

Title	Taxonomic Study on Five Species of the Family Poaceae
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Taxonomic Study on Five Species of the Family Poaceae

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Abstract

Grasses are widely distributed plants among the Angiosperms. In the present study, 5 species belong to 5 genera of the family Poaceae from Mandalay District have been undertaken. The morphological characters of collected species have been thoroughly studied and described with Scientific name, Myanmar name, Flowering period and their uses. An artificial key to the studied species are constructed.

Introduction

The study area, Mandalay District is located between north latitudes of 21°10'13" and 22°10'46" and east longitude of 95°59'20" and 96°17'01". It has an area of 351.31 square miles. This area consists of seven townships (Maung Maung 1999).

The grass family, Poaceae is very large and one of the gross morphological complexity (Lawrence 1964). This family contains about 9000 species distributed among 651 genera (Neil 1994). Poaceae is abundantly found in the tropical and subtropical regions of both hemispheres. Grasses are characterized by the spikelets which are not found in any other family except in Cyperaceae. The spikelet is the unit of inflorescences. It consists of a pair of alternate and distichous bracts at the base, called empty bracts or glumes followed by a floret or florets. The florets are distichously arranged and alternate on a jointed or tough axis, the rhachilla. Each floret is subtended by the two bracts called flowering bracts or lemma (the outer) and palea (the inner). It consists of a perianth represented by two or three minute scales called lodicules, a single whorl of two or three stamens or two alternating whorls of six stamens and a central ovary bearing a pair of lateral or rarely solitary style and usually contain plumose stigmas.

Grain, sugar, spices, paper, perfume and thousands of other items of daily uses are the products of various grasses. The world's population depend on the grain of cultivated grasses (rice, wheat, corn, sorghum, etc.) for their staple food. Grasses are either as forage for grazing animals or as

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cereals supply indirectly or directly the larger part of man's nutritional wants. The grasses also make a major contribution to much of the world's landscape. Grasses play an important role on the surface of the earth by protecting the soil erosion (Bor 1960). Therefore, the study of grasses become needed from various points of view.

The aims and objectives of the present paper are mainly to get taxonomic information of grasses and to study their distribution found in Mandalay District.

Materials and Methods

Some members of the family Poaceae were collected from Mandalay District. Specimens are properly collected by taking the field trips. Field notes were made by the location and plant habit. Inflorescences of the specimens were recorded by photographs. The collected specimens were kept immediately into the plastic bags to identify and classify systematically. The specimens have been observed and described in detail. Identification of specimens were done by referring references of Cope (1982), Bor (1960), Backer (1968), Hooker (1897), Rhind (1945) and Neil (1994). The Index for nomenclatural data referred is Index Kewensis by which the name and synonyms of plants up to the rank of species being confirmed. An artificial key to the species were also constructed.

Results

Some members of grasses found in Mandalay District were described in Table 1.

Table 1. List of Collected Species

Sub-family	Tribe	Scientific Name
Bambusoideae	Oryzeae	1. *Leersia hexandra* Sw.
Chloridrideae	Chlorideae	2. *Cynodon dactylon* (L.) Pers.
	Eragrostideae	3. *Dactyloctenium aegyptium* (L.) Willd.
Panicoideae	Paniceae	4. *Brachiaria brizantha* (Hochst. ex A.Rich.) Stapf
		5. *Oplimenus compositus* (L.) P. Beauv.

Artificial key to the species

1. Plants semi-aquatic; stamens 6 ---------- 1. *Leersia hexandra*
1. Plants not semi-aquatic; stamens 3 ---------- 2
   2. Inflorescences digitately arranged ---------- 3
   2. Inflorescences not digitately arranged ---------- 4
3. Leafblades acuminate apex; spikelets awnless; lemma boat-shaped ----- ---------- 2. *Cynodon dactylon*
3. Leafblades acute apex; spikelets awned; lemma broadly ovate ---------- ---------- 3. *Dactyloctenium aegyptium*
   4. Spikelets solitary, awnless; leafblades broadly linear ---------- ---------- 4. *Brachiaria brizantha*
   4. Spikelets binate, awned; leafblades lanceolate or narrowly ovate ---- ---------- 5. *Oplismenus compositus*

1. ***Leersia hexandra*** Sw., Prod. Veg.Ind. Occ. 21.1788. (Figure 1. A)

Pharus ciliatus Retz., Obs. Bot. 5.23.1789.

Leersia australis R.Br., Prod. 210. 1810.

Myanmar name : Thaman myet

Flowering period : September to January

Perennial, decumbent or creeping, semi-aquatic, rhizomatous grasses. Culms 0.5-1.0 m high, 1.0-2.0 mm in diameter, slender, hollow, branched, glabrous, rooting at the lower nodes; nodes 1.0-1.5 mm long, hairy; internodes 1.8-7.6 cm long, glabrous. Leaf-sheath 4.4-8.0 cm long, 1.2-2.5 mm wide, glaucous, sparsely hairy; ligule membranous, truncate, 2.0-2.5 mm long; leaf-blades linear, 6.3-15.6 cm long, 2.0-5.0 mm wide, attenuate at the base, scabrous along the margin, acute at the apex, glaucous on the upper surface, sparsely hairy on the lower surface. Inflorescences open panicle: main axis 7.5-15.5 cm long, subangular, straight, glabrous; branch axis 1.8-2.5 cm long, capillary, zig-zag, scabrous. Spikelets solitary, elliptic, 3.0-3.5 mm long, 1.0-1.2 mm wide, 1-flowered, laterally

compressed, awnless. Glumes absent. Floret elliptic, bisexual, awnless; lemma oblong or boat-shaped, 3.0-3.5 mm long, 0.7-0.8 mm wide, 5-nerved, acute at the apex, hispid ciliate on the mid-nerved, curved upwards, chartaceous yellowish brown or pale pink; palea elliptic, 3.0-3.5 mm long, 1.0-1.2 mm wide, 3-nerved, hispid ciliate along the margin, acute at the apex, chartaceous, yellowish brown or pale pink. Lodicules 2, very minute, cuneate. Stamens 6; filaments filiform, 0.5-1.0 mm long, white; anther dithecous, 1.8-2.0 mm long, yellow; ovaries ovoid, 0.2-0.3 mm long, pale brown; styles 2, 0.7-0.8 mm long, white; stigmas 2, plumose, 1.0-1.2 mm long, yellow. Caryopsis ovoid, 0.5-1.0 mm long, brown.

Specimen examined : Mandalay District, Chanmyathasi Township, Aung pin le; Mahaaungmye Township, Mahamyaing; Patheingyi Township, Yan kin village, Khin Moe Moe Khine, No. 87, September 9, 2006 & December 4, 2007.

Uses : It can be cultivated for hay in wet rice-fields with a very high yield (Backer 1968).

2. ***Cynodon dactylon*** (L.) Pers., Syn. Pl. 1: 85. 1805. (Figure 1. B)

Panicum dactylon L., Sp. ll. ed. 1.1: 58. 1753.

Myanmar name : Mye sa myet

Flowering period : Throughout the year

Perennial, erect, stoloniferous sward-forming grasses. Culms 30.0-40.0 cm high, 1.0-1.8 mm in diameter, slender, branched, glabrous, smooth; nodes 1.0-2.0 mm long, glabrous; internodes 1.0-4.8 cm long, glabrous. Leaf-sheath 0.9-2.2 cm long, 1.2-2.0 mm wide, terete, glabrous, bearded at the mouth; ligule a short membrane with ciliate margin, 0.2-0.3 mm long; leaf-blades linear-lanceolate, 1.5-6.0 cm long, 0.1-0.2 cm wide, not attenuate at the base, scabrescent along the margin, acuminate at the apex, sparsely hairy on both surfaces, glaucous. Inflorescences 4- to 6- digitately arranged spikes, all of them borne together; main axis straight, glabrous, terete; each spike 3.0-3.7 cm long, the rhachis of spikes continuous and ending in a spikelet. Spikelets narrowly ovate, 2.0-3.0 mm long, 1.2-1.5 mm wide, strongly laterally compressed, imbricate in 2 rows, subsessile, glabrous; flower bisexual, light green, awnless. Glumes 2, unequal, keeled; lower glume lanceolate, 1.2-1.5 mm long, 0.4-0.5 mm wide, 1-nerved,

hyaline, acute to acuminate at the apex, scabrescent on the nerve, upper glume lanceolate, 1.5-2.0 mm long, 0.7-0.8 mm wide, 1-nerved, acute to acuminate at the apex, hyaline, scabrescent on the nerve. Floret solitary, ovate or elliptic, 2.5-3.0 mm long, 1.0-1.5 mm wide, awnless, shortly-pedicellate, bisexual; lemma boat-shaped, 2.0-2.5 mm long, 1.0-1.5 mm wide, 3-nerved, awnless, membranous, glabrous, keeled, acute at the apex, hairy at the mid-nerve, the lateral nerves close to the margin; palea elliptic-oblong, 2.0-2.5 mm long, 0.5-0.7 mm wide, 2-nerved, entire along the margin, acute at the apex, membranous, glabrous. Lodicules 2, very minute, ovate-cuneate. Stamens 3, exserted at the anthesis; filaments slender, 1.0-1.2 mm long, white; anther dithecous, 0.6-1.2 mm long, pale yellowish green; ovaries ellipsoid, 0.5-0.7 mm long, pale brown; styles 2, 0.3-0.4 mm long, glabrous; stigmas 2, plumose, 0.3-0.5 mm long, pale yellowish green, laterally exserted. Caryopsis ellipsoid, 0.8-1.0 mm long, laterally compressed, brown.

Specimen examined : Throughout the Mandalay District area, Khin Moe Moe Khine, No. 59, April 12, 2005 & December 25, 2006.

Uses : It is grazed by ruminants, to control erosion and as a turf grass (Mannetje *et al*. 1992). Fresh juice is memulcent, astringent and diuretic. The plant is hemostatic and laxative (Kapoor 2001).

3. ***Dactyloctenium aegyptium*** (L.) Willd., Enum. Hort. Berol. 1029. 1809.

(Figure 1. C)

Cynosurus aegyptius L. Sp. Pl. ed. 1.1: 72. 1753.

Eleusine aegyptia (L.) Desf., Fl. At Lant. 1:85. 1789.

Myanmar name : Myet le gwa; Dedok chi

Flowering period : Throughout the year

Annual, erect, stoloniferous robust grasses. Culms 18.0-46.0 cm high, 1.0-2.5 mm in diameter, slender, solid, branched, glabrous; nodes 1.0-2.5 mm long, glabrous; internodes 2.5-8.0 cm long, glabrous. Leaf-sheath 2.0-5.0 cm long, 2.5-4.0 mm wide, slightly compressed, glabrous; ligule membranous ring, 1.0-2.0 mm long; leaf-blades linear, 2.5-8.0 cm long, 2.0-7.0 mm wide, subrounded at the base, ciliate along the margin, acute at the apex, pubescent on the lower surface, glabrous on the upper surface.

Inflorescences 2- to 6- digitately arranged spikes, all of them borne together, main axis straight, slightly compressed; each branch axis 1.2-3.5 cm long, continuous, ending in a spikelet. Spikelets ovate, 3- to 4-flowered, 2.8-3.0 mm long, 1.0-2.0 mm wide, awned, laterally compressed, sessile, biseriate on the midrib of rhachis of a spike; rhachilla disarticulating above the glume and between the floret. Glumes 2, unequal, deciduous, strongly keeled; lower glume ovate-oblong, 2.0-2.2 mm long, 1.0-1.2 mm wide, 1-nerved, inflexed along the margin, acute at the apex, membranous, scabrescent on the nerves; upper glume elliptic, 2.0-2.5 mm long, 1.0-1.2 mm wide, 1-nerved, inflexed along the margin, hyaline, scabrescent on the nerve, awned; awns 0.5-1.0 mm long, recurved. Florets solitary, sessile, bisexual, awnless; lemma broadly ovate, 2.8-3.0 mm long, 1.0-1.2 mm wide, 3-nerved, inflexed along the margin, mucronate at the apex, membranous, scabrescent on the nerve, with faint submarginal lateral nerves; palea elliptic, 2.9-3.2 mm long, 1.0-1.2 mm wide, 2-nerved, acute at the apex, hyaline, scabrescent on the nerve. Lodicules 2, very minute, obconical. Stamens 3; filaments slender, 0.2 - 0.4 mm long; white; anther dithecous, 0.2-0.3 mm long, yellow; ovaries ovate-oblong, 0.4-0.5 mm long; styles 2, 0.4-0.6 mm long, white; stigma 2, plumose, 1.0-1.2 mm long, white. Caryopsis ovate-oblong, about 1.0 mm long, coarsely transversely rugose, brownish yellow.

Specimen examined : Mandalay District, Khin Moe Moe Khine, No.8, May, 17, 2005 & November 25, 2006.

Uses : This grass is widely used as forage and is relished by all types of ruminants. Although a valuable forage, it can also be a troublesome weed of cultivation. It makes excellent hay. It times of scarcity it is used as a food grain (Mannetje *et al*. 1992).

4. ***Brachiaria brizantha*** (Hochst. ex A. Rich.) Stapf in Prain, Fl. Trop. Afr. 9:531.1919. (Figure 1. D)

Panicum brizanthum Hochst. ex A.Rich. Tent. Fl. Abyas. 2: 363.1851.

Myanmar name : Unknown

Flowering period : October to January

Perennial, erect or prostrate, rhizomatous and stoloniferous tufted grasses. Culms 30.0-80.0 cm high, 1.0-3.5 mm in diameter, terete, solid,

branched, glabrous, rooting at the lower nodes; nodes 0.5-1.5 mm long, glabrous; internodes 1.0-10.5 cm long, glabrous. Leaf-sheath 4.0-9.7 cm long, 1.5-4.0 mm wide, glabrous; ligule membranous, 1.0-1.5 mm long, leaf-blades broadly linear, 10.3-28.0 cm long, 0.5-1.3 cm wide, rounded at the base, scabrous along the margin, acuminate at the apex, sparsely hairy on both surfaces. Inflorescences 3- to 7- spike-like secund racemes; main axis 6.7-10.5 cm long, subangular, scabrescent; branch axis 4.3-9.5 cm long, narrowly winged, scabrous. Spikelets solitary, elliptic, 3.0-4.5 mm long, 1.0-1.5 mm wide, 2-flowered, pubescent, awnless, subsessile. Glumes 2, unequal; lower glume broadly obovate, 1.5-2.0 mm long, 0.8-1.0 mm wide, 3-nerved, inflexed along the margin, obtuse at the apex, membranous, pale yellow; upper glume elliptic, 3.0-4.5 mm long, 1.0-1.5 mm wide, 5-nerved, inflexed along the margin, acute at the apex, membranous, pale yellowish brown, sparsely hairy. Lower floret elliptic-oblong, neuter, awnless; lower lemma elliptic, 3.0-4.5 mm long, 1.0-1.5 mm wide, 5-nerved, inflexed along the margin, acute at the apex, membranous, pale yellow, glabrous; lower palea oblong, 1.2-1.5 mm long, 0.8-1.0 mm wide, nerveless, entire along the margin, obtuse at the apex, membranous, creamy. Upper floret ovate-oblong, bisexual, awnless; upper lemma ovate-oblong, 2.5-3.0 mm long, 1.0-1.2 mm wide, indistinct nerves, coriaceous, pale yellow, granulose, glabrous; upper palea ovate-oblong, 1.5-2.0 mm long, 0.8-1.0 mm wide, nerveless, inflexed along the margin, obtuse at the apex, coriaceous, creamy, glabrous. Lodicules 2, very minute, cuneate. Stamens 3; filaments filiform, 0.5-1.0 mm long, white; anther dithecous, 0.7-1.2 mm long, yellow; ovaries ovoid, 0.3-0.5 mm long, pale yellow; styles 2, 0.5-0.7 mm long, white; stigmas 2, plumose, 0.5-1.0 mm long, yellowish brown. Caryopsis ovoid, 1.0-1.2 mm long, yellow.

Specimen examined : Mandalay District, Patheingyi Township, Kyi gone, Khin Moe Moe Khine, No. 127, November 25, 2006 & December 7, 2007.

Uses : The main use of this grass is as forage in permanent pastures for grazing or for cut and carry systems. It has also proved useful as grazed ground cover in tree plantation (Mannetje *et al*. 1992). It is excellent soil binder (Bor 1960).

5. ***Oplismenus compositus*** (L.)P.Beauv., Ess. Agrost. 54.168.169. 1812.

(Figure 1. E)

Panicum compositum L., Sp. Pl. 1:57.1753.

Myanmar name : Myet let the

Flowering period : September to December

Perennial, rambling and creeping, stoloniferous grasses. Culms 20.0-50.0 cm high, 1.5-2.5 mm in diameter, slender, slightly compressed, solid, glabrous, rooting at the lower nodes; nodes 0.5-1.5 mm long, glabrous; internodes 0.7-4.9 cm long, glabrous leaf-sheath 2.2-7.4 cm long, 1.0-2.5 mm wide, sparsely hairy; ligule membranous with fringed hairs, 0.5-1.0 mm long; leaf-blades lanceolate or narrowly ovate, 1.4-10.6 cm long, 0.3-0.9 cm wide, oblique at the base, scabrescent along the margin, acuminate at the apex, sparsely hairy on both surfaces. Inflorescences 3- to 7- spike-like racemes; main axis 5.8-18.5 cm long, subterete, scabrous; branch axis 1.8-5.6 cm long, angular, narrowly winged, hairy. Spikelets binate, lanceolate or ovate-oblong, secund, 2.5-3.0 mm long, 1.0-1.2 mm wide, 2-flowered, glabrous, awned, dorsally compressed, pedicellate; pedicels unequal, 0.3-0.5 mm long, hairy. Glumes 2, unequal; lower glume ovate, 2.0-2.5 mm long, 0.7-1.0 mm wide, 3-nerved, inflexed along the margin, awned at the apex, hairy, membranous, awns 0.5-0.6 cm long, smooth, pale green; upper glume ovate, 2.5-3.0 mm long, 0.8-1.0 mm wide, 3- to 5-nerved, inflexed along the margin, acute at the apex, sparsely hairy, membranous. Lower floret elliptic-lanceolate, neuter, awnless; lower lemma ovate, 2.0-2.5 mm long, 1.0-1.2 mm wide, 5- to 7- nerved, hairy along the margin, acute at the apex, sparsely hairy, membranous; lower palea narrowly lanceolate or linear-oblong, 2.0-2.3 mm long, 0.2-0.5 mm wide, nerveless, slightly inflexed along the margin, acute and hairy at the apex, membranous. Upper floret ovate-oblong, bisexual, awnless; upper lemma ovate-oblong, 2.3-2.5 mm long, 0.9-1.0 mm wide, nerveless, inflexed along the margin, acute at the apex, glabrous, coriaceous, pale green; upper palea ovate-oblong, 2.0-2.3 mm long, 0.8-1.0 mm wide, nerveless, inflexed along the margin, acute at the apex, glabrous, pale green. Lodicules 2, very minute, obconical. Stamens 3; filaments filiform, 0.5-0.7 mm long, white; anther dithecous, 1.5-1.7 mm long, yellowish-brown; ovaries ellipsoid, 0.5-0.7 mm long, pale green; styles 2, flattened at the base and pointed at the

apex, 0.8-1.0 mm long, white; stigmas 2, plumose, 1.2-1.3 mm long, yellowish brown. Caryopsis ellipsoid, 1.0-1.5 mm long, brown.

Specimen examined : Mandalay District, Patheingyi Township, Mya kha nauk Hill & Ye da khun Hill, Khin Moe Moe Khine, No. 57. November, 26, 2005 & December 5, 2006.

Uses : It is used for epizoic dispersal and adhere to passing animals, man and vehicles (Backer 1968).

Discussion and Conclusion

The present study deals with some species of the family Poaceae growing in Mandalay District. Totally 5 species belong to 5 genera have been identified, classified and described. According to the resulting data, species of *Cynodon dactylon* (L.) Pers. and *Dactyloctenium aegyptium* (L.) Willd. are abundantly found in the study area. *Leersia hexandra* Sw., *Brachiaria brizantha* (Hochest. ex A. Rich.) Stapf and *Oplimenus compositus* (L.) P. Beauv. are slightly found in this area.

Most of the species are used as fodder but some species of *Cynodon dactylon* (L.) Pers. is used as a medicinal plant. Digitately arranged inflorescences can be seen in two species and the three species are not digitately arranged inflorescences. Awned spikelets are found in *Dactyloctenium aegyptium* (L.) Willd. and *Oplismenus compositus* (L.) P. Beauv. and other three species are awnless spikelets. Six stamens are found in one species and three stamens are found in four species.

It is sincerely hoped that the present paper of grass resources from Mandalay District can stand up valuable information for the further investigation of researchers who are facing with some difficulties to know about the species. This study will partially fulfill the requirement of grasses information of the Mandalay District.

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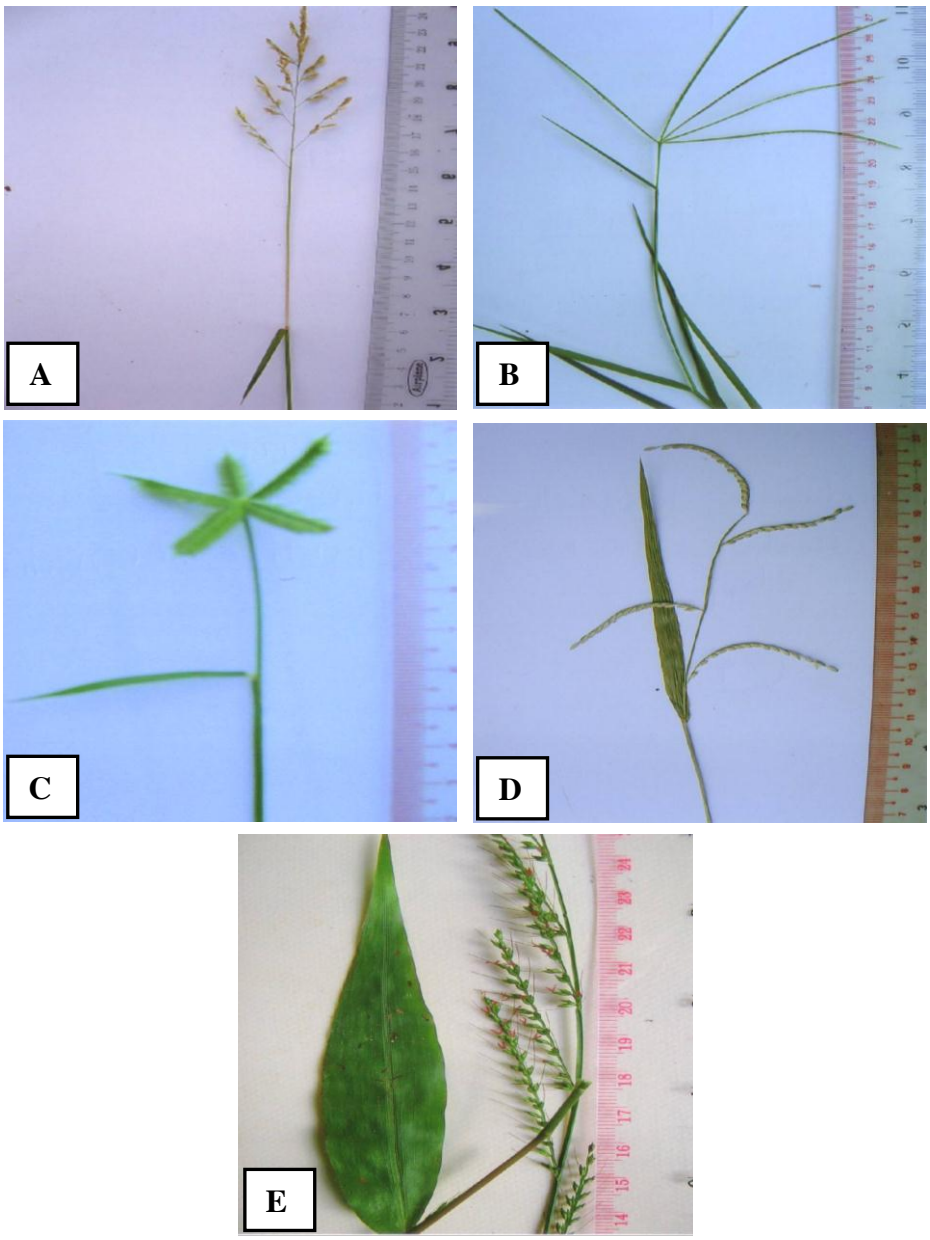

Figure 1. **A.** ***Leersia hexandra*** **Sw.** **B.** ***Cynodon dactylon*** **(L.) Pers.** **C.** ***Dactyloctenium aegyptium*** **(L.) Willd.** **D.** ***Brachiaria brizantha*** **(Hochst. ex A. Rich.) Stapf** **E.** ***Oplismenus compositus*** **(L.) P. Beauv.**

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