

# SOME NEW RECORDS OF POACEAE IN MORADABAD DISTRICT OF ROHILKHAND REGION OF UTTAR PRADESH, INDIA

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**Abstract:** The extensive survey of grasses growing throughout the Moradabad district was carried out during 2011-2013. A total number of 62 species under 47 genera of grasses were collected and identified. In the present investigation nine genera namely *Arachne racemosa* (Heyne) Ohwi, *Arundo donax* L., *Bambusa arundinacea* Willd., *Cymbopogon citratus* (DC) Stapf., *Hygroryza aristata* (Retz.) Nees., *Iseilema laxum* Hack, *Leersia hexandra* Sw., *Thysanolaena maxima* (Roxb) O.Kuntz and *Urochloa panicoides* P. Beauv., three species of *Eragrostis* namely *E. diarrhea* (Schult.) Steud., *E. japonica* (Thumb) Trin., *E. tenella* L., one species of *Digitaria*, (*D.setigera* Roth ex Roem. et Schult.), one species of *Saccharum* (*S. bengalense* Retz.) and one species of *Sporobolus* (*S. marginatus* Hochst. ex A. Rich.) have been recorded for the first time from the study area which have not been listed by Paliwal and Singh (1982).

**Keywords:** Grasses, Moradabad, Poaceae family

## INTRODUCTION

The value of grasses to mankind has been recognized since very early times. The cultivation of cereal grasses dates back to a period when man was emerging from the nomadic stage. The extent to which man's evolution and present position of domination in the biological world has been affected by grasses is an interesting point of speculation. Most civilization have developed in grassland regions and it is probable that were it not for the abundance and widespread distribution of grasses, the human population of the world would not have attained its present level. The grasses are well known for their multipurpose value to the living world. They belong to a very natural, highly evolved and distinctive family Poaceae of flowering plants (Singh, 2007). The grasses have a wide range of distribution occurring in almost all types of habitats and mostly prefer to grow in open places rather than the shady places. The family Poaceae is also one of the most important families to mankind. They are directly consumed as food by human beings or indirectly through the animal products. The role of grasses as soil-binders is too well known to need any elucidation. Grasses like Bamboo are also used as building materials, for making baskets, brooms and for thatching roofs. In fact, the discussion on practical utility of grasses can be limitlessly voluminous. Among flowering plants Poaceae, with their 10,000 species and 620 genera is the fourth largest family of the flowering plants (Mathew, 2014).

Moradabad district (28° -21' to 28° -16' N latitude and 78° -4' to 79° E longitude) is a part of the Ganga-Ramganga doab of Rohilkhand region in U.P. It covers an area of 3493 sq. km. with the elevation of 186 meters above the sea level. The maximum and minimum atmospheric temperatures are 42.2°C and

4°C respectively. The average rainfall varies between 800 to 1000 mm. The relative humidity is up to 90% in monsoon season and in drier part of the year it decreases to less than 20%. The soil of Moradabad is clayey loam and silty loam. Khadar and Bhur tracts are also present in the area. There are a few sporadic references of the collections of angiosperms from Moradabad by T. Thomson and H. B. Naithani in the *Flora of Upper Gangetic Plain and the adjacent Siwalik and sub Himalayan tracts* (Duthie, 1903-1929) and *Supplement to the Flora of Upper Gangetic Plain* (Raizada, 1976) respectively. Thereafter a paper title *A contribution to the Angiospermic flora of Moradabad District* was published by Paliwal and Singh (1982) in which they recorded 47 species under 38 genera of grasses. Considering the importance of grasses and taxonomic curiosity an attempt has been made to enumerate grasses of Moradabad district of Rohilkhand region of Uttar Pradesh.

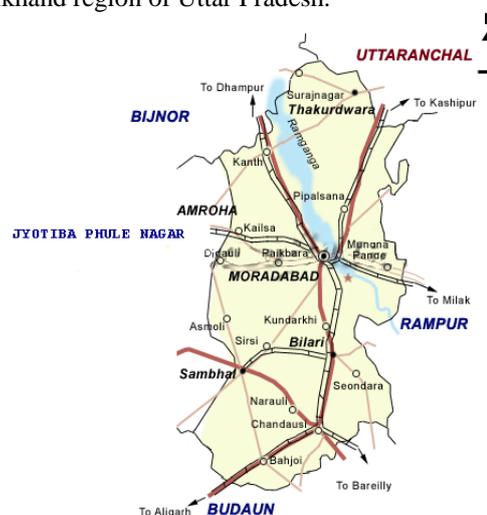


Fig.1. Map of Moradabad

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## MATERIAL AND METHOD

During the present study an extensive survey of grasses of Moradabad district of Rohilkhand region of Uttar Pradesh was undertaken for four years (2011-2013). All the grasses growing over the entire study area were collected in all the seasons during the survey. Among grasses, the leaves branches and inflorescence of different species of the same genera look very much alike in appearance to the naked eye and are liable to be passed unnoticed, thinking them one and the same species. So during the collection of grasses a closer examination of each and every sample was made with the help of hand lens. An effort was always made to dissect and identify the grass specimens soon after they were brought to the laboratory. *Flora of Delhi* by Maheshwari (1963), *The Grasses of the Upper Gangetic Plain* by Raizada et al. (1961 & 1966), *The Grass Flora of India* by Jain (1986), *Common grasses of Meerut* by Singh (1971), *Grasses of Kumaon and Garhwal divisions and Dehradun Dist.* by Mishra and Joshi (1974), *Herbaceous Flora of Dehradun* by Babu (1977), *Additions to Grass flora of India* by Jain and Srivastava (1988), *The Grasses of Uttar Pradesh* by Uniyal et al. (1994), *Sedges & Grasses of Eastern Uttar Pradesh* by Singh (2007) have been consulted for identification of species. All specimens were deposited in the Herbarium, Department of Botany, Hindu College, Moradabad (U.P.). In all cases, however the identification of grasses was finally confirmed by matching them in the herbarium of the FRI Dehradun and BSI Allahabad.

### Enumeration

#### *Arachne* Wt. et. Arn.

*Arachne racemosa* (Heyne) Ohwi, GBCIP.487. *Eleusine verticillata* Rox. FBI.7:295; FD.391.

Simple or branched, annual with tufted culms, erect, 30-60 cm. high grass. Leaves 16-25 x 1.2 – 1.5 cm. linear, lanceolate, acuminate, margins. Subdenticulate. Spikes generally 6-20, scattered or whorled, suberect with numerous close spikelets. Spikes generally 6-20, scattered or whorled, suberect with numerous close spikelets. Spikelets shining, 6-12 Flowered, 4-6 2-3 mm. closely imbricate, biseriate. Glumes broadly ovate, acuminate, unequal. Lemmas glabrous, acuminate, keeled. Grains grooved, oblong, rugose.

Flowering and fruiting: July-Oct.

Field notes – Abundantly found in open waste places, along road sides, railway line & in the cultivated fields.

Locality – Meerpur. Local Name – Makra. (Specimen no. Bk.964)

#### *Arundo* Linn.

*Arundo donax* Linn. FBI.7:302; GBCIP. 413; FD.373.

A tall 3-5 m. high perennial, large grass with creeping rhizome. Culms stout, hollow, many noded, smooth and glabrous. Leaves lanceolate. 30-60 x 2.5 cm. glabrous, acuminate. Inflorescence a large, erect, 40x60 x10 cm. terminal plumose, panicle. Spikelets palebrown or purplish. 1-1.5 cm long, 2-5 flowered. Rachilla and glumes more or less glabrous. Lemmas 2-toothed. 7-nerved, acuminate, long, hairy on the back in the lower half. Paleas 2-keeled, ciliate on keels. Stamens-3.

Flowering and fruiting: Sept-March.

Field notes – Common along the banks of rivers and marshy places.

Locality – Gagan Area. Local Name –Nurhal. (Specimen no. Bk. 694)

#### *Bambusa* Schreb. nom. cons.

*Bambusa arundinacea* Willd. Sp. Pl. 81. 1753. HFD.588; FBI.7:395; *Arundo bambusa* Linn.

A tall, upto 25 m high thorny with erect to drooping, crowded bright green culms. Culms sheaths 20-30x12-20 cm. rounded at apex, blade triangular when flattened out, covered thickly with golden hairs on the back when young, glabrous within. Leaves 17.5-2.0 x 2-5 cm. linear or linear- lanceolate, glabrous above, glabrate beneath, margins scabrid, tip sharp, stiff. Inflorescence an enormous panicle. Spikelets lanceolate, acute, nearly 5 in a cluster with 1-3 glumes, 3-6 bisexual lemmas followed by 1-3 male ones, 1-3 barren ones. Lodicules-3, fimbriate, small. Stamens drooping, slender, anthers obtuse. Grain with short beak formed by the style base. Flowers rarely in the area.

Field notes – Planted in private gardens as ornamental.

Locality – City Area. Local Name –.Baans (Specimen no. Bk.742)

#### *Cymbopogon* Spreng.

*Cymbopogon citratus* (DC) Stapf. MGWL. 43; *Andropogon citratus* DC. Cat.Hort. Monsp.78.1813.

An aromatic, perennial green, stout with leafy sterile shoots from a short rhizome. Culms erect, more or less 2 m. tall. Leaves long, alternate towards the base, tapering upwards to a setaceous point, 60-90 x0.6-1.6 cm. glabrous, scabrid at apex and oblong the margins, midrib slightly stout below, whitish on upper side, generally 30-60 cm. long.

Flowering and fruiting: Jan -March.

Field notes -Cultivated in private gardens for its aromatic leaves.

Locality – City Area. Local Name –Lemon grass (Specimen no. Bk. 654)

#### *Digitaria* Heist ex Febricius

*Digitaria setigera* Roth ex Roem. et Schult. Syst. Veg. 2: 474. 1817. GBCIP. 305. 1960; Veldkamp. in Blumea 21. 37. 1973 var. *setigera*. *Paspalum sanguinale* Lamk. var. *puriens* Hook. FBI. 7: 15.

1897. - *Digitaria microbahnae* (Presl.) Henr. in Meded. Rijks. Herb. 61: 13. 1930.

An erect or decumbent-ascending, tufted annual. Nodes glabrous. Leaves linear-lanceolate, 0.5–1 cm broad. Sheath with spreading long white hairs. Spikes 4–8, subdigitate, 6–10 cm long, densely pubescent, rachis scabrid. Spikelets 2 nate, elliptic, glabrous, acute, 0.25–0.3 cm long, shortly pubescent on the margins and lateral interspaces. Pedicel 0.18–2 cm long. Lower glume absent. Upper glume 3 nerved, obtuse, 0.05–0.08 cm long. Lower lemma lanceolate, hairy, 5-nerved.

Flowering and fruiting: July–Nov.

Field notes –Common in agricultural fields, waste places and along road sides.

Locality – Manoharpur. Local name: Kiwai (Specimen no. BK. 541)

### ***Eragrostis* Beauv.**

*Eragrostis diarrhea* (Schult.) Steud. GBCIP. 507. 1960. - *E. interrupta* var. *koenigii* Stapf. ex Hook.f. FBI.3:316. FD. 386.

A slender tufted perennial grass with culms from geniculate and ascending base. Leaves flat, narrow and glabrous. Panicles long, narrow, contracted with many subwhorled speculate branches and Panicles look like lobed structures. Spikelets 1-4 mm. long, minute, purplish or pinkish in color, ovate to linear, rachilla joined between the flowering glumes. Lemma obtuse. Grain obovoid.

Flowering and fruiting: Aug. – Dec.

Field notes –Commonly found in damp waste places.

Locality – kanth road. Local name: Lampa (Specimen no. BK. 541)

*Eragrostis japonica* (Thunb.) Trin. In Mem. Acad. Sci. Petersb. Ser. 6, 1: 405. 1830; *Poa japonica* Thunb. Fl. Jap. 51. 1785. - *Diandrochloa japonica* (Thunb.) Henry - BBSI. 9: 290. 1967. HFD.612., GBCIP. 509. 1960. - *E. enterrupta* var. *tenuissima* Stapf. ex Hook.f. FBI. 7: 316. 1896.

An erect or decumbent-ascending, tufted, up to 60 cm tall, annual with glabrous nodes. Leaves 15–20 x 0.3–0.4 cm. scabrid. Ligule a ciliate rim. Sheaths glabrous. Panicles long, loose, lanceolate-oblong in outline, green or purplish, 15–23 x 2–4 cm; branches in whorls or clusters, divided from the base. Spikelets ovate, purplish, 0.12–0.15 x 0.1 cm, compressed, 4–6 flowered. Pedicel scabrid, 0.2cm long. Glumes subequal, ovate-oblong, 1-nerved. Lemma ovate, obtuse, 3-nerved. Palea equalling the lemmas, smooth keeled. Stamens three. Caryopsis brown, obovoid.

Flowering and fruiting: Oct – March

Field notes–Common in dry rice fields and adjacent waste lands.

Locality – Thakurwdara. Local name: not known (Specimen no. BK. 664)

*Eragrostis tenella* (Linn.) P. Beauv. ex Roem. ex Schult. Syst. Veg. 2: 576. 1817; GBCIP. 513; GUGP.

3: 89. - *Poa tenella* Linn. Sp. Pl. 69. 1753. – *E. tenella* var. *plumosa* Hook. f. FBI. 7: 315.FD.386.

A decumbent- ascending, 10–20 cm tall, densely tufted annual. Leaves 8–10 x 0.3–0.5 cm, linear, acuminate, scabrid. Ligule a scarious rim. Sheaths glabrous. Panicles 10–12.5 x 3–4 cm, plumose, usually open, flexuous or contracted, oblong with spreading branches. Spikelets 0.4 cm long, linearoblong, greenish-purple, 4–6 flowered. Pedicel scabrid with a minute circular gland pit. Involucral glumes, subequal, 1-nerved. Lemma ovate-oblong, obtuse, 3-nerved. Paleas deciduous, keel scabrous. Rachilla glabrous, persistent. Stamens 3. Grain oblanceolate-oblong. Flowering and fruiting: July – Dec.

Field notes -Very common in grassy fields, gardens and moist placecs.

Locality – Kanth road. Local name: not known (Specimen no. BK. 553)

### ***Hygrolyza* Nees**

*Hygrolyza aristata* (Retz.)Nees ex Wight et Arn. in Edinb. new phil. J. 15: 380. 1833. FBI. 7: 95; GBCIP. 567, f. 67.

Floating, perennial glabrous grass. Culms 30 cm spongy with whorled feathery roots at nodes. Leaves 3-8 x 0.6-1.8 cm ovate oblong, base rounded. Sheaths inflated. Panicles 3-6 cm long with few bisexual pedicellate spikelets. Glumes absent. Floral glumes awned. Lemma 5 nerved, 6-7 mm narrow lanceolate with 1.3 cm long scabrid awn. Palea awnless. Stamen 6. Grain oblong

Flowering and fruiting: Oct – April.

Field notes -Commonly found in the margins of the ponds.

Locality – Shahpur tigr. Local name: not known (Specimen no. BK. 201)

### ***Iseilema* Anders.**

*Iseilema laxum* Hack. in DC. Mon.Phan.6:682.1889, FBI.7:218. FD.369;

A perennial, erect, decumbent ascending or prostrate grass. Leaves linear, glabrous, purplish or green, margins scabrid, sheaths lax. Inflorescence interspersed with spath like bracts. Spikelets arranged in long, narrow, racimiform panicle of distant, axillary, pedunculate fascicled. Involucral spikelets whorled, pedicellate, mall or neutral. Pedicelled spikelets born on very slender pedicels, mall or neutral resembling the involucral. Sessile spikelets 2-sexual, upper floral glune reduced to an own.

Flowering and Fruting: Sept–Dec.

Field notes: Commonly found in wet places.

Locality: Kanth. Local name: not known (Specimen no. Bk).

### ***Leersia* Swartz**

*Leersia hexandra* Sw., Prod. Veg. Ind. Occ.21. 1788. *L. hexandra* ssp. *grandiflora* (Döll) Roseng., B.R. Arrill. & Izag.

An aquatic perennial grass which grows from 30 cm to 1 m high, rhizomes elongate; culms 25-150 cm long, decumbent, rooting at the nodes, sheaths coarsely scabrous-hispid to glabrous, ligule truncate, 1-6 mm long, auriculate; The leaves 30 cm long, flat, coated with rough hairs, spikelets flattened, ridged, keeled, 1-flowered; greenish or purplish, flowers 3/16, panicles narrow, terminal, 5-15 cm long, exerted, branches 3-13 cm long, filiform, ascending to somewhat spreading in more robust forms. Culms 25-150 cm long, decumbent, glabrous to coarsely scabrous near the nodes; blades 5-25 cm long, 3-5 mm wide, scabrous to nearly glabrous above and beneath. Lemma acute to acuminate, ciliate (to 0.6 mm long), stamens 6, anthers 2-3 mm long; pistil about 2.5 mm; caryopsis usually not seen.

Flowering and fruiting: June- Sept.

Field notes: A very common grass in moist situation in paddy fields and near ponds. Locality: Thakurdwara. Local Name: not known (Specimen no. Bk.115).

#### **Sachharum Linn.**

*Saccharum bengalense* Retz. Obs. Bot. 5: 16. 1789. GBCIP. 211 *S. munja* Roxb. *S. arundinaceum* Hook.f. FBI. 7: 119. 1789) - *Erianthus munja* (Roxb.) Tesweit, Raizada *et al.* Ind. For. Rec. (Bot.) 4: 186.

A large, tufted, perennial, up to 3 m. tall. Culms solid. Leaves linear, acuminate, scabrid on margins, 2.5 cm broad. Sheath hairy on margins. Ligule ciliate rim. Panicle plumose, 30-60 cm. long, with whorled branches. Joints and pedicels ciliate. Sessile spikelets, lanceolate, acute, 0.5-0.6 cm long, 2-nerved. Upper glume acuminate, glabrous, ciliate on keel. Lower lemma empty, epaleate, acute. Upper lemma hermaphrodite, epaleate. Pedicelled spikelets, similar to sessile spikelets. Stamen - 3.

Flowering and fruiting: Oct. - Dec.

Field notes: Common along river banks.

Locality: Gagan area. Local name: Munja (Specimen no. BK.601)

#### **Sporobolus R. Br.**

*Sporobolus marginatus* Hochst. ex A. Rich. Tent. Fl. Abyss. 2: 397. 1851. Bor. Grasses. Ind. 632. FD.404.

An erect perennial grass with a woody base. Flowering branches stout or slender, 15-60 cm tall. Leaves narrow, flat and minutely ciliate. Panicles pyramidal, open, branches whorled, horizontally ascending. Spikelets minute, 2x1 mm, spindle shaped, 1-flowered, crowded and subsessile at the ends of branches. Lower involucre glume much shorter than the upper, nerveless. Floral glume ovate, 1-nerved. Paleas hyaline, often splitting from the middle.

Flowering and Fruiting: May - Oct.

Field notes: Common in roadsides and in dry habitats.

Locality: Lodipur. Local name: not known (Specimen no. Bk.647).

#### **Thysanolaena Nees**

*Thysanolaena maxima* (Roxb) O.Kuntz HFD. 650; GBCIP:650; *Agrostis maxima* Roxb. Fl. Ind. Carey & wall. 1:319, 1820. FD.372; *T. agrostis* Nees FBI. 7:61.

A perennial, handsome grass; Culms rounded, reed like, erect or ascending, 2.5 - 3.5 m. tall with glabrous nodes. Leaves large, broad, lanceolate, narrowed into an acuminate apex, base semi amplexicaul, 30-60x5-7cm. glabrous. Panicles effuse, glabrous, decumbent, 35-60 cm. long with filiform branches. Spikelets greenish or purplish, 2-flowered, 1-2 nate, minute, elliptic, lanceolate, acuminate, pedicellate. Involucral glume hyaline, sub equal. Lower floral glume empty, lanceolate, upper hermaphrodite, ovate, ciliate with erect, white, long hairs, stamens 2 or rarely 1.

Flowering and fruiting: Nov - Feb.

Field notes: Planted as ornamental grass in the gardens.

Locality: MDA Colony. Local name: not known (Specimen no Bk. 642).

#### **Urochloa P. Beauv.**

*Urochloa panicoides* Beauv. Ess. Agrost. 53. t. 11. f.1. 1812. *Panicum javanicum* Hook.f. *U. panicoides* var. *pubescens* (Kunth) Rev. Gram. 1:31. 1829. GBCIP. 372. 1960. FD.396.

A tufted, 30-60 cm tall, annual. Culms geniculately ascending, rooting at base. Leaves 4-9 cm long, ovate, lanceolate, finely hirsute, margins crisped, ciliate. Sheath densely ciliate upwards. Raceme dense, 2-seriate, 2.5-4.5 cm long, rachis flat on back, triquetrous. Spikelets ovate to elliptic-oblong, 0.4 cm long, pubescent. Lower glume ovate-rounded, obtuse, 5-nerved, away from the rachis. Upper glume glabrous, 9-nerved. Lower lemma empty or male. Upper lemma hermaphrodite, transversely rugose. Caryopsis 0.2 cm long, rotundate, elliptic.

Flowering and fruiting: Aug. - Oct.

Field notes: Commonly seen along roadsides, in fields and gardens.

Locality: MDA Colony. Local name: not known (Specimen no. BK. 641)

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