

Grasses of Acharya Jagadish Chandra Bose Indian Botanic Garden (AJCBIBG), Howrah, India

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(Received 1 December, 2023; Accepted 6 February, 2024)

ABSTRACT

Grasses being the members of the family Poaceae deserves special attention as it has an integral role in the lives of both human beings and animals. From ecological point of view their role is immense but at the same time grasses are neglected since time immemorial due to difficulties to work out scientifically. Realizing the very fact, the present study aimed at listing out the grasses growing in the Acharya Jagadish Chandra Bose Indian Botanic Garden (AJCBIBG), an old and historic garden as well as, an excellent centre for ex-situ conservation of plant wealth from across the globe. This communication deals with enumeration of the grasses (32 species) dwelled in the garden premises along with correct nomenclature and synonyms available if any. Concurrently, flowering and fruiting time, and notes are also provided wherever essential including utilitarian values.

Key words: Grasses, AJCBIBG, Uses, Importance

Introduction

The grasses forming a natural and homogenous group of plants with remarkable diversity belonging to the angiosperm family Poaceae, the fifth largest family of flowering plants in the world species wise and third in genera wise (Good, 1953; Clayton and Renvoize, 1989) and broadly represented by more than 700 genera and 10,000 species. But according to Mabberley (2002), Poaceae known to have about 9550 species under 668 genera. In India it is represented by 1334 species and 261 genera (Karthikeyan, 2005); out of these 1184 are grasses and rest are bamboos. Grasses occupy wide tracts of land and they are evenly distributed in all parts of the world. They occur in every soils, in all kinds of situations and under all climatic conditions. As grasses do not like shade, they are not usually abundant within the forests either as regards the number of individuals, or

of species. But in open places they grow very well and sometimes whole tracts become grasslands. Then a majority portion of the actual vegetation would consist of grasses.

The early work on the grasses of Indian sub-continent was by Griffith (1834), who described grasses of Jheels of Sylhet (now in Bangladesh). Conspicuous bamboos caught the attention of Kurz (1878) Gamble (1896), Duthie (1883, 1886, 1888, 1893) and Stapf (1906) collected, studied and distributed grasses of different regions of India and Sri Lanka. Nineteenth century closed with the publication of monumental work the 'Flora of British India' Vol. 7 (Gramineae by Hook.f. and Stapf, 1896–1897). This was followed by the publication of 'Bengal plants' (Prain, 1903), Flora of Bombay II (Cooke, 1908), 'Botany of Bihar and Orissa' (Mooney, 1939, 1950), 'Flora of the Presidency of Madras' (Gramineae pt. X, Fischer, 1934). Intensive studies of

the grasses were made by Blatter and Mc Cann, their work resulted in the excellent accounts of the grasses of Bombay (1934). Achariar and Mudaliar (1921) studied the grasses of Madras and the adjoining areas and published the grasses of South India. Bor made an extensive collection in Assam, Uttar Pradesh and the Himalayas and published grasses of Assam (Flora of Assam Vol. 5. Gramineae, 1940), common grasses of Uttar Pradesh (1941) and 'Grasses of Burma, Ceylon, India and Pakistan' (1960, reprint 1973). Stewart (1945) published an account of the grasses of the N.W. India. Raizida, Jain and Bhardwaja (1961, 1964) have published 'The grasses of the Upper Gangetic Plain' which is a supplement to the 'Flora of Upper Gangetic plain' by Duthie. Desai and Murty (1950), Majumdar (1956) have brought out the accounts of the grasses of Junagadh (Gujarat), Dharwar (Kathiawar), 24 Parganas (West Bengal), respectively. Tewari (1954–1955, 1961) and Shukla and Panigrahi (1967) have accounts of the grasses of Madhya Pradesh which were precursors to the 'Grasses of Madhya Pradesh' by Roy (1984). Patunkar (1980) published 'Grasses of Marathawada' (Maharashtra). Several additions and name changes in family have been published by Shukla and Jain (1979); Ved Prakash *et al.* (1979); Uniyal (1986); Karthikeyan *et al.* (1989). The latter have brought out a checklist of the Monocots with updated nomenclature. Choudhury (1950–1960) studied the grasses of West Bengal. Jain and his co-workers (1960 onwards) have published numerous papers on the Indian grasses including bibliography of the family Gramineae (1961, 1972) and 'Grasses of Bengal, Bihar and Orissa' (1975). They have also revised genera like *Cynodon* (1967), *Arthraxon* (1972) and *Anthoxanthum* (1975). Recently Singh *et al.* (1976) have published the grasses of Karnataka state and Majumdar (1980) published classification of the Indian grasses.

Several workers are presently engaged in the study of this family, however, the study of grasses has not attracted the desired attention as the group is considered difficult for identification. Their spikelets being minute, the grasses require careful dissection for correct determination. Being a botanically "neglected group", grasses need a separate detailed taxonomic investigation. The present study has been carried out with the broad objective to present a comprehensive floristic account of the grasses of Indian Botanic Garden, Howrah (West Bengal).

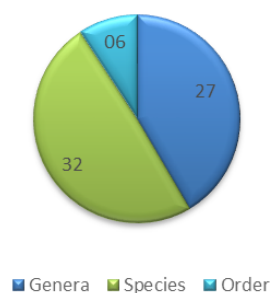
Study Area

The Acharya Jagadish Chandra Bose Indian Botanic Garden (erstwhile known as Indian Botanic Garden), situated in Howrah (22° 35' N, 88° 21' E), with an average altitude of 4.6 m above mean sea level, is the oldest and third largest garden in the world. It comprises an area of 110 ha (273 acres) and stands on the right bank of River Hooghly. The garden is divided into 25 divisions, each specified for growing different types of plants. There are 24 lakes in the garden and the garden is the living repository of more than 12,000 trees, shrubs and climbers representing over 1,400 species together with a large number of wild and cultivated herbs. The Indian Botanic Garden preserves one of the best collections of native and exotic plants and large number of curious, rare and endangered species. The 'Great Banyan Tree', which is more than 270 years old, is one of the main attractions of this garden, and it finds mention in "Guinness Book of World Records". The garden provides various ecological conditions that support the growth of various plants, such as Angiosperms including variety of grasses, Gymnosperms, Bryophytes, Pteridophytes, Algae, Fungi and Lichens.

Materials and Methods

The present study is based on a comprehensive and exhaustive collection of grasses from different divisions of AJCBIBG (Map. 1). The plant specimens were collected from different localities of the garden. Habitat and studied ecology were recorded during the collections. The measurements of various floral parts have been taken. As per earlier report (Banerjee and Pal, 2015) there are about 71 species recorded from the AJCBIBG Campus but during the present study 32 species have been collected and

Pie chart showing distribution of Grasses in AJCBIBG



identified. Identification of the specimens were made with the help of important Floras such as Flora of British India, Vol. 7 (Hook.f., 1896), Flora of Kerala- Grasses (Sreekumar and Nair, 1991), Grasses of North-Eastern India (Shukla, 1967) and earlier focused works in and around the study area (Banerjee and Pal, 2015; Jain *et al.*, 1975). The authentication was done by comparing them with validated specimens housed in CAL.

Enumeration

1. *Apluda mutica* L., Sp. Pl: 82. 1753; C.E.C. Fisch. in Gamble, Fl. Madras. 1750. 1934 (Repr. ed. 3: 1212. 1957); Bor, Grasses Burma, Ceylon, India & Pakistan: 93. t. 7. 1960; Banerjee & Pal, Bull. Bot. Surv. India 16(1-4): 72. 1974. *A. aristata* L., Amoen. Acad. 4: 303. 1756; C.E.C. Fisch. in Gamble, Fl. Madras: 1750. 1934 (Repr. ed. 3: 1212. 1957). *A. mutica* L., Hook.f., Fl. Brit. India 7: 150. 1896. (ANDROPOGONEAE)

Fl. & Fr.: August–December.

Notes: A highly variable species. Small, slender, annual forms with creeping and rooting culms as well as tall, stout, perennial forms with erect and tufted culms were observed in the area. Hacker described several varieties within this species. As Bor (*l.c*) states, none of them can be maintained as separate entities.

2. *Arundo donax* L., Sp. Pl.: 81. 1753; Hook.f., Fl. Brit. India 7: 302. 1896; Bor, Grasses Burma, Ceylon, India & Pakistan: 413. t. 44. 1960; Banerjee & Pal, Bull. Bot. Surv. India 16(1-4): 79. 1974. (ARUNDINEAE)

Fl. & Fr.: August–December.

3. *Axonopus compressus* (Sw.) P. Beauv., Ess. Agrost. 12: 154. 1812; Bor, Grasses Burma, Ceylon, India & Pakistan: 278. 1960; Banerjee & Pal, Bull. Bot. Surv. India 16(1-4): 75. 1974. *Millium compressum* Sw., Prodr. Veg. Ind. Occ.: 24. 1788. (PANICEAE)

Fl. & Fr.: Throughout the year.

Notes: This species shows extreme variation in the shape and size of the leaves. Leaves are either oblong, oblanceolate, linear-oblong, lanceolate or linear-lanceolate. This grass grows gregariously and forms mats and serves as a very good sand binder. The common “*Carpet Grass*”.

4. *Bothriochloa pertusa* (L.) A. Camus, Ann. Soc. Linn. Lyon, n. s. 76: 164. 1931; Bor, Grasses Burma, Ceylon, India & Pakistan: 109. 1960; Banerjee & Pal, Bull. Bot. Surv. India 16(1-4): 72. 1974. *Holcus pertusus* L., Mant. Pl. Altera: 301. 1771. *Andropogon pertusus* (L.) Willd., Sp. Pl. 4(2): 922. 1806; Hook.f., Fl. Brit. India 7: 173. 1896. 191. t. 152–153. 1921. *Amphilophis pertusa* (L.) Nash ex Stapf, Agr. News. Bridge. 15: 179. 1916 et in Prain., Fl. Trop. Afr. 9: 175. 1917; C.E.C. Fisch. in Gamble, Fl. Madras: 1731. 1934 (Repr. ed. 3: 1200. 1957). *Dichanthium pertusum* (L.) W.D. Clayton, Kew Bull. 32: 4. 1977. (ANDROPOGONEAE)

Fl. & Fr.: August–February.

Notes: This species can easily be distinguished by its hairy racemes and lower glumes with 1 or 2 peculiar deep circular pits.

5. *Chloris barbata* Sw., Fl. Ind. Occid. 1: 200. 1797; Hook.f., Fl. Brit. India 7: 292. 1896; C.E.C. Fisch. in Gamble, Fl. Madras: 1838. 1934 (Repr. ed. 3: 1272. 1957); Bor, Grasses Burma, Ceylon, India & Pakistan: 465. 1960; Banerjee & Pal in Bull. Bot. Surv. India 16(1-4): 79. 1974. *Chloris inflata* Link, Enum. Hort. Berol. Alt. 1: 105. 1821; Fosberg, Taxon 25: 178. 1976. (CYNODONTEAE)

Fl. & Fr.: March–December.

6. *Chrysopogon aciculatus* (Retz.) Trin, Fund. Agrost.: 181. 1820; C.E.C. Fisch. in Gamble, Fl. Madras: 1738. 1934 (Repr. ed. 3: 1205. 1957); Bor, Grasses Burma, Ceylon, India & Pakistan: 115. 1960; Banerjee & Pal, Bull. Bot. Surv. India 16(1-4): 74. 1974. *Andropogon aciculatus* Retz., Obs. Bot. 5: 22. 1789; Hook.f., Fl. Brit. India 7: 188. 1896. (ANDROPOGONEAE)

Fl. & Fr.: March–December.

Notes: This species is quite different from all other species of the genus by its peculiar creeping and decumbent habit. The basal prostrate creeping culms form thick carpets along the banks of backwaters and estuaries and help to prevent tidal erosion. The spikelets are easily disarticulating, acicular and the callus is extremely sharp and often gets attached to the skin and hair of animals and cloths of human beings. Hence, it is known as “*Love-Grass*”

7. *Chrysopogon zizanioides* (L.) Roberty, Bull. Inst. Franç. Afrique Noire, A. 22: 106. 1960.. *Vetiveria zizanioides* (L.) Nash in Small, Fl. S.E. U.S.: 67.

1903; C.E.C. Fisch.in Gamble, Fl. Madras: 1733, 1934 (Repr. ed. 3: 1201. 1957); Bor, Grasses Burma, Ceylon, India & Pakistan: 258. 1960; Banerjee & Pal in Bull. Bot. Surv. India 16(1-4): 75. 1974. *Phalaris zizanioides* L., Mant. Pl. Altera: 183. 1771. (ANDROPOGONEAE)

Fl. & Fr.: July–December.

Notes: The aromatic root of this grass is used for cooling water and making local fans. The famous ‘vettiver’ is the medicinally important root of this grass.

8. *Cynodon dactylon* (L.) Pers., Syn. Pl. 1: 85. 1805; Hook.f., Fl. Brit. India 7: 288. 1896; C.E.C. Fisch.in Gamble, Fl. Madras: 1835. 1934 (Repr. ed. 3: 1270. 1957), exct. var. *intermedius*; Bor, Grasses Burma, Ceylon, India & Pakistan: 469. t. 52. 1960; Jain in Bull. Bot. Surv. India 9: 139. 1967; Banerjee & Pal, Bull. Bot. Surv. India 16(1–

4): 79. 1974. *Panicum dactylon* L., Sp. Pl.: 58. 1753. (CYNODONTEAE)

Fl. & Fr.: March–October.

Notes: This cosmopolitan species differs from *C. arcuatus* by having underground rhizomes and shorter racemes and lemmas without clavate hairs. ‘Dog’s tooth’ or ‘Bermuda Grass’ is considered a very good lawn grass, an excellent fodder and an effective sand binder.

9. *Cyrtococcum deccanense* Bor, Kew Bull. 11(2): 255. 1956; Bor, Grasses Burma, Ceylon, India & Pakistan: 291. 1960. *Panicum patens* auct. non L., 1753; Hook.f., Fl. Brit. India 7: 57. 1896; Banerjee & Pal, Bull. Bot. Surv. India 16(1-4): 76. 1974. (PANICEAE)

Fl. & Fr.: June–October.

Notes: This species is similar to *Cyrtococcum patens* but differs by the few and larger spikelets with long pedicels and narrower, elliptic-lan-



Plate 1. A *Apluda mitoca* L.; B. *Arundo donax* L.; C. *Axonopus compressus* (Sw.) P. Beauv.; D. *Bothriochloa pertusa* (L.) A. Camus; E. *Cenchrus ciliaris* L.; F. *Chloris barbata* Sw.; G. *Chrysopogon aciculatus* (Retz.) Trin.

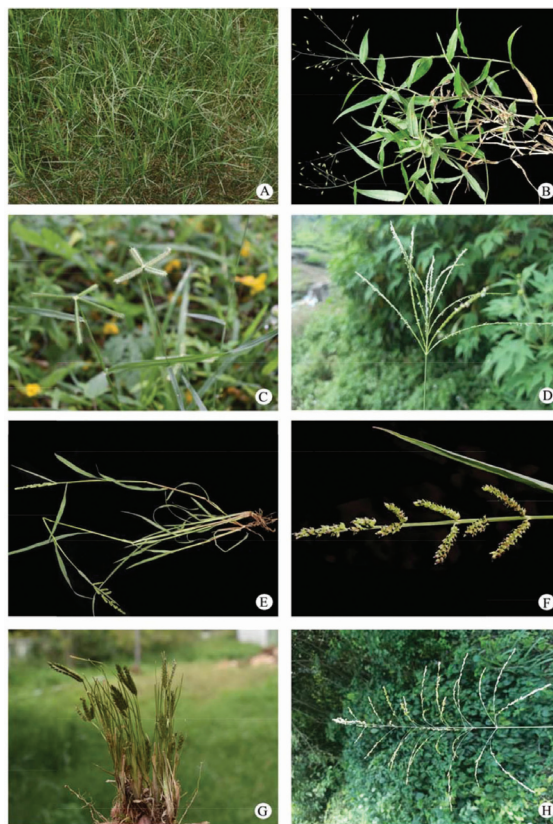


Plate 2. A. *Cynodon dactylon* (L.) Pers.; B. *Cyrtococcum deccanense* Bor; C. *Dactyloctenium aegyptium* (L.) Willd.; D. *Digitaria ciliaris* (Retz.) Koeler; E.&F. *Echinochloa colonum* *(L.) Link.; G. *Eleusine indica* (L.) Gaertn.; H. *Panicum repens* L.

- ceolate leaves with narrowed bases, J.D. Hooker (*l.c.*) treated it as a variety of *C. patens*. But it is quite distinct by its peculiar long, narrow leaves and larger spikelets and also by the habitat specificity.
10. *Dactyloctenium aegyptium* (L.) Willd., Enum. Pl.: 1029. 1809; Bor, Grasses Burma, Ceylon, India & Pakistan: 489. t. 54. 1960; Banerjee & Pal, Bull. Bot. Surv. India 16(1-4): 79. 1974. *Eleusine aegyptica* (L.) Desf, Fl. Atlant. 1: 85. 1798; Hook.f., Fl. Brit. India 7: 295. 1896. (ERAGROSTIDEAE)
Fl. & Fr.: Throughout the year.
Note: The common name is 'Crow-foot' grass.
 11. *Digitaria ciliaris* (Retz.) Koel., Descr. Gram.: 27. 1802; Veldkamp, Blumea 21: 32. 1973; Cope in Nasir & Ali, Fl. Pakistan 143: 228. 1982. *Panicum ciliare* Retz., Obs. Bot. 4: 16. 1786. *Digitaria adscendens* (Kunth) Henr., Blumea 1: 92. 1934; Bor, Grasses Burma, Ceylon, India & Pakistan: 298. 1960; Banerjee & Pal, Bull. Bot. Surv. India 16(1-4): 76. 1974. *Panicum adscendens* Kunth, in Nov. Gen. Sp. 1: 97. 1816. *Digitaria marginata* Link, Enum. Hort. Berol. 1: 102. 1821; C.E.C. Fisch.in Gamble, Fl. Madras: 1764. 1934 (Repr. ed. 3: 1222. 1957) p.p. *Paspalum sanguinale* (L.) Lam. var. *rottleri* Hook.f., Fl. Brit. India 7: 15. 1896, p.p. *Digitaria sanguinalis* (L.) Scop. var. *ciliaris* Rang. & Tad., Handb. S. Ind. Grass. 53. t. 71-72. 1921. (PANICEAE)
Fl. & Fr.: Throughout the year.
Notes: The number and length of racemes and pubescence of the lower lemmas of this species vary considerably. It is polymorphic species. Said to be an excellent fodder grass, with much nutritive value and cattle eat it with relish.
 12. *Digitaria setigera* Roth in Roem. & Schult., Syst. Veg. 2: 474. 1817; Veldkamp, Blumea 21: 37. 1973; Bor, Grasses Burma, Ceylon, India & Pakistan: 305. 1960; Banerjee & Pal, Bull. Bot. Surv. India 16(1-4): 76. 1974. Cope in Nasir & Ali, Fl. Pakistan 143: 226. 1982. *Paspalum sanguinale* (L.) Lam. var. *extensum* Hook.f., Fl. Brit. India 7: 15. 1896. *Digitaria sanguinalis* (L.) Scop. var. *extensum* (Hook.f.) Rang. & Tad., Handb. S. Ind. Grass.: 56. t. 74-75. 1921. (PANICEAE)
Fl. & Fr.: Throughout the year.
Notes: This species is allied to *Digitaria ciliaris*, but can be distinguished by the absence of reduction to a rim of the lower glume and the smaller upper glume which is usually less than half the length of the spikelets. It is also nearer to *D. griffithii*, but differs by its smaller upper glumes, reduced lower glumes and shorter pedicels.
 13. *Echinochloa colonum* (L.) Link., Hort. Berol. 2: 209. 1833; C.E.C. Fisch.in Gamble, Fl. Madras: 1776. 1934 (Repr. ed. 3: 1230. 1957); Bor, Grasses Burma, Ceylon, India & Pakistan: 308. t. 34. 1960; Banerjee & Pal, Bull. Bot. Surv. India 16(1-4): 77. 1974; Cope in Nasir & Ali, Fl. Pakistan 143: 196. 1982. *Panicum colonum* L., Syst. Nat, ed. 10, 2: 870. 1759; Hook.f., Fl. Brit. India 7: 32. 1896. (PANICEAE)
Fl. & Fr.: Throughout the year.
Notes: This grass is very similar to *Echinochloa frumentacea* but can be distinguished by the short straight racemes. This species shows certain amount of variation in their shape and size of the spikelets and it may sometimes intergrade (Cope, *l. c.*) with *E. crus-galli*. The common 'Jungle Rice'.
 14. *Echinochloa crus-galli* (L.) P. Beauv., Ess. Agrost. 12: 161. 1812; C.E.C. Fisch.in Gamble, Fl. Madras: 1777. 1934 (Repr. ed. 3: 1231. 1957); Bor, Grasses Burma, Ceylon, India & Pakistan: 310. 1960; Banerjee & Pal, Bull. Bot. Surv. India 16(1-4): 72. 1974; Cope in Nasir & Ali, Fl. Pakistan 143: 193. 1982. *Panicum crus-galli* L., Sp. Pl.: 56. 1753; Hook.f., Fl. Brit. India 7: 15. 1896. (PANICEAE)
Fl. & Fr.: March-September.
Notes: This species is very similar to *E. stagnina*, but differs by the racemes not spreading in the panicles and the absence of ligule.
 15. *Eleusine indica* (L.) Gaertn., Fruct. Sem. Pl. 1: 8. 1788; Hook.f., Fl. Brit. India 7: 293. 1896; C.E.C. Fisch.in Gamble, Fl. Madras: 1839. 1934 (Repr. ed. 3: 1273. 1957); Bor, Grasses Burma, Ceylon, India & Pakistan: 493. 1960; Banerjee & Pal, Bull. Bot. Surv. India 16(1-4): 79. 1974. *Cynosurus indicus* L., Sp. Pl.: 72. 1763. (ERAGROSTIDEAE)
Fl. & Fr.: Throughout the year.
Notes: 'Crab Grass' or 'Crowfoot Grass'. This can be distinguished from the other species of the genus by its loosely packed sub-digitate spikes and unexposed grains. It is a cosmopolitan weed and also a good fodder.
 16. *Eriochloa procera* (Retz.) C.E. Hubb., Bull. Misc. Inform. Kew 1930(6): 256. 1930; C.E.C. Fisch.in Gamble, Fl. Madras: 1767. 1934 (Repr. ed. 3:

1224. 1957); Bor, Grasses Burma, Ceylon, India & Pakistan: 312. 1960. *Agrostis procera* Retz., Obs. Bot. 4: 19. 1786. *Eriochloa polystachya* auct. non. Kunth 1916: Hook.f., Fl. Brit. India 7: 20. 1896; Banerjee & Pal, Bull. Bot. Surv. India 16(1-4): 72. 1974. (PANICEAE)

Fl. & Fr.: March–September.

Notes: This 'Cup Grass' is quite distinct by having a ring-like growth just below the spikelets which may often serve to identify it in the field. It shows considerable variation in the size of the culms and spikelets and also in habitat.

17. *Imperata cylindrica* (L.) Raeusch., Nom. Bot., ed. 3: 10. 1797; Cope in Nasir & Ali, Fl. Pakistan 143: 252. 1982. *Lagurus cylindricus* L., Syst. Nat., ed. 10, 2: 878. 1759. *Imperata cylindrica* var. *major* (Nees) C.E.Hubb., Grasses Mauritius 96. 1940;; Bor, Grasses Burma, Ceylon, India & Pakistan: 170. 1960; Banerjee & Pal, Bull. Bot. Surv. India 16(1-4): 72. 1974. *I. koenigii* (Retz.) P. Beauv. var.

major Nees., Fl. Afr. Austr.: 90. 1841. *I. cylindrica* subvar. *koenigii* (Retz.) T. Durand & Schinz, Consp. Fl. Afric. 5: 694. 1894; C.E.C. Fisch.in Gamble, Fl. Madras: 1707. 1934 (Repr. ed. 3: 1184. 1957). *I. arundinacea* Cyr. Pl. Rar. Neap. 2: 26. 1792; Hook.f., Fl. Brit. India 7: 106. 1896. (ANDROPOGONEAE)

Fl. & Fr.: Throughout the year.

Notes: The varietal classification here is quite unreliable. According to Cope (*l.c.*) although the differences between the varieties can be demonstrated statistically, the varieties intergrade so much that individual specimens are often unidentifiable. The hairiness of nodes, loose or dense nature of panicles and flat or rolled leaves, etc. are extremely overlapping and unreliable as means of identification. Hence, it seems best to ignore the varietal treatments, as suggested by Cope.

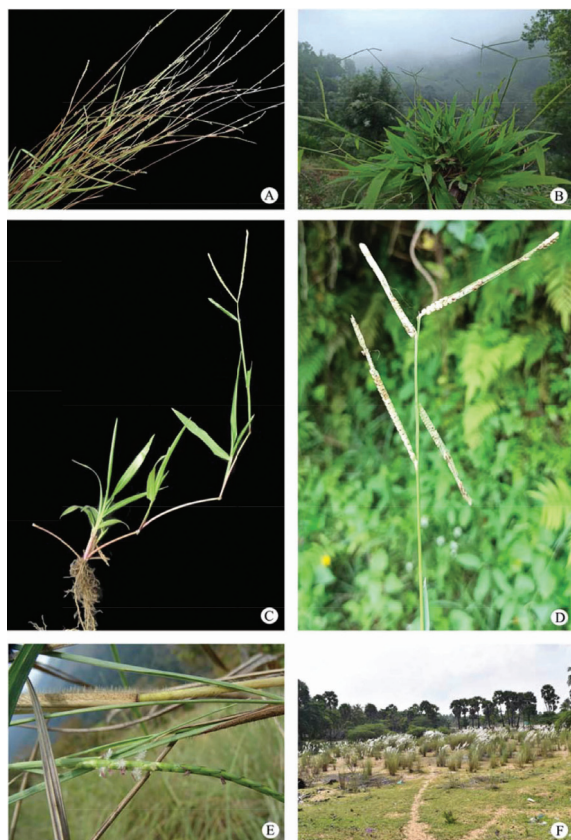


Plate 3. A. *Paspalidium flavidum* (Retz.) A. Camus; B & C. *Paspalum conjugatum* P.J. Bergius; D. *Paspalum scrobiculatum* L.; E. *Rottboellia cochinchinensis* (Lour) Clayton; F. *Saccharum spontaneum* L.

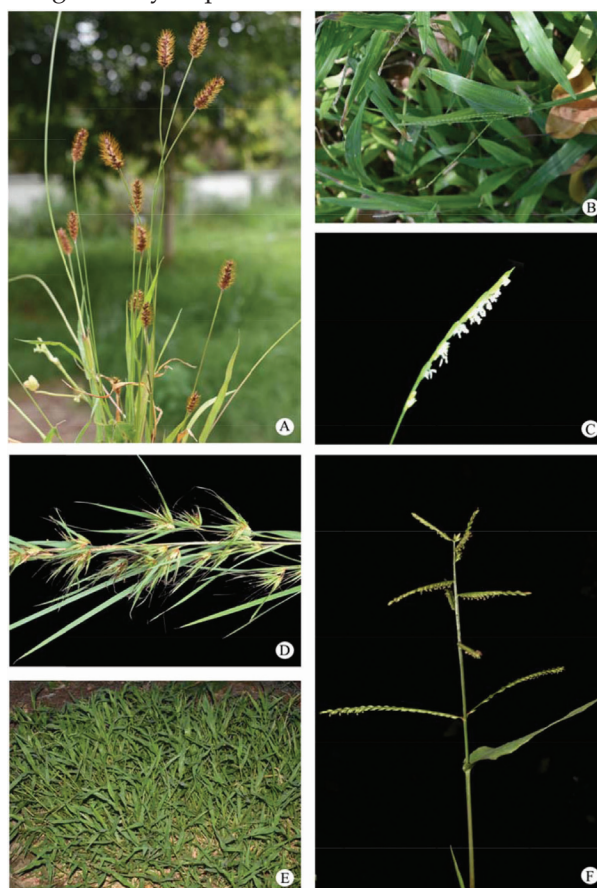


Plate 4. A. *Setaria pumila* (Poir.) Roem. & Schult.; B & C. *Stenotaphrum dimidiatum* (L.) Brongn.; D. *Themeda triandra* Forssk.; E & F. *Urochloa ramosa* (L.) T.Q. Nguyen

18. *Dinebra chinensis* (L.) P.M. Peterson & N. Snow, Ann. Bot. (Oxford) 109: 1326. 2012. *Leptochloa chinensis* (L.) Nees, Syll. Ratisb. 1: 4. 1824; Hook.f., Fl. Brit. India 7: 299. 1896; C.E.C. Fisch.in Gamble, Fl. Madras: 1820. 1934 (Repr. ed. 3: 1260. 1957); Bor, Grasses Burma, Ceylon, India & Pakistan: 516. 1960; Banerjee & Pal, Bull. Bot. Surv. India 16(1-4): 72. 1974. *Poa chinensis* L., Sp. Pl.: 69. 1753. (ERAGROSTIDEAE)

Fl. & Fr.: May–December.

19. *Mnesithea laevis* (Retz.) Kunth, Rev. Gram. 1: 154. 1829; C.E.C. Fisch.in Gamble, Fl. Madras: 1761. 1934 (Repr. ed. 3: 1220. 1957); Bor, Grasses Burma, Ceylon, India & Pakistan: 344. 1960. *Rottboellia laevis* Retz., Obs. Bot. 3: 11. 1783. *R. perforata* Roxb., Pl. Corom. 2: 43, t. 182. 1798; Hook.f., Fl. Brit. India 7: 158. 1896. (ANDROPOGONEAE)

Fl. & Fr.: August–January.

20. *Panicum repens* L., Sp. Pl. ed. 2: 87. 1762; Hook.f., Fl. Brit. India 7: 49. 1896; Rang. & Tad., Handb. S. Ind. Grass. 99. t. 102–103. 1921; C.E.C. Fisch.in Gamble, Fl. Madras: 1783. 1934 (Repr. ed. 3: 1235. 1957); Bor, Grasses Burma, Ceylon, India & Pakistan: 330. 1960; Banerjee & Pal, Bull. Bot. Surv. India 16(1-4): 72. 1974; Majumdar in Bull. Bot. Soc. Beng. 27: 51. 1973. (PANICEAE)

Fl. & Fr.: January–December.

Notes: A cosmopolitan species. It may be confused with *Panicum paludosum*, but can easily be distinguished from it by the thick rhizomes, rigid, glaucous and convolute leaves and non-spongy culms. The rhizomes of this grass are thick and robust which superficially look like the rhizomes of ginger, hence it is commonly called “Ginger grass” or “Ginger root grass”. The rhizomes are said to be a very good lactagogue. A species with considerable fodder value.

21. *Setaria flavidula* (Retz.) Veldkamp, Blumea 39: 376. 1994. *Paspalidium flavidum* (Retz.) A. Camus in Lecomte, Fl. Gen. Indo-Chine 7: 419. 1922; C.E.C. Fisch.in Gamble, Fl. Madras: 1774. 1934 (Repr. ed. 3: 1229. 1957); Bor, Grasses Burma, Ceylon, India & Pakistan: 333. 1960; Banerjee & Pal, Bull. Bot. Surv. India 16(1-4): 72. 1974. *Panicum flavidum* Retz., Obs. Bot. 4: 1786; Hook.f., Fl. Brit. India 7: 28. 1896. (PANICEAE)

Fl. & Fr.: July–December.

Notes: *Setaria flavidula* shows much variation in size and habit and also in the number of nerves of the glumes. This species has a wide range of adaptability. It is quite distinct from the other species of the genus by having leaves with blunt apices, distantly placed spikes and gibbously ovate spikelets.

22. *Paspalum conjugatum* P.J. Bergius, Acta Helv. Phys.-Math. 7: 129 (-130; t. 8) 1772. Hook.f., Fl. Brit. India 7: 11. 1896; C.E.C. Fisch.in Gamble, Fl. Madras: 1772. 1934 (Repr. ed. 3: 1228. 1957); Bor, Grasses Burma, Ceylon, India & Pakistan: 336. 1960; Banerjee & Pal, Bull. Bot. Surv. India 16(1-4): 72. 1974. (PANICEAE)

Fl. & Fr.: Throughout the year.

Notes: This is very common and distinct species of the genus, which can be easily distinguished by its conjugate racemes; during the opening stage the extreme ends of the two racemes remain together leaving the middle portion open. This grass can thrive well in shaded places.

23. *Paspalum scrobiculatum* L., Mant. Pl.: 29. 1767; Hook.f., Fl. Brit. India 7: 10. 1896; Rang. & Tad., Handb. S. Ind. Grass. 49. t. 69–70. 1921; C.E.C. Fisch.in Gamble, Fl. Madras: 1772. 1934 (Repr. ed. 3: 1227. 1957); Bor, Grasses Burma, Ceylon, India & Pakistan: 340. 1960; Banerjee & Pal, Bull. Bot. Surv. India 16(1-4): 72. 1974; W.D. Clayton, Kew Bull. 30(1): 101. 1975; Cope in Nasir & Ali, Fl. Pakistan 143: 213. 1982. *P. orbiculare* Forst., Fl. Ins. Aust. Prodr.: 7. 1786; C.E.C. Fisch.in Gamble, Fl. Madras: 1772. 1934 (Repr. ed. 3: 1227. 1957); Bor, Grasses Burma, Ceylon, India & Pakistan: 340. 1960. *P. commersonii* Lam., Tab. Encycl. 1: 175. t. 43/1. 1791; Bor, Grasses Burma, Ceylon, India & Pakistan: 335, t. 38. 1960. (PANICEAE)

Fl. & Fr.: Throughout the year.

Notes: This is a highly polymorphic species, which exhibits considerable variation in the habit and habitat. Annual or perennial nature of this grass is quite unreliable character to segregate *P. scrobiculatum*, *P. commersonii*, *P. orbiculare*. Similarly, a supposed difference in the nervation of the lower lemmas is also quite unhelpful. According to Clayton (*l.c.*) there seems to be no reliable character for distinguishing *P. orbiculare* and *P. commersonii* from the complex and hence are to be merged under *P. scrobiculatum*.

24. *Rottboellia cochinchinensis* (Lour.) W.D. Clayton, Kew Bull. 35(4): 817–818. 1981. *Stegosia cochinchinensis* Lour., Fl. Cochinch. 1: 51. 1790. *R. exaltata* L.f., Suppl. Pl.: 114. 1782, non (L.) L. F. Nov. Gram. Gen. 23: 37. 1779; Hook.f., Fl. Brit. India 7: 156. 1896; Rang. & Tad., Handb. S. Ind. Grass. 175. t. 145. 1921; C.E.C. Fisch.in Gamble, Fl. Madras: 1759. 1934 (Repr. ed. 3: 1219. 1957); Bor, Grasses Burma, Ceylon, India & Pakistan: 206, t. 13. 1960; Banerjee & Pal, Bull. Bot. Surv. India 16(1–4): 72. 1974. (ANDROPOGONEAE)
Fl. & Fr.: August–March.
Notes: This grass usually have a stilt root system, by which it survives in semi-aquatic habitats, usually in moist or water-logged fields. The basal sheaths here are densely clothed with sharp bristles, hence cows and buffaloes give little or no preference to this grass.
25. *Saccharum spontaneum* L., Mant. Pl. Altera: 183. 1771; Hook.f., Fl. Brit. India 7: 118, 1896; C.E.C. Fisch.in Gamble, Fl. Madras: 1709. 1934 (Repr. ed. 3: 1185. 1957); Bor, Grasses Burma, Ceylon, India & Pakistan: 214. 1960; Banerjee & Pal in Bull. Bot. Surv. India 16(1–4): 75. 1974. (ANDROPOGONEAE)
Fl. & Fr.: Throughout the year, at the end of rains.
Notes: This grass is difficult to be uprooted due to its thick, rhizomatous root-stock and acts as an effective soil binder.
26. *Setaria barbata* (Lam.) Kunth, Rev. Gram. 1: 47. 1829; Bor, Grasses Burma, Ceylon, India & Pakistan: 360. 1960; V.J. Nair *et al.*, J. Econ. Tax. Bot. 3: 271. 1982. *Panicum barbatum* Lam., Tab. Encycl. 1: 171. 1791. *P. flavescens acut. non.* Sw. 1788; Hook.f., Fl. Brit. India 7: 56. 1896; Banerjee & Pal, Bull. Bot. Surv. India 16(1–4): 72. 1974. (PANICEAE)
Fl. & Fr.: September–March.
Notes: This grass was not recorded either by Ranga Achariyar & Tadulinga Mudaliyar (Handbook of some South Indian Grasses, 1857) or by C.E.C. Fischer (Flora of the Presidency of Madras, 1934). Karthikeyan (1968) included this species in his list, probably based on Bor (*l.c.*). It was thought to be not represented in MH. However, a MH sheet which was wrongly identified earlier as *Setaria intermedia* by C.E.C. Fischer, after a critical study with reference to some authentic specimens obtained from CAL turned out to be this species.
27. *Setaria pumila* (Poir.) Roem. & Schult., Syst. Veg. 2: 891. 1817; Cope in Nasir & Ali, Fl. Pakistan 143: 181. 1982. *Panicum pumilum* Poir., Encycl. Meth. Bot. Suppl. 4: 273. 1816. *Setaria pallide-fusca* (Schum.) Stapf & C.E. Hubb., Kew Bull. 1930: 259. 1930; C.E.C. Fisch.in Gamble, Fl. Madras: 1789. 1934 (Repr. ed. 3: 1239. 1957); Bor, Grasses Burma, Ceylon, India & Pakistan: 363. 1960; Banerjee & Pal, Bull. Bot. Surv. India 16(1–4): 72. 1974. *Panicum pallide-fusum* Schum., Beskr. Guin. Pl.: 58. 1827. *Setaria glauca* sensu Hook.f., Fl. Brit. India 7: 78. 1896. (PANICEAE)
Fl. & Fr.: May–December.
Notes: *S. pumila* is a polymorphic species, where the length of leaves and panicles show a gradation in variation.
28. *Sporobolus indicus* (L.) R. Br. var. *diander* (Retz.) Jovet & Guedes, Taxon 22: 163. 1973. *Agrostis diandra* Retz., Obs. Bot. 5: 19. 1789. *Sporobolus diander* (Retz.) P. Beauv., Ess. Agrostogr.: 26. 1812; Hook.f., Fl. Brit. India 7: 247. 1896; C.E.C. Fisch.in Gamble, Fl. Madras: 1817. 1934 (Repr. ed. 3: 258. 1957); Bor, Grasses Burma, Ceylon, India & Pakistan: 629. 1960; Banerjee & Pal, Bull. Bot. Surv. India 16(1–4): 72. 1974; Cope in Nasir & Ali, Fl. Pakistan 143: 136. 1982. (ERAGROSTIDEAE)
Fl. & Fr.: March–September.
Note: This grass is considered as a very good fodder.
29. *Stenotaphrum dimidiatum* (L.) Brongn, Duperr. Bot. Voy. Coquille: 127. 1831; C.E.C. Fisch.in Gamble, Fl. Madras: 1773. 1934 (Repr. ed. 3: 1228. 1957); Bor, Grasses Burma, Ceylon, India & Pakistan: 366. t. 41. 1960; Banerjee & Pal, Bull. Bot. Surv. India 16(1–4): 72. 1974. *Panicum dimidiatum* L., Sp. Pl.: 57. 1753. *Stenotaphrum glabrum* Trin., Fund. Agrost.: 176. 1820; Hook.f., Fl. Brit. India 7: 90. 1896. (PANICEAE)
Fl. & Fr.: June–March.
Notes: This prostrate perennial grass grows gregariously along the banks of streams and backwaters forming thick mats by sending numerous stolons with nodal roots. The spikelets of this curious species are hidden inside the flattened rhachis, just like the ‘Kangaroos’ hiding their cubs inside the pouches; hence it is popular as

'the Kangaroo Grass of Australia'. Since the leaf tips are blunt and rounded and the spreading culms give numerous, stoloniferous branches this species has now been extensively introduced in gardens as a very good lawn grass.

30. *Thysanolaena latifolia* (Roxb. ex Hornem.) Honda, J. Fac. Sci. Univ. Tokyo, Sect. 3, Bot. 3: 312. 1930; Mabb., Taxon 33(3): 437. 1984. *Melica latifolia* Roxb. ex Hornem., Suppl. Hort. Bot. Hafn.: 117. 1819; Roxb., Fl. Indica 1: 328. 1820. *Thysanolaena maxima* (Roxb.) O. Kuntze, Rev. Gen. Pl. 2: 794. 1891; C.E.C. Fisch.in Gamble, Fl. Madras: 1854. 1934 (Repr. ed. 3: 1244. 1957); Bor, Grasses Burma, Ceylon, India & Pakistan: 650. 1960; Banerjee & Pal, Bull. Bot. Surv. India 16(1-4): 72. 1974. *Agrostis maxima* Roxb., Fl. Ind. 1: 319. 1820. *Thysanolaena agrostis* Nees, Edinburgh New Philos. J. 18: 180. 1835; Hook.f., Fl. Brit. India 7: 61. 1896. (THYSANOLAENEAE)
Fl. & Fr.: September–December.

Notes: The inflorescence of this 'Tiger Grass' is extensively used for making brooms. Leaves are said to be of very great fodder value.

31. *Urochloa distachyos* (L.) T.Q. Nguyen., Novosti Sist. Vyssh. Rast. 3: 13. 1966. *Brachiaria subquadriflora* (Trin.) Hitchc. in Lingnan Sci. J. 7: 214. 1931; Bor, Grasses Burma, Ceylon, India & Pakistan: 286. 1960. *Panicum subquadriflorum* Trin., Gram. Panic.: 145. 1826. *Brachiaria miliiformis* (J. Presl) Chase, Contr. U.S. Natl. Herb. 22: 35. 1920; C.E.C. Fisch. in Gamble, Fl. Madras: 1769. 1934 (Repr. ed. 3: 1226. 1957); Bor, Grasses Burma, Ceylon, India & Pakistan: 283–284. 1990. *Panicum miliiforme* J. Presl, Reliq. Haenk. 1(4–5): 300. 1830. *P. distachyon* sensu

Hook.f., Fl. Brit. India 7: 37. 1896. (PANICEAE)
Notes: This species is nearer to *Brachiaria distachya*, but can be distinguished by the larger spikelets, longer leaves, more racemes and epaleate lower florets. It is a highly variable species.

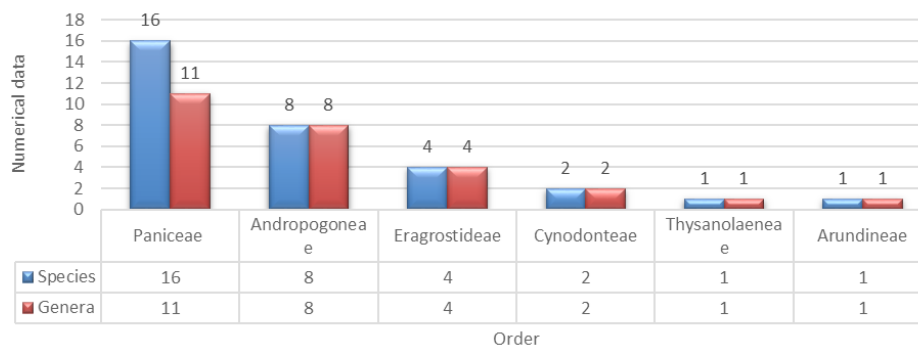
32. *Urochloa ramosa* (L.) T.Q. Nguyen, Novosti Sist. Vyssh. Rast. 3: 13. 1966. *Brachiaria ramosa* (L.) Stapf in Prain, Fl. Trop. Afr. 9: 542. 1919; C.E.C. Fisch.in Gamble, Fl. Madras: 1770. 1934 (Repr. ed. 3: 1226. 1957); Bor, Grasses Burma, Ceylon, India & Pakistan: 284. 1960; Banerjee & Pal, Bull. Bot. Surv. India 16(1–4): 76. 1974. *Panicum ramosum* L., Mant. Pl.: 29. 1767; Hook.f., Fl. Brit. India 7: 36. 1896. (PANICEAE)
Fl. & Fr.: March–September.

Notes: This grass is often associated with *Eleusine indica*. A highly variable species. The leaves show a gradation in their shape and size.

Results and Discussion

The present study resulted enumeration of 32 grasses from the garden under 27 genera belonging to 06 orders. Further it was observed that under order Paniceae there were 11 genera and 16 species followed by 08 genera and 08 species under Andropogoneae and 04 genera and 04 species under Eragrostideae, whereas Thysanolaeneae and Arundineae were represented by 01 genus and 01 species each. Under order Cynodonteae there were 02 genera and 02 species reported. However, earlier worker reported 71 grass species from the garden campus. The disappearance of the species may be due to change in microclimatic conditions coupled

Bar graph displaying the no. of genera and species under different orders of Grasses in AJCBIG



with the abrupt landscaping comparing to the earlier period and topographical variations as well.

Conclusion

Poaceae is an important family of plants playing significant role in the life of human beings and other animals. The economic importance of grasses lies in the paramount role as food: 70% of the world's calories come from grasses. A good number of grasses are cultivated for their grains. In terms of world production crops today, the first four are grasses: sugarcane, wheat, rice and corn. Several grasses are well-known for their rich fodder value. Grasses control erosion, make turf, form lawns and provide the major source for alcohol. For proper utilization of raw materials in a developing country like India, the need for basic economic surveys and assessment of the natural resource is often emphasized. To undertake such surveys and investigation, it is essential that the flora of the country should be well known and only when all the plants are correctly named, described and classified it would be possible to recognize useful or potential plants of economic value. The people all around the garden should be aware about the role of grasses and the magnificent role they plays in developing an ideal habitat for other plants to grow.

Acknowledgement

The authors are thankful to the Director, Botanical Survey of India, Kolkata for necessary help and facilities.

Conflict of Interest- None

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