Genus *Cyperus* in Yangon and Ayeyawady Regions

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Abstract

In this research work, taxonomic studies on selected species of genus *Cyperus* in family Cyperaceae from Yangon and Ayeyawady Regions were undertaken. The sample plants were collected, preserved, identified and classified. In this research, the studied species were 7 species belonging to genus *Cyperus* in family Cyperaceae. The species of *Cyperus compactus* Retzius, *C. compressus* L., *C. corymbosus* Rottb. and *C. pangorei* Rottb are widely distributed in Yangon and Ayeyawady Regions. The rarely founded species in these study areas are *Cyperus articulatus* L., *C. cuspidatus* Kunth and *C. diffusus* Vahl. The morphological characteristics of the collected species were described and presented with relevant photographs. The scientific names, Myanmar name, flowering period had been mentioned. All selected species were found in various habitats. *Cyperus corymbosus* Rottb. and *C. pangorei* Rottb were the sourced plants of commercially used to produce mats, carpets, stuffs of cushion, baskets and various utensil.

Key words: *Cyperus*, Taxonomy, Yangon and Ayeyawady Region

Introduction

The present study deals with the taxonomic study on selected species of *Cyperus* in family Cyperaceae growing in Yangon and Ayeyawady Region. Yangon is situated between latitude 16°20' and 17°50' north and longitudes 95°45' and 96°46' east in the southernmost part of the central plain and area of 3,927.15 square miles. Ayeyawady Region lies between north latitude 15°40' and 18°30' approximately and between east longitudes 94°15' and 96°15'. It is mostly a delta region and has an area of 13,566 square miles.

In this study paper, 7 species belonging to genus *Cyperus* of family Cyperaceae were collected from Yangon and Ayeyawady Regions. Kress *et al.* (2003) stated that Cyperaceae family included 20 genera and 174 species in the checklist of Myanmar. In the early 1980s it was discovered that the rhizomes of *Cyperus articulatus* produce compounds that are effective anti-convulsants and beneficial in calming epileptic seizures. In traditional indigenous medicine, Piri Piri roots are made into a tea to treat myriad ailments, they are used in the tea as a digestive aid, to calm nervous anxiety, as a sedative and tranquillizer, and to induce vomiting at higher doses. The women in certain Amazonian tribes add the root to a love potion that they call Pusanga. *Cyperus pangorei* (mat segde) is especially used in making of the world famous Pathamadai silk mats from India. *Cyperus articulatus* L. (Piri-Piri) has many medicinal uses in both traditional folk remedies and modern

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medicines (Rain Tree Nutrition 2006). *Cyperus pangorei*, like *C. malaccensis* and *C. corymbosus* this species provides material for making mats (Dassanayake 1985).

The main objectives of the present study are to record their morphological characters of studies species that can fulfill the need of information and to contribute the better knowledge of genus *Cyperus* and to study the detailed characters of the species concerned.

Material and Methods

In this study, the sample plants of Cyperaceae were collected from Yangon and Ayeyawady Regions during the months from June 2017 to October 2018. Plant parts including culms, leaves, inflorescences, spikelets, flowers and nutlets were collected. Precise locations of the specimen collections were recorded by using Global Positioning System (GPS) Map Navigator and the habit and nature of the plants including the color of flowers were recorded in the field notes. All the collected specimens including the inflorescence and fruit portions were recorded and photographs were also taken. Identification of genera and species were carried out by comparison of keys and descriptions stated by Hooker (1894), Backer (1968), Dassanayake (1985), Simpson *et al.* (1998) and Wu *et al.* (2010). The detailed characteristics of the resulting species were photographed by a digital camera directly attached to a dissecting microscope.

RESULTS

In this study paper, 7 species belonging to genus *Cyperus* of family Cyperaceae were alphabetically arranged as shown in Table 1.

Table .1 List of Collected Species from Yangon and Ayeyawady Regions

Family	No	Scientific Name
Cyperaceae	1	<i>Cyperus articulatus</i> L.
	2	<i>C. compactus</i> Retzius
	3	<i>C. compressus</i> L.
	4	<i>C. corymbosus</i> Rottb.
	5	<i>C. cuspidatus</i> Kunth
	6	<i>C. diffusus</i> Vahl
	7	<i>C. pangorei</i> Rottb.

1. *Cyperus articulatus* L., Sp. Pl. ed. 1. 44. 1753. (Figure - 1)

Myanmar name : Unknown
 English name : Unknown
 Flowering period : January to August

Perennial herbs, with subaphyllous. Rhizome long creeping. Culms 58.0 cm to 140.0 cm tall, 0.5 cm to 1.2 cm wide, terete, stiffly erect, smooth, distinctly transversely septate, the intersepta 10 mm to 30 mm long, glaucous-green, clothed at base with 1-2 sheaths. Leaf sheath dusky-brown, the uppermost one about 16 cm long, bearing a short blade up to 5.0 cm long, flat, smooth; ligule absent; leaf blade absent. Involucral bracts 4, 0.5 cm to 1.0 cm long, smooth, scalelike. Inflorescences terminal, compound or subdecompound, many spikelets per inflorescence. Spikes ovoid, each

with 2-16 spikelets. Spikelets linear, 1.0 cm to 3.0 cm long, compressed, 20-42 flowered; rachilla wing, oblanceolate, white hyaline. Glumes distichous, 2.2 mm to 2.8 mm long, 1.0 mm to 1.6 mm wide, oblong-lanceolate, keel obtuse, 2-3 veined, apex obtuse, middle green, margin whitish. Stamens 3; anthers linear; connective subdeltoid; filaments short. Style short; stigmas 3, longer than the style. Nutlet oblongoid, 1.0 mm to 1.5 mm long, 0.5 mm to 0.6 mm wide, 3-sided, trigonous, sharply apiculate, slightly stipitate, minutely punctate, brown; seed endospermic.

2. *Cyperus compactus* Retzius, Obsem. Bot. 5: 10. 1788. (Figure - 2)

Myanmar name : Unknown
 English name : Unknown
 Flowering period : January to December

Perennial herbs. Rhizomes short. Culms 28.0 cm to 60.0 cm tall, 3.0 mm to 4.0 mm wide, sub terete, scattered or sparsely tufted, smooth, stout, robust, leaves at the base, slightly swollen base. Leaves longer than culm; leaf sheath purplish red; ligule absent; leaf blade with conspicuously transverse veins, abaxial midvein and margin spinulose, flat, canaliculate, scabrous on both surfaces. Involucral bracts 6, leaflike, scabrous on the margins and upper midribs. Inflorescence terminal, compound or decomposed, lax to slightly dense. Spike with many spikelets congested into nearly a globose. Spikelets subulate, 7.0 mm to 8.0 mm long, 3-6 flowered; rachilla wings white, hyaline. Glumes distichous, 3.0 mm to 4.0 mm long, narrowly oblong, convolute, apex obtuse to acute. Stamens 3; anthers short, broadly linear, connective prominent beyond anthers; filaments slender. Style long; stigmas 3, slender. Nutlet oblongoid, 3-sided, 1.5 mm to 1.8 mm long, apiculate, smooth, yellowish brown to brownish; seed endospermic.

3. *Cyperus compressus* L., Sp. Pl: 1: 46. 1753. (Figure - 3)

Myanmar name : Wetlar myet, wetta myet
 English name : Unknown
 Flowering period : July to December

Annual herbs, with fibrous roots. Culms 7.0 cm to 48.0 cm tall. 0.3 cm to 0.5 cm wide, tufted, triquetrous, slender, smooth, leaves at the base, leaves shorter than culm; leaf sheath reddish brown; ligule absent; leaf blade flat, scabrous at the top, gradually acuminate. Involucral bracts 5, longer than inflorescence, apical margin scabrous, leaflike. Inflorescence terminal, simple, each with 3-4 spikelets. Spike broadly ovoid to sub flabelliform, apical ones obliquely spreading. Spikelets oblongoid, 0.5 cm to 1.5 cm long, 10- 20 flowered, strongly compressed; rachilla wings white, hyaline, persistent. Glumes distichous, 2.8 mm to 4.0 mm long, straw-coloured, apex acute and keeled, slightly long mucro. Stamens 3; anthers linear, appendage connective reddish; filaments slender. Style short; stigmas 3. Nutlet broadly obovoid, 3-sided, 1.5 mm to 1.8 mm long, 0.8 mm to 1.0 mm wide, smooth, dark brown; seed endospermic.

4. *Cyperus corymbosus* Rottb., Descr. & Ic. Rar. Nov. Pl. 42, t. 7, f. 4. 1773. (Figure-4)

Myanmar name : Thabaw myet, Tha bawt myet
 English name : Unknown
 Flowering period : July to November

Perennial herbs, with subaphyllous. Rhizome long creeping. Culms 113.0 cm to 156.0 cm tall, 0.5 cm to 1.0 cm wide, terete, trigonous below inflorescence, smooth, glaucous-green, clothed at base with 2-3 sheaths. Leaf sheath reddish-brown, the uppermost one 15 - 24 cm long, bladeless, bearing a short blade up to 7.0 cm long, flat,

margin scabrous; ligule absent. Involucral bracts 5, lanceolate, serrate at the margin. Inflorescences terminal, compound or subdecompound. Spikes ovoid, each with 8-15 spikelets. Spikelets linear, 0.8 cm to 2.0 cm long, compressed, 11-24 flowered; rachilla wing, oblanceolate, white hyaline or reddish brown. Glumes distichous, 2.0 mm to 2.5 mm long, oblong-lanceolate, apex obtuse. Stamens 3; anthers linear; connective subdeltoid; filaments short. Style long; stigmas 3, longer than the style. Nutlet oblongoid, 1.0 mm to 1.2 mm long, 3-sided, trigonous, apex mucronate, slightly stipitate, minutely punctate, brown; seed endospermic.

5. *Cyperus cuspidatus* Kunth, Nov. Gen. Sp. Pl. 1: 204. 1815. (Figure - 5)

Myanmar name : Unknown
 English name : Unknown
 Flowering period : June to August

Annual herbs with fibrous roots. Rhizome absent. Culms 6.0 cm to 8.0 cm tall, 0.5 mm to 0.9 mm wide, tufted, trigonous, smooth, few leaves at the base. Leaves shorter to longer than culm; leaf sheath reddish brown; ligule absent; leaf blade canaliculate, apical margin scabrous. Involucral bracts 3-4, leaflike, longer than inflorescences, apical margin scabrous. Inflorescence simple to capitate, each rays with 10-20 spikelets. Spikelets stellate cluster, linear, 4.0 mm to 8.0 mm long, strongly flattened, apex emarginate, each with 10-18 flowered; rachilla wingless. Glumes patent, laxly imbricate, 1.5 mm to 1.7 mm long, narrowly elliptic, apex subobtuse to emarginated with recurved mucro 0.5 mm 0.7 mm long, ferruginous to castaneous. Stamens 3; anthers ellipsoid; filaments short. Style about 0.5 mm long; stigmas 3, shorter than style. Nutlets obovoid to cylindrical-obovoid, 0.5 mm to 0.6 mm long, not stipitate, apex apiculate, minutely punctate, yellowish brown; seed endospermic.

6. *Cyperus diffusus* Vahl, Enum. Pl. 2: 321. 1805. (Figure - 6)

Myanmar name : Wet kyein, Wet kyein myet
 English name : Unknown
 Flowering period : June to October

Perennial herbs. Rhizomes hardened, with fibrous roots. Culms 18.0 cm to 35.0 cm tall, 3.0 mm to 4.0 mm wide, triquetrous, stout, slightly thick, smooth, several leaves at the base. Leaves shorter than culm; leaf sheath reddish brown; ligule absent; leaf blade flat, margin scabrous. Involucral bracts 6-7, margin scabrous, longer than inflorescence, leaflike. Inflorescence a decompound to supradecomponent anthela, many spikelets per inflorescences. Spikelets linear-oblong, sessile, digitate in groups of 2-6 at apice of secondary and tertiary rays, slightly turgid, 7-13 flowered; rachilla narrowly winged, hyaline. Glumes distichous, about 2.0 mm long, 1.0 mm to 1.5 mm wide, broadly ovate to orbicular-ovate, apex rounded with recurved mucro. Stamens 3; anthers linear, apex with setose; filaments short. Style short; stigmas 3, Nutlet ellipsoid, 1.0 mm to 1.5 mm long, 3-sided, triquetrous, slightly stipitate, apex slightly apiculate, smooth, dark brown; seed endospermic.

7. *Cyperus pangorei* Rottb., Descr. Ic. Rar. Nov. Pl. 31, t. 7. F. 3: 1773. (Figure - 7)

Myanmar name : Wet la
 English name : Unknown
 Flowering period : September to December

Perennial herbs. Rhizome creeping, clothed with brownish scales. Culms 56.0 cm to 150.0 cm tall, 0.8 cm to 1.3 cm wide, tufted, stiffy, subaphyllous, acutely triquetrous, slightly concave sides, smooth. Leaves reduced to 2-3 subaphyllous sheaths; leaf sheath

pale brown, with short blades; ligule absent; leaf blade canaliculate, smooth. Involucral bracts 3-4, patent, leaflike, longer than inflorescences, smooth to apical margin slightly scabrous, acute at the apex. Inflorescences compound, broadly ellipsoid. Spikelets linear, 1.0 cm to 1.5 cm long, flattened, obliquely spreading, each with 15-20 flowered; rachilla winged, lanceolate, reddish-brown. Glumes slightly imbricate, 1.8 mm to 2.0 mm long, 0.8 mm to 1.0 mm wide, lance-oblong, apex obtuse. Stamens 3; anthers linear; connective prominent beyond anthers, apex setiferous; filaments short. Style short; stigmas 3, longer than style. Nutlets oblongoid, 1.0 mm to 1.2 mm long, 0.5 mm to 0.7 mm wide, 3-sided, not stipitate, apex apiculate, minutely punctate, reddish brown; seed endospermic.

Figure 1.

Cyperus articulatus L.

- A. Habit
- B. Inflorescence
- C. Spikelet
- D. Glume
- E. Flower
- F. Stamens
- G. Gynoecium



Figure 2.

Cyperus compactus Retzius

- A. Habit
- B. Inflorescence
- C. Spikelet
- D. Glume
- E. Flower
- F. Stamens
- G. Gynoecium
- H. Nutlet

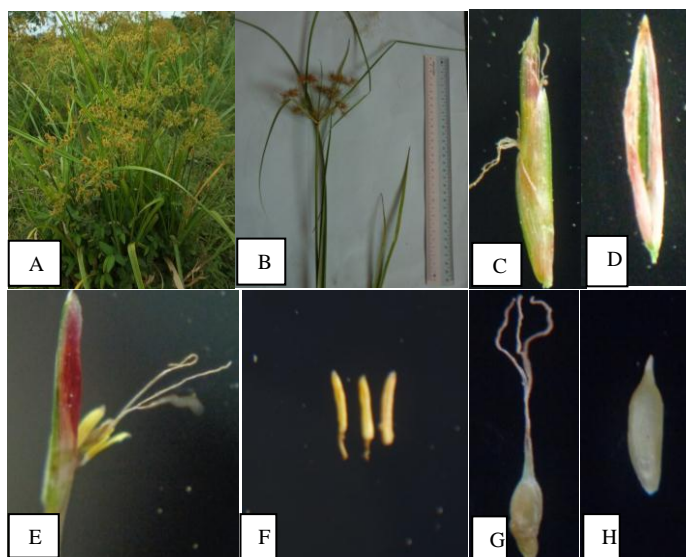


Figure 3.

Cyperus compressus L.

- A. Habit
- B. Inflorescence
- C. Spikelet
- D. Glume
- E. Flower
- F. Stamens
- G. Gynoecium
- H. Nutlet



Figure 4.

Cyperus corymbosus Rottb. A.

Habit

- B. Inflorescence
- C. Spikelet
- D. Flower
- E. Glume
- F. Stamens
- G. Gynoecium
- H. Nutlet

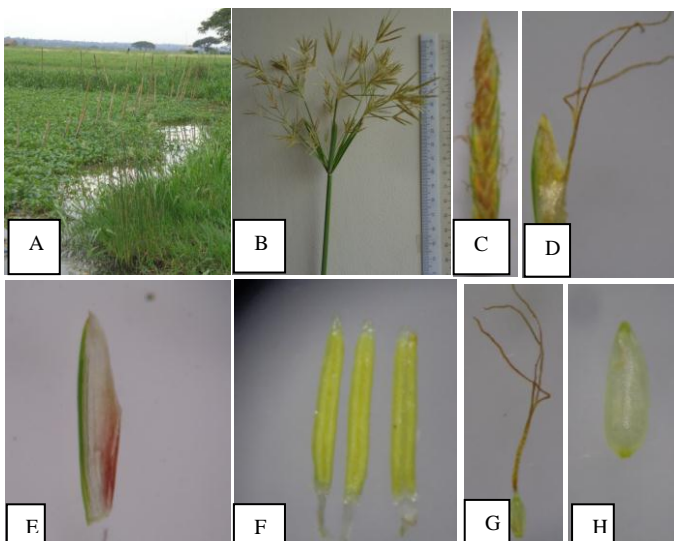


Figure 5.

Cyperus cuspidatus Kunth

- A. Habit
- B. Inflorescence
- C. Spikelet
- D. Flower
- E. Glume
- F. Stamens
- G. Gynoecium
- H. Nutlet

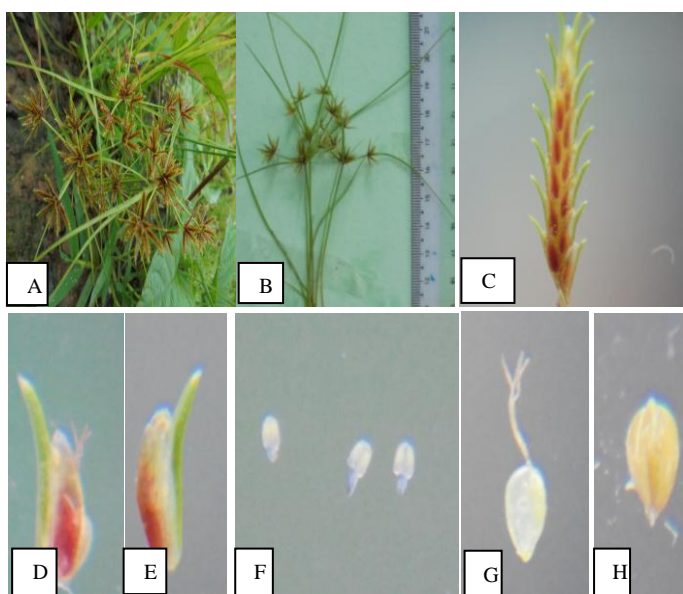


Figure 6.

Cyperus diffusus Vahl

- A. Habit
- B. Inflorescence
- C. Spikelet
- D. Glume
- E. Flower
- F. Stamens
- G. Gynoecium
- H. Nutlet

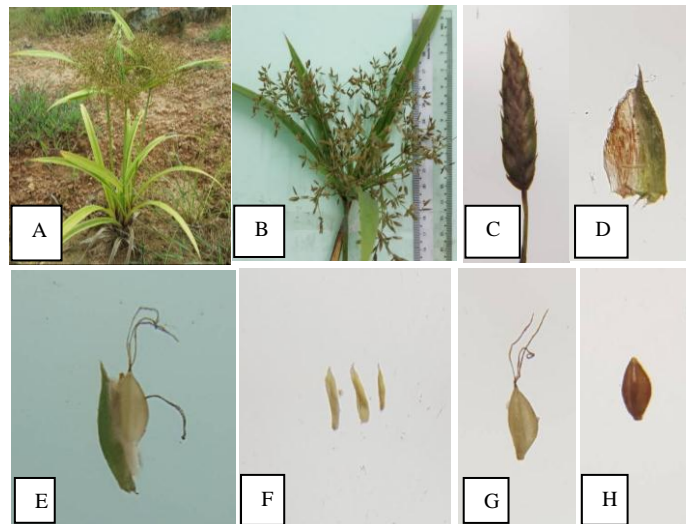
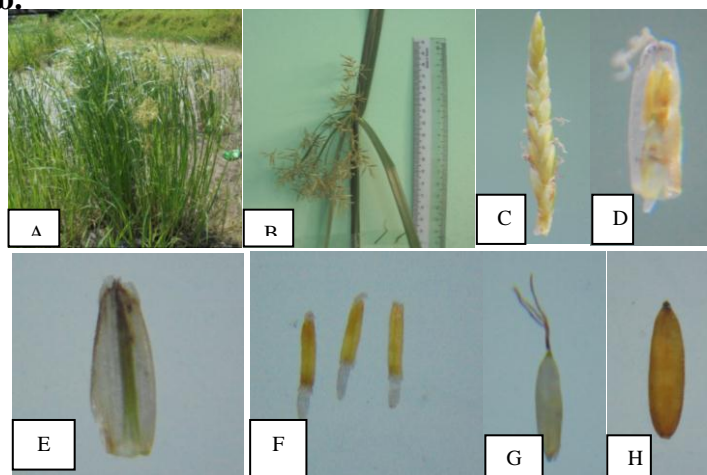


Figure 7. *Cyperus pangorei* Rottb.

- A. Habit
- B. Inflorescence
- C. Spikelet
- D. Flower
- E. Glume
- F. Stamens
- G. Gynoecium
- H. Nutlet



Perfume and Medicine from *Cyperus articulatus* rhizomes



Many different baskets from *Cyperus corymbosus*



Ornamental indoor plants (*Cyperus diffusus*)



Various mats from *Cyperus pangorei*

Discussion and Conclusion

The present paper deals with the taxonomic study on sedge plants genus *Cyperus* growing in Yangon and Ayeyawady Regions. In this paper, 7 species belonging to genus *Cyperus* were selected. They can be differentiated from other genus by its culms, leaves, spikelet, glume distichous, style continuous with ovary and not demarcated, stigma three with 3-sided nutlets.

This paper studied the habit of *Cyperus articulatus* L., *C. corymbosus* Rottb. and *C. pangorei* Rottb.. They are subaphyllous, perennial herbs with long creeping rhizomes although that *Cyperus compressus* L. and *C. cuspidatus* Kunth are annual herbs with fibrous roots. *Cyperus compactus* Retzius and *C. diffusus* Vahl, habit are perennial herbs with hardened rhizomes.

The culms are terete, smooth and distinctly transversely septate in *Cyperus articulatus* L.. The culms of *Cyperus compressus* L., *Cyperus diffusus* Vahl and *C. pangorei* Rottb. are smooth, acutely triquetrous culms and the remaining species are smooth, terete to trigonous below inflorescences. The inflorescence shapes of *Cyperus compactus* Retzius are compound or decomposed, spike with many spikelets congested into nearly a globose and simple, broadly ovoid to subflabelliform in *Cyperus compressus* L. The other species are compound or decomposed inflorescences. The nutlet shapes are ellipsoid, broadly obovoid to cylindrical obovoid in *Cyperus compressus* L., *C. corymbosus* Rottb., *C. cuspidatus* Kunth, and *C. diffusus* Vahl. and the other species are oblongoid shapes. The observed characters of studied species are in agreement with those mentioned by Hooker (1894), Backer (1968), Dassanayake (1985), Wu *et al.* (2010) and Simpson *et al.* (1998).

According to studied species, it can be observed that these species are widely distributed in study area. Some species of Cyperaceae are dominantly distributed in wetland areas and ecologically important for the environmental conservation. In Conclusion, the present research can provide information of morphological characters, knowledge of traditional culture and economic importance on genus *Cyperus* of Yangon and Ayeyawady Regions.

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