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Research Paper

A TAXONOMIC REVISION OF THE GENUS *Iseilema* ANDERSSON (POACEAE) IN INDIA

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Abstract

A detailed work on genus *Iseilema* archives all names published in a concise nomenclatural & taxonomical review. It is derived from the tribe *Andropogoneae* with specific limitations. Detailed taxonomic information & descriptions of all taxa and photo plates have been provided for easy identification.

Key words: *Andropogoneae*, Endemic, India, *Iseilema*, Revision.

INTRODUCTION

The genus *Iseilema* Andersson (1856) is represented by about 26 species and is chiefly distributed in Tropical Asia to Australia (Clayton *et al.* 2006 & 2019). The genus is characterized by a compound panicle, racemes bearing three heteromorphous spikelets, four pedicelled involucral spikelets at the base (male), one sessile spikelet (female or bisexual) and two pedicelled spikelets (male or not) (Clayton & Renvoize 1986). In India, it is represented by about 8 species (Bor 1960; Kabeer & Nair 2009; Chandramohan *et al*, 2020). It is closely resembled with genus *Themeda* but distinguished in having pedicelled involucral spikelets.

The genus name is derived from “isos” means equal and “eilèma” means involucre. At first, Andersson N.J. (1856) described the genus *Iseilema* from tribe *Andropogoneae* based on characters as continuous panicles, racemes bearing three heteromorphous spikelets, four pedicelled involucral spikelets at the base, one sessile spikelet with awn and two pedicelled spikelets in his book *Nova Acta Regiae Societatis Scientiarum Upsaliensis.* The first species was *Andropogon prostratus* L. (1771) based on a Köenig collection from India (Linneus described 1211.8), now *Iseilema prostratum*. Later,

Steudel (1854) described *Anthistiria argutum* from Burma, now *Iseilema argutum* (Nees ex Steud.) Andersson. Andersson (1856) described four species. Hackel (1889) reported five species in his work. Over the years, other species were described, forming a range from Tropical Asia to Australia. Of them, ca. 14 species are native to Australia, 6 species are native to India. In India, the genus has 8 species, of them 3 species are very common and remaining are very rare and restricted to type locality.

While assessment of forest resources in some states of Peninsular India since 2018, authors have collected *Iseilema* species from different regions. Many researchers were failed to distinguish species within genus due to range of variability. Though, there is no consequence studies on the genus in India. The present study is a comprehensive treatment of genus *Iseilema* in India based on relevant literature, specimens deposited in Indian herbaria and live collections. The detailed description and key of all species are provided here for easy identification. Specimens were deposited in Herbarium of Botanical Survey of India, Deccan Regional Centre, Hyderabad (BSID).

MATERIALS AND METHODS:

Specimens were collected through field trips in Peninsular India and herbarium specimens were examined. Identification was confirmed after consulting types, protologues, earlier published literature.

SYSTEMATIC TREATMENT:

Iseilema Andersson, Nova Acta Regiae Societatis Scientiarum Upsaliensis, ser. 3, 2: 250. 1856.

Lectotype: *Iseilema prostratum* (L.) Andersson, designated by Roberty (1960: 99).

Herbs; annuals or perennials; culms slender, compressed, many noded; nodes glabrous or bearded. Leaf sheaths compressed, keeled, shorter than the internodes; ligule short, membranous; leaf blades linear to lanceolate, with rounded equilateral base. Inflorescence a loose or dense panicles, terminal or axillary, subtended by spathe and spatheole, usually occupying most of the stem; spatheoles boat-shaped, acute, compressed, more or less herbaceous on the back, many nerved, with scarious margins; racemes fascicled or clusters, solitary at the apex of the stem and branches, articulate

with the peduncle below the lowest spikelets, at length all falling away from it. Racemes with three heteromorphous spikelets, lower four involucral spikelets (male or neuter), one sessile spikelet (female or rarely bisexual) and two pedicelled spikelets (male or empty). Involucral spikelets awnless, pedicellate; pedicels short, flattened. Sessile spikelets female or bisexual, awned, short stipitate. Pedicellate spikelets on long slender pedicels, similar to the involucral. As remarked by Hackel (Monog. Andropog. p. 679) the dispersion of the spikelets of *Iseilema* is by the wind carrying away all the spikelets in a body, whereas in *Themeda* the bisexual glumes alone disarticulate and are probably carried away by adhesion to the coats of animals.

Distribution: ca. 26 species distributed in Tropical Asia to Australia.

Key to the Indian Taxa:

1.	Pedicels of involucral spikelets as long as broad	2
-	Pedicels of involucral spikelets longer than broad	4
2	Pedicelled spikelets much reduced in to scales	*Iseilema hubbardii*
-	Pedicelled spikelets developed, male, rarely barren	3
3	Sessile spikelets shorter than involucral spikelets	*Iseilema venkateswarlui*
-	Sessile spikelets as long as involucral spikelets	*Iseilema anthephoroides*
4	Keels of spathe, spatheole & spikelets without tubercled glands	5
-	Keels of spathe, spatheole, spikelets with tubercled glands, reddish	6
5	Annuals; leaf blade 5-15 cm long; sessile spikelets 3 x 0.5 mm, upper glume shortly mucronate at apex	*Iseilema jainianum*
-	Perennials; leaf blades 5-35 cm long; sessile spikelets 5-5.5 x 0.8-1 mm, upper glume beaked, acuminate at apex	*Iseilema hackelii*
6	Peduncles often exserted beyond spatheole; sessile and involucral spikelets more or less equal	*Iseilema prostratum*
-	Peduncles short, inserted in spatheole; sessile and involucral spikelets unequal	7

7	Clusters of spikelets in globose fascicles; upper glume of Involucral spikelets 3-nerved, wings hairy; Sessile spikelets ca. 5 mm long; lower glume granulate on keels	*Iseilema holei*
-	Clusters of spikelets not in globose fascicles; upper glume of Involucral spikelets 1-nerved, wings glabrous; Sessile spikelets 3–3.5 mm long;lower glume glabrous	*Iseilema kunhikannanii*

Iseilema anthephoroides Hack. in DC. Monogr. Phan. 6: 683. 1889; Hook. *f*., FI. Brit. India 7: 219. 1896; Blatt. & McCann, Bombay Grass. 112. 1935; Bor, Grass. Burma Ceylon India Pakistan 187. 1960; Henry *et al*., Fl. Tamil Nadu Ind., Ser. I: Analysis 124. 1989; Shetty & Singh, Fl. Rajastan 3: 1069. 1993; Saxena & Brahmam, Fl Orissa 4: 2403. 1995; Naik, Fl. Marathwada 1055. 1998; Yadav & Sardesai, Fl. Kolhapur District, 590. 2002; Kabeer & Nair, Fl. Tamil Nadu: Grasses. 445. 2009; Potdar *et al*., Grasses Maharashtra 209. 2012; Pullaiah, Fl Telangana 3: 1140. 2015; Pullaiah *et al*., Fl Andhra Pradesh. 5: 2211. 2018; Lakshminarasimhan *et al*., Fl. Karnataka 3: 710. 2019 (**Plate 1A & Plate 2**).

Type: India, Patna, Wall. 8767 A (Lectotype: K!-Acc. no. K000245990).

Annuals; Culms erect to decumbent, tufted, compressed, up to 40 cm tall; nodes glabrous; internodes pale yellow. Leaf sheath compressed, 2-6 cm long, glabrous; ligule short, ciliate, membranous, 0.3-0.5 mm long; leaf blade flat, linear to ovate or oblong to lanceolate, 3-12 x 0.3-0.6 cm, glabrous or sparsely pilose, margins tubercle based hairy towards base, acute or obtuse at apex, leaves at times clustered at the base. Inflorescence of false panicles, 8-14 cm long, subtended by spathe and spatheole; consists four male involucral spikelets surrounding sessile spikelet accompanied by 2 male pedicelled spikelets. Spikelets enclosed partly or sometimes wholly in spathe; spatheole oblong to elliptic, concave, 0.8-1.3 cm long, 1-keeled, without tubercles, glabrous or rarely tubercled hairy. Peduncle of cluster very short. **Involucral spikelets** narrowly ovate to elliptic or oblong to lanceolate, 5.5-7 x 1.0-1.5 mm, acute to acuminate at apex, awnless, pedicelled; pedicels as long as broad, 1-1.2 x 1-1.2 mm, flattened, sparsely hairy on the margins, form a short at apex. Lower glume membranous, narrowly ovate to lanceolate or elliptic, 5.5-7 x 1.0-1.5 mm, margins narrowly inflexed, 2- keeled, keels covered by tubercle based hairs, 5-7 nerved, chartaceous, brownish, acute at apex. Upper glume hyaline, narrowly elliptic to oblong, 5-6 x 1.0-1.2 mm, margins narrowly inflexed, chartaceous, 3-nerved, acute at apex.

Lemma oblong, 1-1.1 mm long, acute at apex or sometimes minute. Stamens 3, anther 1.5-3 mm long, yellowish brown; filaments hyaline. **Sessile spikelet** female or bisexual, narrowly ovate, 5-7 x 1-1.2 mm, acuminate, awned, short stipitate; callus short. Lower glume coriaceous, ovate to elliptic up to middle and long beaked towards the apex, 5-6.5 x 1-1.2 mm, yellowish, margins inflexed, 5-nerved, scabrid on nerves, hairy in lower portion. Upper glume membranous, narrowly ovate, 4.8-6.2 x 0.8-1 mm, chartaceous, margins incurved, 3-nerved, glabrous, acute to acuminate at apex. Lower lemma hyaline, ovate to oblong-lanceolate, 2.5-3 x 0.8-1 mm, nerveless, muticous at apex. Upper lemma 1.2-3 mm long, reduced to a hyaline base of 12-20 mm long with geniculate awn; column 1-2.2 mm, twisted, finely serrulate. Stamens 3, anthers 2.8-3 mm long. Ovary oblong, 0.5-0.6 mm long, acute at apex; style 3 mm long; stigma plumose, 0.8-3 mm, purplish. Caryopsis 2.3-2.5 x 0.7-0.8 mm, ellipsoid. **Pedicelled spikelets** male or barren, oblong to lanceolate, sometimes reduced to short, empty, 3.5-4 x 0.8-1 mm, acute to acuminate, chartaceous, yellow, pedicelled; pedicels 3.5-5 mm long, more or less scabrid. Lower glume oblong to lanceolate, 3.2-3.8 x 0.8 mm, acute to acuminate apex, chartaceous, 5-7 nerved, finely scabrid above the middle ob dorsal surface, margins incurved, hyaline. Upper glume ovate to elliptic, ca. 3 x 0.8 cm, acuminate at apex, membranous, 3-nerved, margins incurved.

Flowering & Fruiting: July - November.

Habitat: Common in marshy localities, along water courses, forest paths & grass lands.

Distribution: Endemic to India: Andhra Pradesh, Bihar, Chhattisgarh, Daman & Diu, Gujarat, Karnataka, Kerala, Madhya Pradesh, Maharashtra, Odisha, Mizoram, Rajastan, Tamil Nadu, Telangana, West Bengal.

Specimens examined: India (**Andhra Pradesh**, Vishakapatnam, Shrungavarapukota, 4th September, 1960, *N.P. Balakrishnan* 11031 (CAL), Srikakulam, 8th September, 1962, *N.P. Balakrishnan* 1504 (CAL), Ananthpuram, Batrepalli, 14th February, 2009, *B.V. Ravi Prasada Rao* 37066 (BSID), Vijayawada, open places near agriculture fields, 11st January, 2020, *Chandramohan* KCM 105 (BSID); **Chhattisgarh**, Dhamtari Forest Division, Kekra Khali, 28th December, 2019, *Chandramohan* KCM 101 (BSID); **Gujarat**, Jambusar, Mural village, agriculutal field bunds, 01st December, 2019, *Chandramohan* KCM 102 (BSID); **Karnataka**, Tumkur dist., 24th October, 1979, *S.R. Ramesh* KFP 9767 (CAL); **Kerala**,

Palaghat dist., Walayar Dam site, 11st July, 1963, *Joseph* 17105 (CAL); **Madhya Pradesh**, Sidhi, Gandhigram, 22nd October, 1962, *Panigrahi* 5659 (CAL), Indore, Sardarpur, 12nd September, 1964, *Arora* 5869 (CAL), Narsighpur, on the way Nagrsingpur to Shahpur, agriculture bunds, 21st February, 2020, *Chandramohan* KCM 104 (BSID); **Maharashtra**, Khandala forest, Wasim to Pusad road, 01st September 1963, *R.S. Rao* 90976 (BSI), Solapur dist, near Nannaj, Mardi, 16th September, 2010, *Jayanthi & S.C. Yadav* 198026 (BSI), Pandharpur, Inspection bunglow compound, 26th October, 1963, *R.S. Rao* 090568 (BSI), Nagpur-Chandapur road, 07th September, 1963, *R.S. Rao* 091262 (BSI), Lavala/Khairgaon 16/4-17 mile point 22nd September, 1963, *R.S. Rao* 092144 (BSI), Poona dist., Law college Hill top, 29th August, 1960, *K.N. Subramanian* 064608 (BSI), On the way to Chipodi forest range, 18th September, 1963, *R.S. Rao* 091763 (BSI), Osmanabad, 28th August, 1963, *R.S. Rao* 090767 (BSI), Sahajad, 20th July, 1957, *S.D. Mahajan* 026738 (BSI), Akola dist., 22nd August, 1997, S.Y. Kamble 149426 (BSI), Saptarsingi, 10th September, 1966, *R.D. Pataskar* 101230 (CAL), Subapur road, 14th mile, 02nd October, 1956, *Puri* 7427 (CAL), Ambazari Biodiversity Park, Nagpur, 15th July, 2019, *Chandramohan* KCM 103 (BSID); **Mizoram**, Mamit dist., 3rd April, 2011, *Soumyashree Pathak* 48485 (CAL); **Odisha**, Sudargarh dist., Kunchpani, 23rd November, 1987, *D. Namhata* MN2665 (CAL), Satkosia Tiger Reserve, Purunakote, 6th September, 2014, *KC Mohan* 5183 (BSID), Balugaon, Chilika, 13th February, 2012, *Alok Chorghe* 2498 (BSID), Ganjam, Balipadar, 19th August, 2013, *Alok Chorghe* 10219 (BSID), Satkosia Wildlife Sanctuary, Tikarpada, 3rd November, 2011, *Alok Chorghe* 2398 (BSID), Angul, Mandagiri hills, 3rd November, 2011, *Alok Chorghe* 2372 (BSID); **Rajastan**, Chittorgarh, orai dam site, 13th December, 1963, *D.M. Verma* 1682 (CAL); **Tamil Nadu**, Tanjavur dist., Mannarguda, 13rd September, 1977, *K. Ramamurthy* 51196 (CAL), Ramananthapuram, Karraikkudi, 28th November, 1977, *N.C. Nair* 51788 (CAL); **Telangana**, Hyderabad, Borabanda to Hitech city, 23rd August, 2007, *V. Sampath kumar & K. Chandra* 000337 (BSID), Khammam, Koriguttalu, 19th October, 1995, *R. Rajan* 106034 (BSID); **West Bengal**, *S. Kurz* Acc. No. 533046 (CAL).

Note: It is a very good fodder grass. It grows usually on open grounds, forming mat like structures. It is easily distinguish in having peduncle short, enclosed in spathe or spatheole; pedicels of involucral spikelets as long as broad.

Iseilema hackelii Shrestha & Gandhi in Harvard Pap. Bot. 13(2): 295. 2008. *Iseilema laxum* Hack. in A.DC. & C.DC., Monogr. Phan. 6: 682. 1889 non Hack. 1888; Hook, *f*., FI. Brit. India 7: 218. 1896; Cooke, FI. Presi. Bombay 3: 516. 1958 (Repr. ed.); Blatt. & McCann, Bombay Grass. 113. 1935; Bor, Grass. Burma Ceylon India Pakistan 188. 1960; Henry *et al.*, Fl. Tamil Nadu Ind., Ser. I: Analysis 125. 1989; Shetty & Singh, Fl. Rajastan 3: 1069. 1993; Saxena & Brahmam, Fl Orissa 4: 2404. 1995; Naik, Fl. Marathwada 1056. 1998; Murthy & Panigrahi, Fl. Bilaspur district, 72. 1999; Yadav & Sardesai, Fl. Kolhapur District, 590. 2002; Kabeer & Nair, Fl. Tamil Nadu: Grasses. 447. 2009; Potdar *et al*., Grasses Maharashtra 210. 2012; Pullaiah, Fl Telangana 3: 1141. 2015; Pullaiah *et al*., Fl Andhra Pradesh. 5: 2212. 2018; Lakshminarasimhan *et al*., Fl. Karnataka 3: 711. 2019 (**Plate 1B, C & D & Plate 3**).

Type: India, Patna, Wallich, N. 8767 B (Lectotype: K!-Acc. no. K000911779).

Perennials; Culms erect, tufted, compressed, 20-120 cm high, sparingly branched, glabrous; nodes glabrous. Leaf sheath compressed, 2-8.5 cm long, keeled, glabrous; ligule short, hairy, membranous; leaf blade flat, linear to lanceolate or ovate to lanceolate, 5-35 x 0.3-0.5 cm, glabrous, subacute at apex, rarely long hairy towards base. Panicle consists cluster of spikelets. Cluster of spikelets consist four male involucral spikelets surrounding sessile spikelet accompanied by 2 male pedicelled spikelets. Racemes enclosed partly in the spathe and spatheole. Spatheole 2-2.3 cm long, without tubercles. Peduncle of cluster short, enclosed in spatheole. All spikelets without tubercles. **Involucral spikelets** elliptic to ovate, 4.5-5 x 1.3-1.5 mm, muticous, pedicelled; pedicels 0.7-1 x 0.2-0.3 mm, glabrous. Lower glume membranous, elliptic to ovate, 4.5-5 x 1.3-1.5 mm, margins inflexed, 3-5 nerved, rarely 7 nerved, 2-keeled, keels ciliate, apex muticous. Upper glume membranous, narrowly elliptic, 4.5-4.8 x 0.8-1 mm, margins inflexed, 3-nerved, glabrous, acute at apex. Lemma not fully developed; Palea absent. Lodicules 2. Stamens 3, anthers 2-2.5 mm long. **Sessile spikelets** narrowly ovate, 5-5.5 x 0.8-1 mm, acuminate at apex, awned, shortly stipitate. Lower glume coriaceous, narrowly linear to lanceolate or sometimes ovate, 5-5.5 x 0.8-1 mm, margins inflexed, 7-nerved, including 1.5-2 mm long beak, 2-fid at apex, more or less scabrid, rarely long hairy towards apex. Upper glume subcoriaceous, narrowly ovate, 4.5-5.3 x 0.8-1 mm, margins inflexed, 1-nerved, acuminate at apex. Lower lemma hyaline, narrowly ovate, 2.5-3 x 0.5-0.6 mm, margins narrowly inflexed, 2-nerved, apex muticous

or 2-fid. Upper lemma short, hyaline, with 10-15 mm long awn. Palea absent. Lodicules 2. Stamens 3, anthers 2-2.2 mm long. Style short, stigma feathery, 6-9 mm long. Caryopsis elliptic, 1.8-2 x 0.8-1 mm. **Pedicelled spikelets** narrowly ovate, 4.5-5 x 0.8-1 mm, pedicelled; pedicels slender, 2-2.5 mm long, sparsely ciliate. Lower glume membranous, elliptic to ovate, 4.5-5 x 1.1-1.4 mm, margins inflexed, 3-nerved, 2-keeled, keels scabrid, apex muticous. Upper glume membranous, narrowly elliptic, 4.3-4.5 x 0.8-1 mm, margins inflexed, 3-nerved towards apex, glabrous, acute at apex. Lemma oblong to lanceolate, 2.8-3 x 0.4-0.6 mm; Palea absent. Lodicules 2. Stamens 3, anthers 2-2.5 mm long.

Flowering & Fruiting: Most of the year.

Habitat: It grows in moist places, along water channels and agriculture fields.

Distribution: World: Myanmar, Sri Lanka & India: Andhra Pradesh, Bihar, Chhattisgarh, Daman & Diu, Gujarat, Karnataka, Madhya Pradesh, Maharashtra, Odisha, Rajastan, Tamil Nadu, Telangana, Uttar Pradesh, West Bengal.

Specimens examined: India (**Andhra Pradesh**, Krishna dist., August, 1883, *J.S. Gamble* 12737 (CAL), Godavari dist., Kovvur, 18th April, 1902, *C.A. Barber* 4341 (CAL), Godavari dist., Dowleshwaram, 1st May, 1902, *C.A. Barber* 4366 (CAL), Cuddapah, October, 1886, *J.S. Gamble* 18216 (CAL), Godavari delta, Tapeshwaram, 28th December, 1901, *Bourne* 3264 (CAL), Kothajupudi, 18th November, 1955, *P.C. Nanda* 173 (CAL), Polavaram Agency, 10th March, 1962, *D.C.S. Raju* 80 (CAL), Vijayawada, August, 1954, *s.n.*49 (CAL), Srikakulam, Salur, 8th September, 1962, *N.P. Balakrishnan* 1004 (CAL), Polavaram, Papikonda, *D.C.S. Raju* 546 (CAL), Ananthapuram, Gutturu, 7th November, 2009, *B.V. Ravi Prasada Rao* 37158 (CAL), Prakasham, Giddalur, 21st January, 2008, *Ravi Prasada Rao* 30575 (BSID); **Bihar**, Gaya, October, 1894, *Mohim* 1357 (CAL); **Chhattisgarh**, Bilaspur, 2nd November, 1970, *Panigrahi* 13259A (CAL), Bilaspur, Gourilla, 23rd October, 1960, *J.K. Maheshwari* 4060 (CAL), Bilaspur, 27th October, 1970, *G. Panigrahi,* 12997 (CAL), Dhamtari forest Division, Sonjhari beat, 01st March, 2019, *Chandramohan* KCM 107 (BSID); **Diu & Daman**, Coilegue, Daman, 3rd May, 1963, *S.R. Rolla* 88958 (CAL); **Gujarat**, Jambusar, Mural village, agriculture fields, 01st December, 2019, *Chandramohan* KCM 106 (BSID); **Karnataka**, Tumkur dist., near Sire, 16th January, 1979, *S.B. Manohar* KFP 5590 (CAL), Mysore, palace dairy farm, 17th November, 1956, *B.D. Patil* 851 (CAL),

Bidar, on the way to Bidar, 27th November, 1979, *S.R. Ramesh* KFP 10116 (CAL); **Madhya Pradesh**, Morangabad, Tarniya, 25th July, 1964, *Panigrahi* 4477 (CAL), Shivpuri area, 12th October, 1958, *P.C. Nanda* 1821 (CAL), Gwalior, 12th November, 1962, *Panigrahi* 5767 (CAL), Sidhi, Way to Bastua, 18th January, 1964, *Panigrahi* 2305 (CAL), Allahabad to Rewa Road, 21st October, 1962, *Panigrahi* 5507 (CAL), Shivpuri, Satanwara, 12th October, 1958, *P.C. Panda* 1822 (CAL), Hoshangabad, 28th September, 1960, *Joseph* 11054 (CAL), Satna, way to nirva forest, 19th September, 1959, *K.M. Sebastine* 8868 (CAL), Rewa dist., 12th February, 1959, *K.M. Sebastine* 7734 (CAL), Sidhi, Badra, 18th January, 1964, *G. Panigrahi* 2305 (CAL), Sidhi, Majhouli, 19th January, 1971, *Sengupta* 14131 (CAL), Panna dist., Mohandra - panna road, 18th October, 1980, *Ram Lal* 31361 (CAL), Indore, 13th December, 1918, *P. Murthy* 01, Acc.no. 533014 (CAL), Narsinghpur, Gotegaon, along perennial stream, 23rd February, 2020, *Chandramohan* KCM 112 (BSID), Narsinghpur, on the way Chhindwara to Narsinghpur, Dunda, 19th February, 2020, *Chandramohan* KCM 113 (BSID); **Maharashtra**, Poona dist., Kalas Plataeu, November, 1929, *S.R. Godbok* 03624 (BSI), Khandesh, Mhaswa, 21st August, 1956, *G.S. Puri* 6475 A & B (BSI), Chandrapur dist., Khandringi, 15th October, 1972, *B.M. Wadhwar* 130115 (BSI), Pune dist., Ralegaon village, 23rd September, 1965, *K. Hemadri* 107244 (BSI), Khandala, Junnagaon, 10th February, 1977, *S. Karthikeyan* 148579 (BSI), Akola dist., Karla, 18th February, 1978, *S.Y. Kamble* 150547 (BSI), Kondeswar hill, near the temple, 26th April, 1961, *K.P. Janardhanan* 072215 (BSI), Bhandara dist., Ringapur tank from Koka, 20th February, 1977, *S.K. Malhotra* 149527 (BSI), Buldhana dist., Kiwarkhed village, 23rd June, 1982, *P.G. Diwakar* 162918 (BSI), Nagpur, Maharajbagh, 16th January, 1962, *V.K. Agrawal* Acc.no. 533005 (CAL), Bhandara dist., Nawegaon lake area, 13th December, 1977, *S.K. Malhotra* 151404 (BSI), Bhandara, 2nd, December, 1957, *P.C. Nanda* 1340 (CAL), Nagpur, Ambazari Biodiversity Park, Hingna, 15th July, 2019, *Chandramohan* KCM 108 (BSID), Wardha dist, Deoli, 16th November, 2019, *Chandramohan* KCM 109 (BSID), Wardha dist, Saldoha, 13th November, 2019, *Chandramohan* KCM 110 (BSID); **Odisha**, Kalahandi, Langigarh road, 4th September, 1983, *Jafri* 13662 (CAL), Koraput, 20th March, 1943, *Biswal* 6202 (CAL), Satkosia Wildlife Sanctuary, Purunakote, *Alok Chorghe* 2377 (BSID), Satkosia Tiger Reserve, Kuanaria Dam, 22nd February, 2017, *KC Mohan* 8370 (BSID); **Rajastan**, Jhalawar, comp.08, 17th September, 1964, *B.M. Wadhwa* 5421 (CAL), Chittorgarh, Wagon river bed, 17th August, 1979, *V.Singh* 7246 (CAL), Naka kota, Shahabad, 12th August, 1963,

D.M. Verma 444 (CAL), Dug Kyasra, 16th December, 1964, *D.M. Verma* 6776 (CAL), Kota, Kota lake, 24th May, 1965, *Wadhwa* 9453 (CAL), Shahbad Kisan, 14th August, 1963, *D.M. Verma* 701 (CAL), Kota, Babul Bari, 4th September, 1956, *B.D. Patil* 428 (CAL), Chittorgarh, Pach Deva, 14th August, 1979, *V. Singh* 6951 (CAL); **Tamil Nadu**, Coimbatore, *C.E.C. Fischer* 1265 (CAL), Coimbatore, Agriculture college, 22nd June, 1957, *K. Subramanyam* 3522 (CAL), Trichirapalle, 29th October, 1958, *K.M. Sebastine* 7039 (CAL), Madras aerodrome area, 25th October, 1956, *B.D. Patil* 591 (CAL), Grand North trunk road, 24th October, 1956, *S.C. Agrawal* 588 (CAL); **Telangana**, Nagarjuna konda valley, krishna river, 28th November, 1961, *Thothatri* 9820 (CAL), Mahabubnagar, Amangal, Karkalpada beat, 19th February, 1996, *S.R. Srinivasan* 104549 (BSID), Khammam, 22nd October, 1995, *R. Ranjan* 106049 (BSID), Hyderabad, Outer ring road, Rajendranagar, 10th July, 2018, *Chandramohan* KCM 111(BSID); **Uttar Pradesh**, Upper Khajuri, 7th October, 1969, *Panigrahi* 12299 (CAL), Allahabad, Hariharpur to Khiri, 28th April, 1967, *Panigrahi* 11277 (CAL), Harra, RH compound, 3rd October, 1969, *G. Panigrahi* 12369 (CAL), Bundelkhand, 4th December, 1986, *J.F. Duthie* 6069 (CAL); **West Bengal**, Bengal, *Griffith*, 6805 (CAL), Hugli dist., August, 1902, *s.n.* Acc. No. 533012 (CAL).

Note: It is highly variable species among *Iseilema* in India. Variations may be occurred due to climatic situations, soil depth, availability of water. Few individuals found throughout Maharashtra and Gujarat are morphologically differ. Some cases like where spikelets are imperfect, those are little larger than usual.

Iseilema holei Haines, Bot. Bihar Orissa 2: 1055. 1924 [3: 1103. 1961 (Repr. ed.)]; Bor, Grass. Burma Ceylon India Pakistan 188. 1960 (**Map.1**).

Type: India, Bihar (now Jharkhand), Palamu, Haines 4481 (Lectotype: K!-Acc. no. K000911773).

Annuals; Culms tufted, compressed, 60-100 cm tall; nodes densely bearded. Leaf sheath compressed with prominent keels, 4-10 cm long, glabrous; ligule very short, membranous, hairy; leaf blade linear to lanceolate, 20-45 x 0.6 cm, glabrous, sparsely pilose near the base, scabrid along margins, acute to acuminate at apex. Inflorescence of panicles, subtended by spathe and spatheole. Panicles of dense fascicles of spikelets enclosed in spathe & spatheoles. Spatheole 6-8 mm, red, not at all acuminate, mostly

with a row of small tubercles along, the keel but not on the submarginal nerve. Inflorescence consists of consists four male or neutral involucral spikelets surrounding hermaphrodite sessile spikelet accompanied by 2 male pedicelled spikelets. Peduncle of cluster, scabrid, tip saucer shaped. **Involucral spikelets** elliptic or oblong-lanceolate, 3-3.8 mm long on slender pedicel, acute or mucronulate. Lower glume ovate to lanceolate, 9 nerved, altogether, 7 between the keels of which 2 are imperfect; keels granulate, margins broadly inflexed. Upper glume ovate, 3-nerved, with broadly inflexed margins; stamens 0 or 3. **Sessile spikelet** bisexual, lanceolate or linear to lanceolate, ca. 5 mm long; callus bearded. Lower glumes narrowly lanceolate, 4 nerved, imperfect, between keels; keels scabrid except at the top and bottom, margins broadly inflexed over, 2-cuspidate or truncate at apex. Upper glume polished, ovate, suddenly acuminate from one third way up, 3 nerved above, margins wrapping over lemma. Lower lemma linear, hyaline, truncate, minutely denticulate. Upper lemma deeply 2-fid, 1.3 mm long, including the finely subulate segments; awn very slender, 6-8 mm long, smooth. Styles reaching tip of upper glume and feathery stigmas exserted far beyond the awn. Caryopsis ellipsoid, brown, 1.3 mm long. **Pedicelled spikelets** not described.

Flowering & Fruiting: October.

Habitat: It grows in moist places inside the forest.

Distribution: Endemic to Jharkhand (formerly Bihar), Palamu. It may be mentioned here that there is only one collection.

Specimens examined: India (**Jharkhand**, Palamu, October, 1918, *H.H. Haines* 4481 (K).

Note: Description based on original protologue (Haines, 1924). Published literature and studies revealed that *I. holei* is restricted to Palamu hills, Jharkhand state only. Collections from Kawal Tiger Reserve, Telangana state (BSID 3937) are wrongly identified. It is also reported from Maharashtra state on authority of Laxmi. in Sharma *et al*. (1996) op. cit. It is mentioned here the description did not match with original protologue. Sessile spikelets longer than involucral spikelets as per original publication where as Grasses of Maharashtra, both spikelets are equal.

Iseilema hubbardii Murty, J. Bombay Nat. Hist. Soc. 65: 665. 1969 (**Map.1**).

Lectotype: Madhya Pradesh, University campus, Ujjain, U. Satyavathi IAU 3 (K000245992!) designated by V. Drisya & A.K. Pradeep (2019).

Annuals; Culms prostrate, rooting at the nodes, 25-40 cm tall, round, purple or white; nodes glabrous, brown; leaf sheath compressed, 2.3-2.8 cm long, glabrous; leaf blade ovate to lanceolate or oblong to lanceolate, up to 15 x 0.45 cm, glabrous, acute to apiculate at apex. Inflorescence consists clusters of spikelets. Cluster of spikelets consists four male involucral spikelets surrounding sessile spikelet accompanied by 2 barren pedicelled spikelets. **Involucral spikelets** 7-9 x 1.5 mm, lanceolate to oblong, acute to acuminate, pedicelled; pedicels 1.25-1.5 mm long, ciliate on the margins. Lower glume elliptic to lanceolate, 3-nerved, hairy towards towards apex, acute at apex. Upper glume ovate to lanceolate, 1-nerved. Stamens 3, anthers 3 mm long. **Sessile spikelets** short stipitate, 7-8 mm long, of which 3.5 mm form the beak; stipe 1 mm long, pilose at the tip; lower glume elliptic to oblong, appressed hairy towards the base of the beak, pilose on the margins, 7-nerved, inconspicuous; upper glume elliptic to oblong, 3-nerved, apex narrowed into beak; lemma 4 mm long, very narrow, produced into a perfect awn; awn ca.18 mm long, column twisted chest nut color, 9 mm long; palea a hyaline, 4 mm long. Caryopsis elliptic, dorsally compressed embryo, 3/4 the length of the grain. **Pedicelled spikelets** consists of reduced scales seated on the very slender pedicels.

Flowering & Fruiting: November.

Habitat: It grows in plains.

Distribution: World: India: Endemic to Madhya Pradesh.

Specimens examined: India (**Madhya Pradesh**, Ujjain, University campus, 22nd November, 1966, U. Satyavathi IAU 3 (K000245992!) (K!)

Note: Description based on original protologue (Murty & Satyavathi, 1969). The species was not found during our survey in Ujjain. It has been reported from only type locality.

Iseilema jainianum Umamahesw. & P. Daniel in J. Bombay Nat. Hist. Soc. 98 (3): 425. 2001 (Jainiana); P. Daniel & Umamahesw., Fl. Gulf Mannar: 566. t. 98. 2001; Kabeer & Nair, Fl. Tamil Nadu: Grasses. 448. 2009 (**Map.1**).

Type :India: Tamil Nadu, Tuticorin dist., Gulf of Mannar coast, *D. Daniel & P. Umamaheshwari* 107240 (CAL).

Annual; Culms tufted, erect, 60 cm long, glabrous. Leaf sheath 2-6 cm long, glabrous, purplish near the node; ligule short, with fringe of hairs, 4 mm long. Leaf blade linear to lanceolate, acuminate at apex, 3-15 x 0.2-0.4 cm, glabrous, glandular or scabrid towards the base. Panicles erect, spreading, up to 15 cm long; spatheole boat shaped, 0.8-2 cm long, glabrous. Inflorescence consists clusters of spikelets. Cluster of spikelets consists four male involucral spikelets surrounding sessile spikelet accompanied by 2 male pedicelled spikelets. **Involucral spikelets** staminate, lanceolate, acute, 3.5 x 1 mm, pedicelled; pedicels 1 mm long, terete, sparsely hairy. lower glume oblong, obtuse at apex, 3x1 mm, 2-keeled, hairy on the keel; nerves 5-7, prominent; upper glume oblong or elliptic, obtuse or sub acute, 3.2 x 1 mm, 3-nerved; lemma linear to oblong, toothed, as long as the upper glume, membranous, hyaline. Palea absent. Lodicules 2, truncate. Stamens 3, anthers 1.7 mm long. **Sessile spikelets** ovate to lanceolate, 3 x 0.5 mm, awned. Lower glume lanceolate to ovate, bifid, 2.8 x 1 mm, 2- keeled, minutely ciliolate; upper glume oblong to ovate, shortly mucronate, 3 x 0.8 mm, 1-nerved, lemma hyaline, narrow, with 11 mm long awn, base broad, awn geniculate, purplish brown for 4.5 mm, straminous for 5 mm. Palea oblong, obtuse, 2 x 0.6 mm, hyaline. Ovary ellipsoid or oblong, 0.8 mm long; styles 2, 1.2 mm long; stigmas 2, 3.5 mm long, plumose, brownish. Caryopsis ellipsoid, cuneate at the base, 1.5 x 0.5 mm, yellowish. **Pedicellate spikelets** male, elliptic, acute, 3.5 x 0.9 mm; pedicels 1.5 mm long, glabrous. Lower glume oblong or elliptic, obtuse, 3.8 x 1 mm; nerves 9, prominent, ridge like beneath; upper glume membranous, hyaline. Stamens 3, anthers 2-2.5 mm long.

Flowering & Fruiting: December - January.

Habitat: It grows in open dry coastal plains.

Distribution: World: India: Endemic to Tamil Nadu.

Specimens examined: India (**Tamil Nadu**, Tuticorin district, Gulf of Mannar coast, Kanyakumari-Thiruchandur highway, *D. Daniel & P. Umamaheshwari* 107240 (MH)

Iseilema kunhikannanii K.C. Mohan, Y. Mahesh & K. Prasad, Phytotaxa 434 (1): 113-117. 2020 (**Plate 4 & Map.1**).

Type :India: Rajasthan, Bundi district, Bundi forest division, Near Garrada village, K. Chandramohan, 17th October, 2018. (holo: CAL, iso: BSID).

Annuals or short-lived perennials; Culms erect, tufted, robust, glabrous, up to 100 cm high; nodes bearded; internodes pale yellow. Leaf sheaths 6-10 cm long, compressed, keeled, median keel tuberculate and extended little above the lamina, mouth ciliate; ligules short, membranous, 1.5-2 mm long, with 2-4 mm long cilia at apex; leaf blades flat, linear, 10-40 × 0.4-0.5 cm, acuminate at apex, ciliate along margins, sparsely villous at base. Inflorescence a dense false panicle, terminal and axillary, subtended by spathe and spatheole; panicles with clusters of spikelets in dense fascicles; spathe 1.5-5 cm long, tuberculate on keels and marginal nerves, with reduced leaf blade; spatheole boat shaped, lanceolate, 6-12 mm long, tuberculate on keels and marginal nerves. Racemes solitary, with three heteromorphous spikelets; lower four involucral spikelets (male), one sessile spikelet (female) and two pedicelled spikelets (male or not); peduncle short and within spathe, 6-10 mm long, tuberculate above; rachis carrying sessile spikelet, 1-1.2 mm long, sparsely hairy. **Involucral spikelets** lanceolate, 4-4.8 × 0.8-1 mm, acute to acuminate at apex, scabrid throughout, sparsely hairy; pedicels of involucral spikelets longer than broad, 0.5-1 × 0.2-0.3 mm, hairy at base only. Lower glumes lanceolate, 3.2-4.5 × 0.9-1.1 mm, acute at apex, margins sparsely hairy, 5-nerved, scabrid, 2-keeled, sparsely tubercled on keels. Upper glumes lanceolate, 3.2-3.8 × 0.6-0.8 mm, acute at apex, 1-nerved, glabrous, 2-keeled, keels winged; wings glabrous. Upper lemmas hyaline, linear-lanceolate, 2-2.5 × 0.2-0.3 mm, 2-cleft at apex. Stamens 3, anthers 1.4-1.6 mm long; filaments 0.5-0.6 mm long. **Sessile spikelets** linear to lanceolate, 3-3.5 × 0.6-0.8 mm, narrowed at apex and broader at base, awned, sparsely hairy or not at base. Lower glume linear to lanceolate, 3-3.5 × 0.7-0.8 mm, deeply cleft at apex, 4-nerved, scabrid on upper half and glabrous on lower half, 2- keeled. Upper glume linear-lanceolate, 3-3.2 × 0.4-0.6 mm, acuminate to aristate at apex, 3-nerved, 2-keeled; arista up to 0.6 mm long. Upper lemma linear, 1.2-1.5 × 0.1-0.2 mm, awned; awn geniculate, 10-14 mm long. Upper palea hyaline, oblong-lanceolate, 2-2.5 × 0.4-0.6 mm, cleft at apex, nerveless. Caryopsis elliptic, 1.2-1.4 × 0.6-0.8 mm. **Pedicelled spikelets** linear to lanceolate, 4.5-5 × 0.6-0.8 mm, scabrid throughout; pedicel 1-1.4 mm long, ciliate at base only. Lower glumes linear-lanceolate, 3.6-4 × 0.8-1 mm, truncate at apex, 5-nerved, scabrid, tuberculate on nerves. Upper glumes linear-lanceolate, 3.6-4 × 0.4-0.6 mm, acuminate at apex, 1-nerved, glabrous, scabrid and tuberculate on nerve. Upper lemmas linear-lanceolate, 3-3.4 × 0.2-0.3 mm, glabrous, hyaline.

Flowering & Fruiting: September-November.

Distribution: India: It is currently known from the Bundi forest division in the Bundi district of Rajasthan state. 10-12 individuals are found with patchy distribution in grass lands.

Iseilema prostratum (L.) Andersson in Nov. Act. Soc. Sci. Upsal. 3, 2: 251. 1856; Bor, Grass. Burma Ceylon India Pakistan 188. 1960. *Andropogon prostratus* L., Mant. 304. 1771. *Iseilema wightii* Andersson, op. cit.; Hook, *f*., FI. Brit. India 7: 218. 1896; Cooke, FI. Presi. Bombay 3: 516. 1958 (Repr. ed.); Blatt. & McCann, Bombay Grass. 113. 1935; Henry *et al*., Fl. Tamil Nadu Ind., Ser. I: Analysis 125. 1989; Shetty & Singh, Fl. Rajastan 3: 1070. 1993; Saxena & Brahmam, Fl Orissa 4: 2405. 1995; Naik, Fl. Marathwada 1057. 1998; Yadav & Sardesai, Fl. Kolhapur District, 590.2002; Paria & Chhattopadyay, Flora of Hazaribagh district, Bihar, 1102. 2005; Kabeer & Nair, Fl. Tamil Nadu: Grasses. 449. 2009; Potdar *et al*., Grasses Maharashtra 213. 2012; Pullaiah, Fl Telangana 3: 1142. 2015; Pullaiah *et al*., Fl Andhra Pradesh. 5: 2213. 2018; Lakshminarasimhan *et al*., Fl. Karnataka 3: 712. 2019 (**Plate 5,6 & 7**).

Type: India, Wight. R., 1710 (Lectotype: K!-Acc. no. K000245986).

Annuals or Perennials. Culms terete, sub erect, often prostrate and rooting at base, ascending, 20-100 cm tall; nodes glabrous or bearded. Leaf sheath compressed, 1-5 cm long, sometimes covered with bulbous based hairs; ligule short, ciliate, membranous; leaf blade 10-30 x 0.2-0.5 cm, linear to lanceolate, acute at apex, pale reddish, sometimes whole plant reddish. Panicle erect, spreading, consists clusters of spikelets. Cluster of spikelets solitary, consists four male involucral spikelets surrounding sessile spikelet accompanied by 2 male pedicelled spikelets. Spatheole 1.8-2.5 cm long, tubercled. Pedicels and spikelets more or less tubercled. Peduncles longer than spathe & spatheole, fully exserted from spatheole, tubercled. **Involucral spikelets** male, 3-4.5 x 0.7-1.0 mm, elliptic to ovate, green or tinged with violet or fully violet, pedicelled; pedicels 0.6-0.9 mm long, sparsely hairy. Lower glume membranous, elliptic to ovate, 3-4.2 x 0.6-0.8 mm, margins inflexed, covered with tubercles on nerves and keels, 5-7 nerved, acute at apex. Upper glume membranous, elliptic to ovate, 3-4 x 0.6-0.7 mm, margins inflexed, 3-nerved, acute at apex. Lower lemma hyaline, oblong to lanceolate or lanceolate, 2.5-2.8 x 0.3-0.5 mm, glabrous, nerveless, obtuse or acute at apex. Lodicules

2. Stamens 3, anthers 1.2-1.5 mm long. **Sessile spikelets** narrowly ovate, 3-4.1 x 0.6-0.9 mm, awned, shortly stipitate; callus hairy. Lower glume subcoriacceous, narrowly ovate, 3-4.1 x 0.6-0.8 mm, glabrous lower half, margins inflexed, 3-nerved, scabrid towards apex, sparsely long hairy, apex 2-fid. Upper glume subcoriaceous, narrowly ovate, 3.1-4 x 0.6-0.7 mm, margins inflexed, 3-nerved in upper half, apex acuminate. Lower lemma hyaline, ovate to oblong, 1.8-2.2 x 0.4-0.5 mm, nerveless, truncate at apex, broad towards the base. Upper lemma a hyaline base of 8-12 mm with long geniculate awn. Palea absent. Lodicules 2. Style short, stigma feathery, 5-7.5 mm long. Caryopsis 1.8-2 x 0.6-0.8 mm, elliptic-ovate. **Pedicelled spikelets** narrowly elliptic to ovate, 3-4.5 x 0.6-0.9 mm, acute, pedicelled; pedicels slender, 1-2 mm long, sparsely hairy. Lower glume membranous, narrowly ovate to elliptic, 3-4.2 x 0.5-0.8 mm, margins inflexed, keels covered with tubercles, 5-7 nerved, acute at apex. Upper glume membranous, narrowly elliptic to ovate, 3-4 x 0.5-0.6 mm, margins inflexed, 3-nerved, acute at apex. Lower lemma hyaline, narrowly ovate-oblong or lanceolate, 2.3-2.8 x 0.3-0.5 mm, nerveless, obtuse at apex. Lodicules 2. Stamens 3, anthers 1.3-1.6 mm long.

Flowering & Fruiting: July - November.

Habitat: It grows in moist places, along water channels, grass lands and agriculture fields.

Distribution: World: Myanmar, Sri Lanka, Pakistan & India: Throughout the country.

Specimens examined: India (**Andhra Pradesh**, Kurnool dist., cement nagar valley, 3rd December, 1983, T.Pullaiah et al. 1811 (CAL), Vijayanagaram dist., salur, 12th September, 1962, N.P. Balakrishnan A1153 (CAL), Cuddapah, balapalle, 12th November, 1962, J.L. Ellis 15025 (CAL), Guntur dist., Nallapadu, 11st January, 2020, *Chandramohan* KCM 122 (BSID); **Bihar**, Bandhwa, 30th October, 1945, J.J. Wood 1015/187 (CAL); Chhattisgarh, on the way SH-6 Nagri to Gariyaband, 20th August, 2018, *Chandramohan* KCM 120 (BSID), Dhamtari, Nagri, 23th August, 2018, *Chandramohan* KCM 121 (BSID); **Gujarat**, Nadiad, 21st September, 1957, S.K. Jain 24340 (CAL), Karjan, Vemardi, road side, 4th December, 2019, *Chandramohan* KCM 114 (BSID); **Haryana**, Hissar, 08th August, 1985, J.F. Duthie 5076 (CAL); **Jharkhand**, Hazirabagh lake, 15th December, 1883, C.B. Clarke 33803 (CAL), Hazaribagh, 10th October, 1873, C.B. Clarke 21152 (CAL); **Karnataka**, North kannara, 30th November, 1889, Talbot 2143 (CAL), Belgaum, Munro

876; **Madhya Pradesh**, Kanha National Park, 12th March, 1962, J.K. Maheshwari 4856 (CAL), Sagar dist, Mohli RF, 8th November, 1960, N.P. Balakrishnan 11538 (CAL), Mandla, Khari RF, 28th November, 1961, Joseph 13464 (CAL), Gwalior, 01st September, 1990, s.n. 37 (CAL), Chandni, 28th September, 1908, Burkill, I.H. 31094 (CAL), Shivpuri, Satanwara, 12th October, 1958, P.C. Nanda 1828 (CAL), Bailadilla, 19th December, 1963, Panigrahi 1156 (CAL); **Maharashtra**, Mahabaleshwar, 1884, *T.Cooke* Acc. No. 532997 (CAL), Dhulia, 28th December, 1956, *B.D. Patil* 1137 (CAL), Chotanagpur, 18th November, 1883, *C.B. Clarke* 34285 (CAL), Chandrapur, 5th December, 1989, *J.F. Duthie* 9970 (CAL), Central Province, 13th July, 1988, *J.F. Duthie* 8481 (CAL), Wardha dist., Seldoh, 13th November, 2019, *Chandramohan* KCM 115 (BSID), Wardha dist., Bori reservoir, 15th November, 2019, *Chandramohan* KCM 116 (BSID), Dhulia dist., Laling Kuran, 03rd November, 1959, *J.B. Shah* 60040 (BSI), Nagpur, Ambazari Biodiversity Park, 14th July, 2020, *Chandramohan* KCM 119 (BSID), Dhulia dist., Laling Kuran, 03rd November, 1968, *Pataskar* 117665 (BSI), Nagpur, Ambazari Biodiversity Park, 15th July, 2020, *Chandramohan* KCM 117 (BSID); Dadargaon, 7th October, 1969, *Pataskar* 118337 (BSI), Nagpur, Ambazari Biodiversity Park, 15th July, 2020, *Chandramohan* KCM 118 (BSID), Chandrapur dist., Ramdigi, 19th October, 1972, *B.M. Wadhwa* 130225 (BSI); **Odisha**, Sambalpur, s.n. Acc.No. 532988 (CAL); Ganjam, December, 1949, W.Wight 3047 (CAL), Angul, malagiri hills, 23rd December, 1960, C.R. Rao 2469 (CAL), Mayurbhanj, simlipal RF, 26th November, 1979, A.R.K. Sastry 12314 (CAL); **Rajastan**, Kota, 15th September, 1964, *B.M. Wadhwa* 1975 (CAL); Bikaner, Toliyasar, 21st August, 1977, *A.N. Singh* 4355 (CAL), Baragaon, 10th October, 1965, *S. Sharma* 1899 (CAL), Pali, near Gundoj, 31st August, 1975, B.V. Shetty 1978 (CAL), Jhalawar, 17th September, 1964, Wadhwa 5415 (CAL); **Tamil Nadu**, Madurai, near alagarkoil, 23rd September, 1957, K. Subramanyam 4357 (CAL), 1710, Wight 3273 (CAL), Tinnevelly dist., on the way to five falls, 25th July, 1957, K. Subramanyam 3813 (CAL); **Telangana**, Nalgonda, krishna river basin, 16th December, 1959, K.M. Sebastine 9821 (CAL), Yadadri dist., Saidapur, 09th September, 2017, *Chandramohan* KCM 123 (BSID), Yadadri dist., near raigiri koneru, 10th September, 2017, *Chandramohan* KCM 124 (BSID); **Uttara Pradesh**, Bundelkhand, 26th November, 1986, J.F. Duthie 6570 (CAL), Mirzapur, kotwa, 15th July, 1965, O.P. Misra 9707 (CAL).

Note: It can be distinguished by its prostate habit, longer peduncles and shorter spikelets. It shows variability in height of the culm, arrangement of spikelets (clusters) due to different habitats (**Plate5 & 7**). On rocky surface, it appears annual with weak culms (**Plate 6**). Perennial, culms strong, vigorous where soil depth is high (**Plate 7**).

Iseilema venkateswarlui Satyavathi, J. Bombay Nat. Hist. Soc. 65: 666. 1969. Pullaiah et al. Fl. Andhra Pradesh. 5: 2213. 2018 (**Map.1**).

Lectotype: Andhra Pradesh, Guntur, Waltair, Lam farm, Satyavathi IAG 4 (K000245995!) designated by V. Drisya & A.K. Pradeep (2019).

Annuals; Culms prostrate, rooting at the nodes, 30-40 cm tall, round, purple or white; nodes glabrous, brown; leaf sheath compressed, 2.3-3.1 cm long, glabrous; leaf blade linear to lanceolate or lanceolate, up to 15 x 0.25 cm, glabrous, acute at apex. Inflorescence consists clusters of spikelets. Cluster of spikelets consists four male involucral spikelets surrounding sessile spikelet accompanied by 2 male pedicelled spikelets. **Involucral spikelets** 6.5-7.5 x 1.25-1.5 mm, oblong, acute, markedly umbonate at the base, pedicelled; pedicels 1.25 x 1-1.25 mm, broad towards apex, densely ciliate on the outer margins; lower glume elliptic to oblong, 3-nerved with 2 inconspicuous nerves, acute at apex; upper glume ovate, 1-nerved, acute at apex; stamens 3, 3 mm long. **Sessile spikelets** 5.5 mm long, of which 3.5 mm are elliptic and remainder the beak; in some racemes beak longer than lower elliptic portion; lower glume elliptic to oblong, appressed hairy towards the base of the beak, pilose on the margins, 7-nerved, inconspicuous; upper glume elliptic to oblong, 3-nerved, apex narrowed into beak; lemma 4 mm long, very narrow, produced into a perfect awn; awn ca.18 mm long, column twisted chest nut color, 9 mm long; palea a hyaline, 4 mm long. Caryopsis not mentioned. **Pedicelled spikelets** 5.5 mm long, pedicelled; pedicels 4-4.5 mm long; lower glume ovate to elliptic, 5.5 mm long, 4-5 nerved, scabrid along margins, acute at apex; upper glume ovate, 5.5 mm long, 3-nerved, acute at apex.

Flowering & Fruiting: September.

Habitat: It grows in agriculture fields.

Distribution: World: India: Endemic to Andhra Pradesh.

Specimens examined: India (**Andhra Pradesh**, Guntur, Lam farm, 26th September, 1966, U. Satyavathi IAG 4 (K000245995!)(K!).

Note: It is very close to *Iseilema argutum* as per description provided in protologue (Murthy & Satyavathi, 1969). In *I. venkateshwarlui*, leaf blades up to 15 x 0.25 cm, apex acute to apiculate, peduncles short; Involucral spikelets 6.5-7.5 mm long, lower glume 3-5 nerved; sessile spikelets 5.5 mm long where as in *I. argutum*, leaf blades 5.5-18 x 0.2-0.6 cm, apex acute or obtuse-apiculate; Involucral spikelets 4.5-6 mm long, lower glume 5-nerved; sessile spikelet 3-5.2 mm long (Veldkamp, 2016). The images provided in Kew herbarium differ each other morphologically. There are no specimens collections after type collection for both the species. It could be a great assert to distinguish both the species.

Elevation: It grows in elevation 40-950 m.

Ecology & Cytology of *Iseilema*:

The species of *Andropogoneae* have attained high adaptive peaks of evolution and species differentiation in the Indo-Malaysian region (Hartly, 1958), where there is a high to moderate rainfall. Most of the Indian *Iseilema* are known for fodder. Each one of *Iseilema*, is a species complex or a cluster of chromosome races, shows a gradually ascending series of haploid chromosome numbers 3 to 18 (Rao, 1975). Many of the *Iseilema* species are endemic and growing in a particular region or area and known from one locality (type locality). *I anthephoroides* is native to Peninsular India (Except one collection from Mizoram) due to habitual to certain environmental conditions obtained in that area. Like wise, number of chromosome and their polymorphism would lead to large variation among species complex. The species complexes of *Iseilema laxum* & I. *prostratum* have combined polyploid and one B chromosome with adaptability, although they show maximum differentiation within species (Rao, 1975). Variations have been mentioned here for *I. laxum* & *I. prostratum* which are happened due to above said. The genus *Iseilema* shows maximum cytological variability with unusual chromosome numbers.

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Plate 1: A. *Iseilema anthephoroides* Hack.; B & C. *Iseilema hackelii* Shrestha & Gandhi; D. Habitat of *I. hackelii*

Plate 2: *Iseilema anthephoroides* Hack. A. Habit; B & C. Cluster of spikelets; D. Involucral spikelets; E. Lower glume; F. Upper glume; G. Stamens; H & I. Pedicelled spikelets; J. Lower glume; K. Upper glume; L. Sessile spikelet; M & O.. Lower glume & Upper glume (Dorsal view); O & P. Lower glume & Upper glume (Ventral view); Q. Lower lemma; R. Upper lemma awn; S. Caryopsis

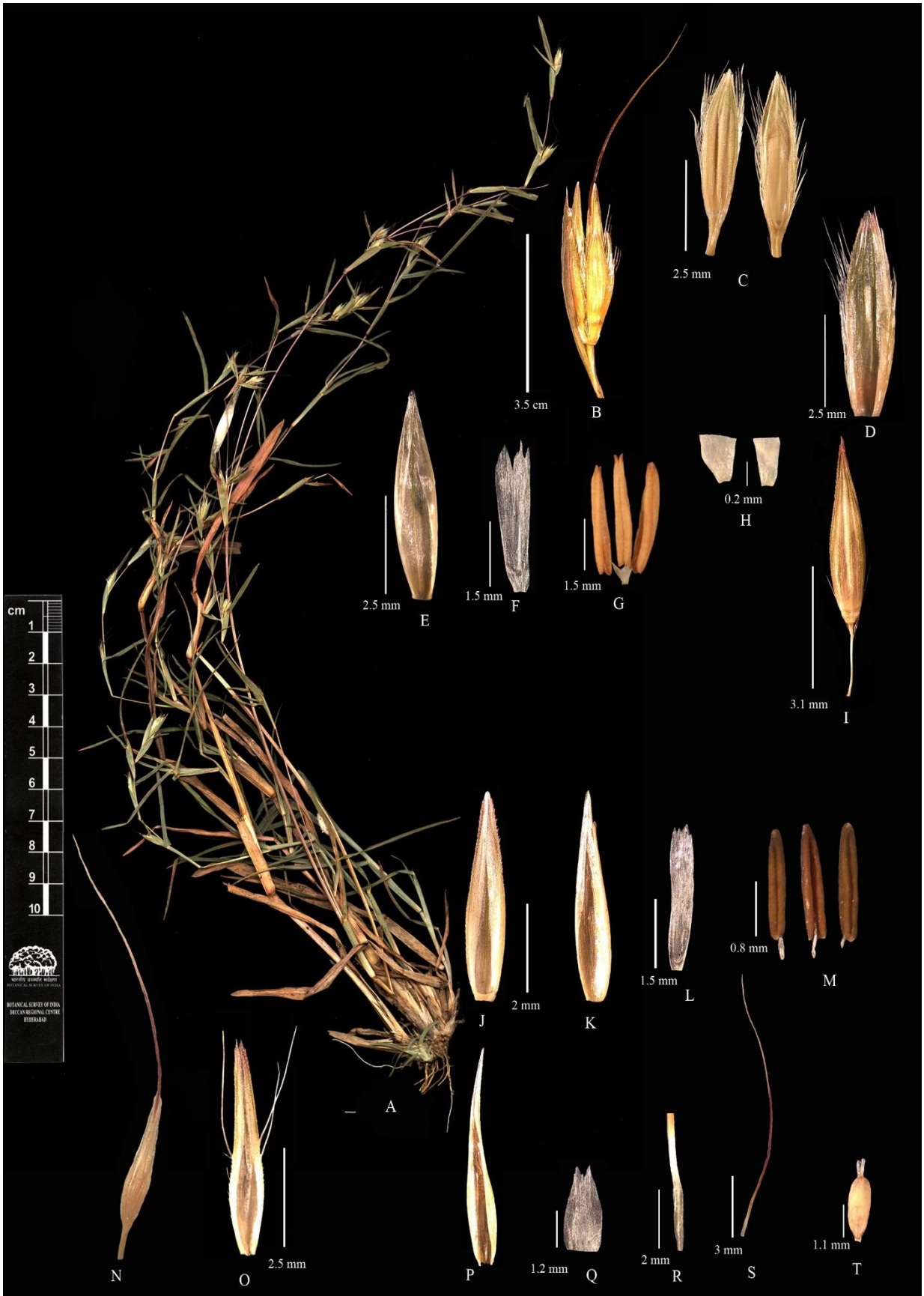
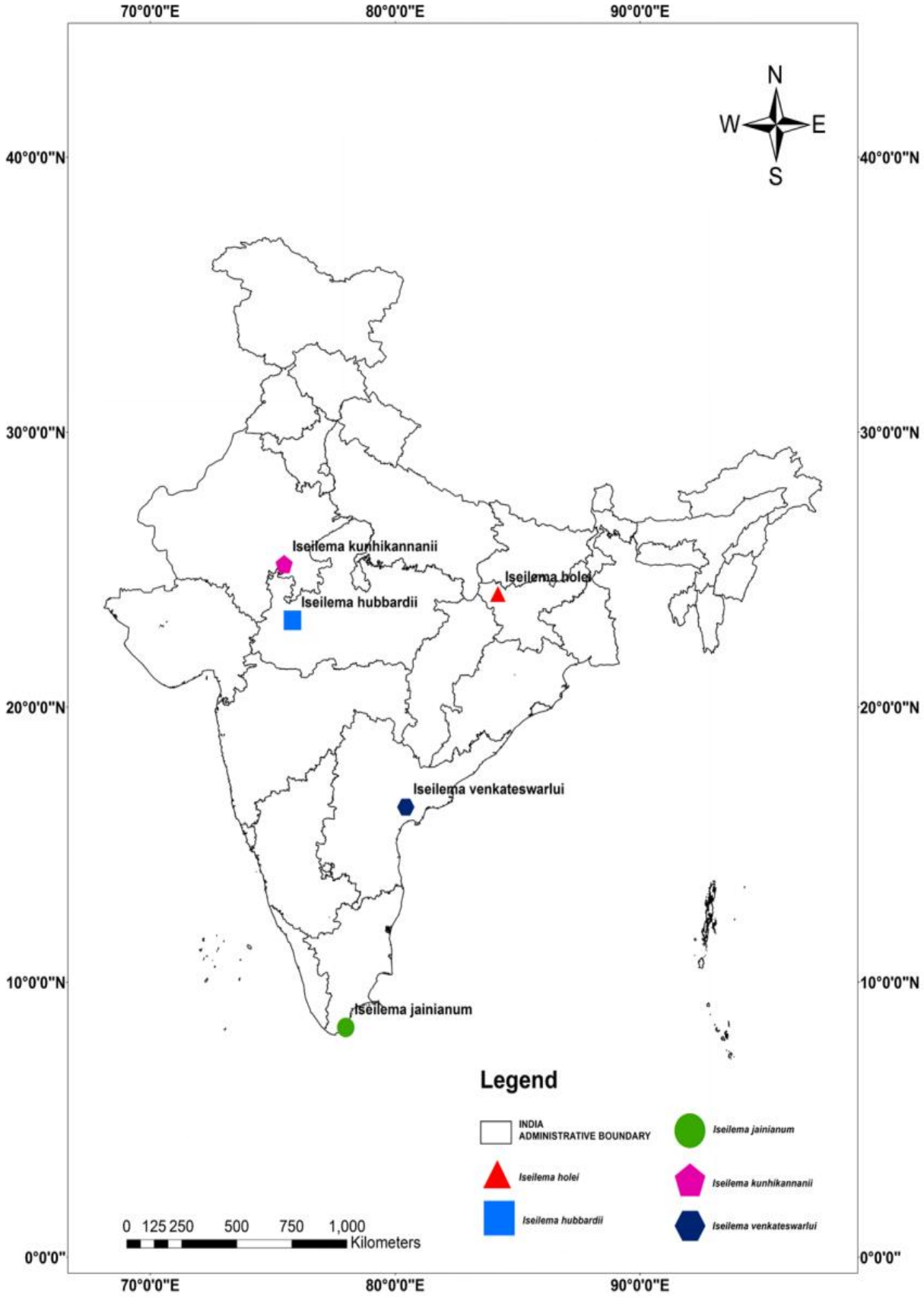


Plate 3: *Iseilema hackelii* Shrestha & Gandhi A. Habit; B. Cluster of spikelets; C. Involucral spikelets; D. Lower glume; E. Upper glume; F. Lemma; G. Stamens; H. Lodicules; I-M. Pedicelled spikelets: J. Lower glume; K. Upper glume; L. Lemma; M. Stamens; N-T. Sessile spikelets: O. Lower glume; P. Upper glume; Q. Lower lemma; R & S. Awn of upper lemma; T. Caryopsis



Map 1: Distribution of *Iseilema* species in India

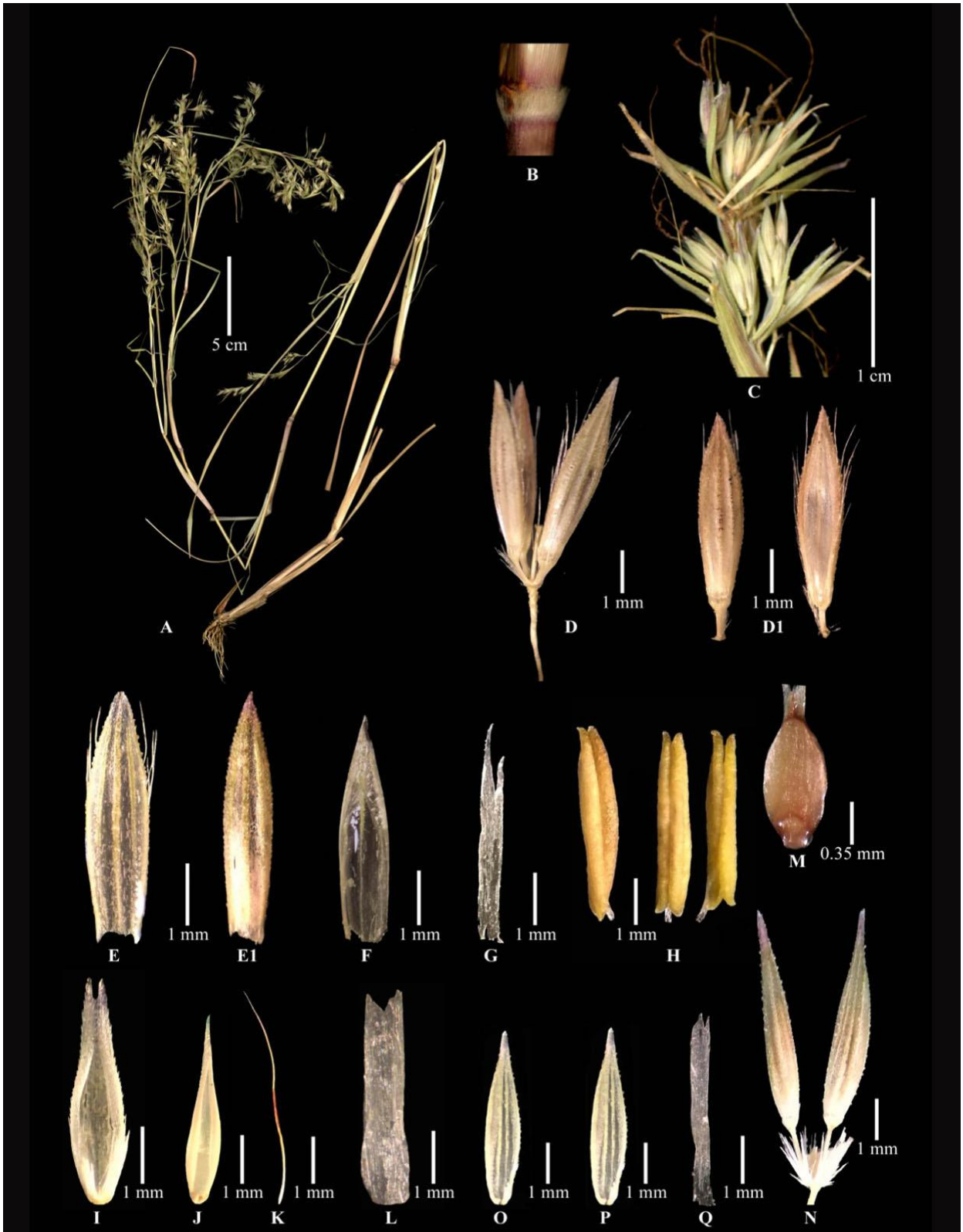


Plate 4. *Iseilema kunhikannanii* A. Habit; B. Nodes with hairs; C. Part of inflorescence; D.–H.: Involucral spikelets: D.–D1. Involucral spikelets; E.–E1. Lower glume; F. Upper glume; G. Upper lemma; H. Stamens; I.–M. Sessile spikelet: I. Lower glume; J. Upper glume; K. Upper lemmas; L. Upper palea; M. Caryopsis; N.–Q. Pedicelled spikelets: N. Pedicelled spikelets; O. Lower glume; P. Upper glume; Q. Upper lemma.

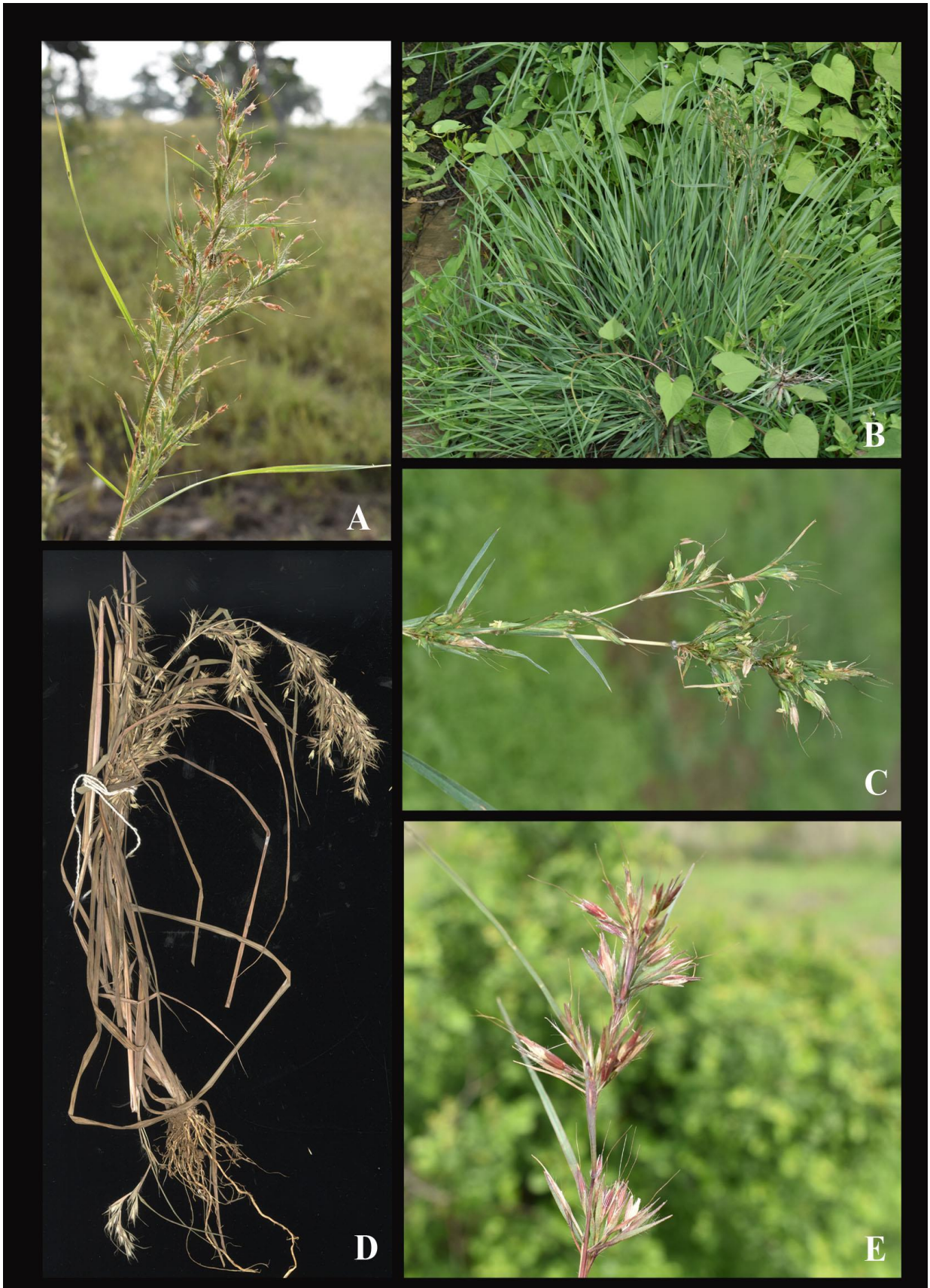


Plate5: *Iseilema prostratum* (L.) Andersson A. Part of Panicle; B. Habit; C, D & E. Variations within species

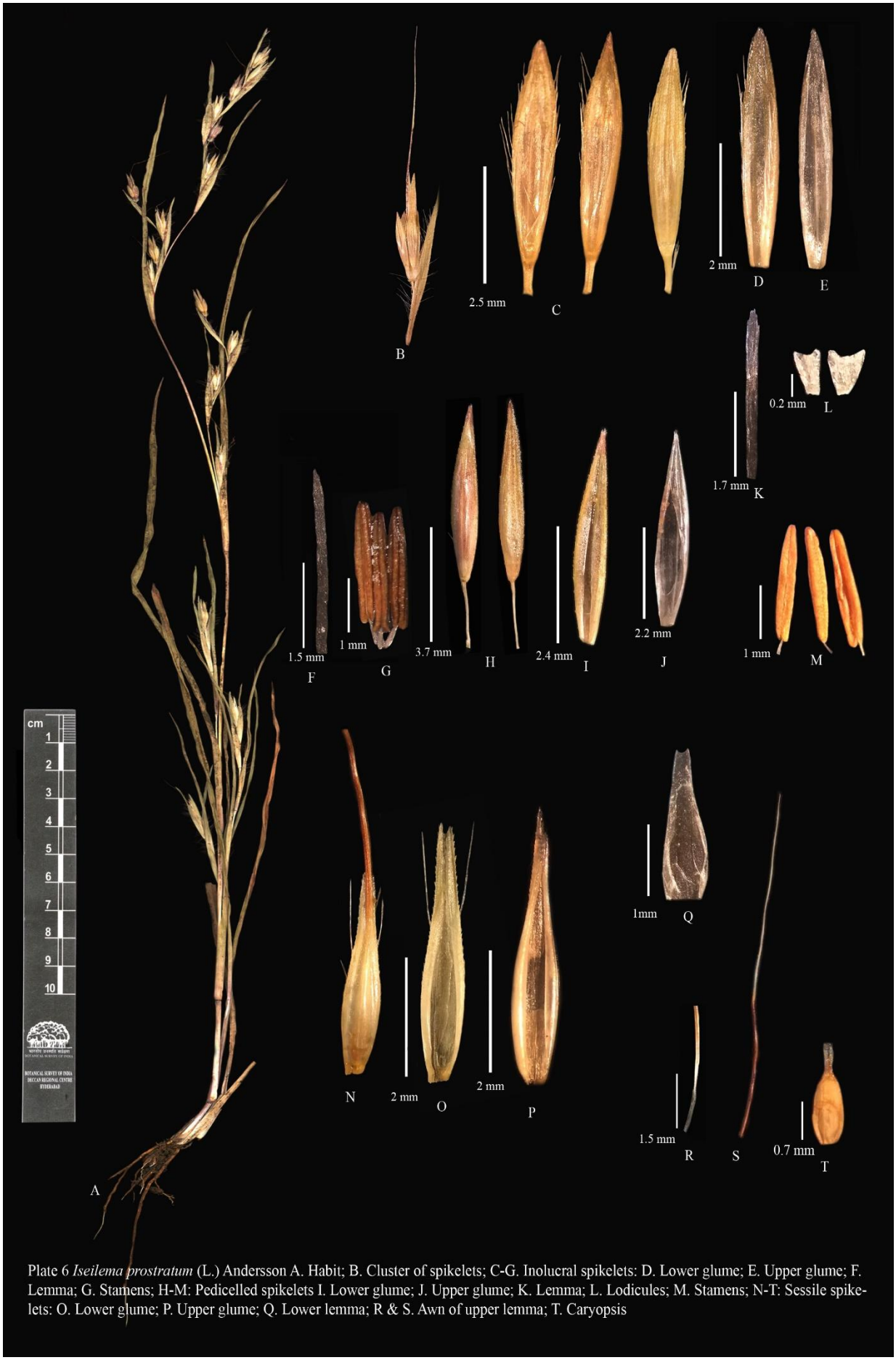


Plate 6 *Iseilema prostratum* (L.) Andersson A. Habit; B. Cluster of spikelets; C-G. Inolucral spikelets: D. Lower glume; E. Upper glume; F. Lemma; G. Stamens; H-M: Pedicelled spikelets I. Lower glume; J. Upper glume; K. Lemma; L. Lodicules; M. Stamens; N-T: Sessile spikelets: O. Lower glume; P. Upper glume; Q. Lower lemma; R & S. Awn of upper lemma; T. Caryopsis

Plate7 *Iseilema prostratum* (L.) Andersson A. Habit; B. Panicle; C. Cluster of spikelets; D-I. Involucral spikelets: E. Lower glume; F. Upper glume; G. Lemma; H. Amthers; I. Lodicules; J-N: Pedicelled spikelets: K. Lower glume; L. Upper glume; M. Lemma; N. Anthers; O-U: Sessile spikelet: P. Sessile spikelet; Q. Lower glume; R. Upper glume; S. Lower lemma; T. Awn of upper lemma; U. Stigma