

NOTES ON INDIAN CYPERACEAE

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ABSTRACT

In this paper, a new subspecies of *Cyperus sanguinolentus* Vahl is described. Changes in the nomenclature of five species of *Cyperus* are given. One new plant record for India, five for eastern India and two for W. Bengal are presented. Critical notes on *Cyperus alopecuroides* Rottb. and on *C. corymbosus* Rottb. complex are also included.

INTRODUCTION

Few interesting observations on Cyperaceae, made during my studies on monocotyledons of Calcutta and its suburbs, are presented in this paper. A new subspecies of *Cyperus sanguinolentus* Vahl is described; nomenclature of 5 species of *Cyperus* is brought up-to-date. New plant records presented in this paper are: For India—*Fimbristylis squarrosa* Vahl var. *esquarrosa* Makino; for eastern India—*Cyperus laevigatus* Linn., *C. bulbosus* Vahl, *C. alulatus* Kern, *C. difformis* Linn. var. *breviglobosus* Kuekenh., *C. pumilus* Linn. var. *membranaceus* (Vahl) Kuekenh.; for W. Bengal—*C. flavidus* Retz., *Fimbristylis cymosa* R. Br. And critical notes on *Cyperus alopecuroides* Rottb. and *C. corymbosus* Rottb. and its closely allied *C. pangorei* Rottb. and *C. bengalensis* Spreng. are also presented.

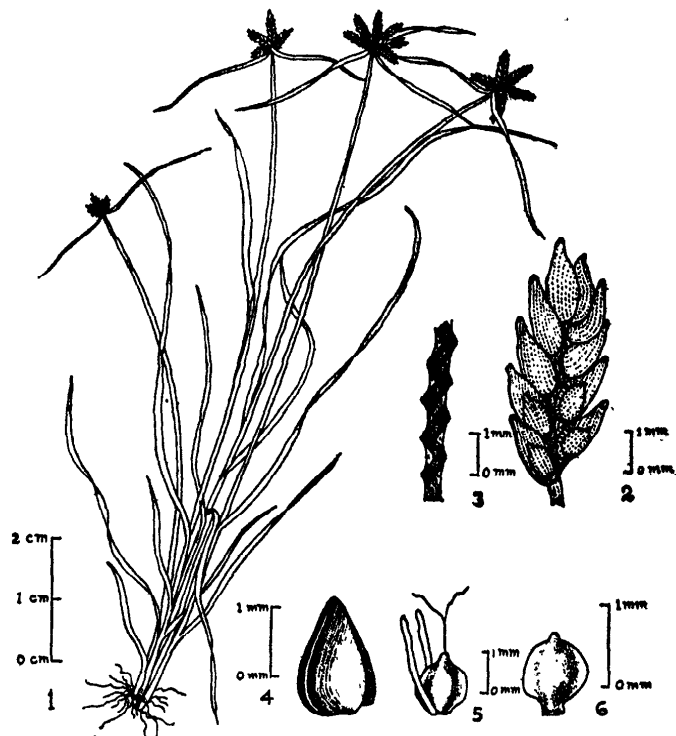
A NEW SUBSPECIES OF CYPERUS SANGUINOLENTUS VAHL

Cyperus sanguinolentus Vahl, subsp. **sacer** Korla.
subsp. nov.

Accedit ad subsp. *sanguinolentus*, a qua differt praecipue staminibus duobus, nuculis suborbicularibus et relative minoribus et foliis ad 1 mm latis, bracteis patentibus; accedit etiam ad subsp. *teysmanni* (Boeck.) Kern, a qua differt foliis 1.5 mm latis, inflorescentiis paucispiculatis, spiculis ad 3 mm latis, glumis distincta depressione laterali vel nulla.

Herba glabra, gracilis; radices fibrosae, filiformes; culmi 11-19 cm longi, caespitosi, obscure trigoni in parte superiore, inconspicue striati, leves. Folia 2.5-8 cm longa, ad 1.5 mm lata, basalia, erecta vel paulum patentia, linearia, acuta, nervo medio paulisper eminenti in pagina inferiore; vaginae ad 4.8 cm longae, laxae culmos amplexantes, membranaceae, pallide brunneae ad basin, vix striatae, obliquae et prope os fissae. Inflorescentia capitata, spiculis 4-7 constans; bractae 2, raro 3, ad 4.8 cm

longae, patentes, foliaceae, tertia quidem minutissima et setacea. Spiculae 5-16 mm ad 3 mm latae,



Cyperus sanguinolentus Vahl subsp. **sacer** Korla, subsp. nov.
Figs. 1-6 : 1. Plant. 2. Portion of a spikelet. 3. Rachilla.
4. Glume. 5. Deflorate flower. 6. Nut.

14-28-florae, lineari-oblongae, sanguinolentae, saepe fuscae; rachilla rectangularis, striis brunneis, internodiis \pm 1 mm longis. Glumae 1.8 \times 1 mm depressione distincta vel nulla ornatae ad utrumque latus, late ovatae; subobtusae, pallide vel luteole brunneae, per zonam sanguinolentae ad latera vel rarius per totam glumam; carina eminens, trinervia. Stamina bina, antherae lineari-oblongae; filamenta complanata, ligulata, antheris longiora. Styli bifidi, complanati, graciles, luteoli; styli brachia styloaequilonga. Nuculae \pm 1 mm longae 0.8 mm latae, pallide brunneae, suborbiculares, apiculatae, dense punctatae.

Typus, *Korlahalli* 232A, et isotypus, *Korlahalli* 232B, lecti ad Sodepur in Bengalia occidentali ab auctore—3-7-1964 et positi in CAL.

Cyperus sanguinolentus Vahl subsp. *sacer* Korla. subsp. nov. allied to *C. sanguinolentus* Vahl subsp. *sanguinolentus* and *C. sanguinolentus* Vahl subsp. *teysmanni* (Boeck.) Kern, but differs from the first mainly in having stamens 2, nuts suborbicular and relatively smaller up to 1 mm long only and leaves up to 1.5 mm wide, bracts spreading; and from the second in having leaves 1.5 mm wide, inflorescence paucispiculate, spikelets up to 3 mm wide, glumes with or without distinct depressions on sides.

Glabrous, slender herbs; roots fibrous filiform; culms 11-19 cm long, tufted, obscurely trigonous at top, inconspicuously striated, smooth. Leaves 2.5-8 cm long, up to 1.5 mm wide, basal, erect or slightly spreading, linear, acute, midrib faintly prominent on lower side; sheaths up to 4.8 cm long, loosely clasping the culms, membranous, pale brown at base, faintly striated, oblique and split open near mouth. Inflorescence capitate, of 4-7 spikelets; bracts 2, rarely 3, each up to 4.8 cm long, spreading, foliaceous, the third one very small and setaceous. Spikelets 5-16 mm long, up to 3 mm wide, 14-28-flowered, linear-oblong, blood-coloured, often dark; rachilla rectangular with brown streaks, internodes \pm 1 mm long. Glumes 1.8×1 mm, with or without distinct depressions on both sides, broadly ovate, subobtusate, pale or yellowish brown, with a sanguineous band on sides or rarely all over; keel prominent, 3-nerved. Stamens 2, anthers linear-oblong; filaments flat, ligulate, longer than the anthers. Styles bifid, flat, slender, yellowish; style arms as long as style. Nuts \pm 1 mm long, 0.8 mm wide, pale brown, suborbicular, apiculate, densely punctated.

Types: Holotype *Korlahalli* 232A and isotype *Korlahalli* 232B, 3-7-1964, West Bengal, Sodepur (CAL).

Habitat: Low lying wet grassland.

J. H. Kern of Rijksherbarium, Leiden, who examined my specimen comments "A diandrous subspecies of *Cyperus sanguinolentus* Vahl not occurring in Malesia, but obviously common in India. Possibly *Cyperus concolor* Steud. of which I have not seen the type". *Cyperus concolor* Steud. Syn. 2: 6, 1855, was based on an Indian plant: "Hrbr. Hohenackeri nr. 946, Ind. Or." Steudel does not mention the number of stamens for *C. concolor* and it has been treated as conspecific with *C. sanguinolentus* Vahl by Kuekenenthal (Pflanzenreich 101: 385,

1936) and Kern (Reinwardtia 3: 54, 1954). So, on further enquiry Kern informed that the Leiden Herbarium has a specimen from the collection of Hohenacker 946 and on the strength of this specimen he referred *C. concolor* to the synonymy of *C. sanguinolentus* subsp. *sanguinolentus* for it is triandrous and undoubtedly belongs here. But as he has not seen the holotype, he suggested that my plant "...might be *C. concolor*. If not so, your plant may represent a new subspecies worth describing". Steudel's type specimens are in the Paris Herbarium. On consulting the Paris Herbarium, J. Raynal informed that "We have here five sheets of Hohenacker 946, including two from Steudel's Herbarium of these two one only bears Steudel's own handwriting, and consequently has to be considered as the holotype. Nevertheless the material on the five sheets is quite homogeneous, —. There are nearly always 3 stamens; the third one may lack, but only by accident, as it seems...". On examining the spikelet from the type material of *C. concolor* which he had sent to me, I am convinced that my plant is not *C. concolor* Steud.

NOMENCLATURE

***Cyperus flavidus* Retz.** Obs. 5: 13, 1789; *non sensu* Clarke in J. Linn. Soc. 20: 287, 1883 & Fl. Brit. Ind. 6: 600, 1893 *quae est C. tenuispica* Steud. *C. globosus* All. Auctur, Fl. Pedem. 49, 1789, non Forsk. 1775; Clarke in J. Linn. Soc. 21: 47, 1884; Kuekenh. in Pfreich. 101: 352, 1936; Kern in Reinwardtia 6: 61, 1961; Koyama in Quart. J. Taiwan Mus. 14(3 & 4): 184, 1961. *C. capillaris* Koenig ex Roxb. Fl. Ind. 1: 198, 1820. *Pycnus capillaris* (Koen. ex Roxb.) Nees in Linnaea 9: 283, 1834; Clarke in Hook. f. Fl. Brit. Ind. 6: 591, 1893. *P. globosus* (All.) Reichenb. Fl. Germ. Exc. 2: 140, 1830; Blatt. & McC. in J. Bombay nat. Hist. Soc. 37: 29, 1935.

Cyperus flavidus Retz. (1789) is the earliest validly published name for this taxon; *C. globosus* All. (1789) is a later homonym of *C. globosus* Forsk. Fl. Aeg. Arb. 13, 1775. Application of the name *C. flavidus* Retz. to this taxon may create a confusion, as in most of Indian floras *Cyperus tenuispica* Steud. has been described as *C. flavidus* Retz. Though *C. tenuispica* and *C. flavidus* are two different species, Clarke made the mistake of adapting *C. flavidus* Retz. for the former species (see J. Linn. Soc. 20: 287, 1883) and followed in his other works (e.g. Indian species of *Cyperus*, Cyperaceae in Fl. Brit.

Ind. and Fl. Trop. Africa); later workers followed him until Fischer in Kew Bull. 1931: 262, 1931 cleared this confusion.

The following new combinations have been proposed:

Cyperus flavidus Retz. var. **khasianus** (Clarke) Korla. comb. nov. *C. globosus* All. var. *khasianus* Clarke in J. Linn. Soc. 21: 48, 1884.

Cyperus flavidus Retz. var. **nilagiricus** (Hochst. ex Steud.) Korla. comb. nov. *C. nilagiricus* Hochst. ex Steud. Syn. Cyp. 2, 1855.

Cyperus flavidus Retz. var. **strictus** (Roxb.) Korla. comb. nov. *C. globosus* All. var. *strictus* (Roxb.) Clarke in J. Linn. Soc. 20: 280, 1883. *C. strictus* Roxb. 1: 200, 1820.

Cyperus flavidus Retz. var. **erectus** (Clarke) Korla. comb. nov. *Pycneus globosus* (All.) Reichenb. var. *erectus* Clarke in J. Linn. Soc. 34: 15, 1898.

Cyperus bengalensis Spreng. Neue Entd. 3: 101, 1822. *C. tegetiformis* Roxb. (Hort. Beng. 6, 1814 nom. nud.) ex Kunth, Enum. Pl. 2: 56, 1837; Clarke in J. Linn. Soc. 21: 157, 1884 & in Hook. f. Fl. Brit. Ind. 6: 612, 1893. *C. corymbosus* Rottb. var. *longispiculatus* (O. Ktze.) Kuekenh. in Pfreich. 101: 82, 1935.

The earliest validly published name at specific rank is *C. bengalensis* Spreng. and this should be adopted for this taxon.

Cyperus micans Kunth, Enum. Pl. 2: 12, 1837. *C. ferrugineus* Poir. in Lam. Encycl. 7: 261, 1806, non Linn. 1753; Kuekenh. in Pfreich. 101: 373, 1936.

C. ferruginus Poir. (1806) is a later homonym of *C. ferrugineus* Linn. Sp. Pl. 44, 1753 (see Kuekenh. Pfreich. 101: 629, 1936); so the next validly published name, *C. micans* Kunth should be adopted for this taxon.

Cyperus diluvialis Roem. & Schult. Syst. 2: 124, 1824. *C. inundatus* Roxb. [Hort. Beng. 6, 1814 nom. nud. &] Fl. Ind. 3: 201, 1832; Clarke in J. Linn. Soc. 21: 73, 1884. *Juncellus inundatus* (Roxb.) Clarke in Hook. f. Fl. Brit. Ind. 6: 595, 1893. *C. serotinus* Rottb. var. *inundatus* (Roxb.) Kuekenh. in Pfreich. 101: 318, 1936.

C. diluvialis is the earliest validly published name for this taxon at specific rank; however, if it is treated as a variety of *C. serotinus* Rottb., Kuekenh. combination should be followed as it is the earliest at varietal rank.

Cyperus michelianus (Linn.) Delile, Fl. Aegypt. Illustr. 50, 1813. *Scirpus michelianus* Linn. Sp. Pl. 52, 1753.

This combination has been wrongly attributed to Link (1827); Delile made it early (1813). In a personal communication, J. H. Kern of Rijksherbarium, Leiden informs "...Delile's name is indeed based on the Linnaean binomial, and nomenclaturally it belongs to Linne's type, although Delile's plant is *Cyperus pygmaeus* Rottb."

NEW RECORDS

FOR INDIA:

Fimbristylis squarrosa Vahl var. **esquarrosa** Makino, Bot. Mag. Tokyo 17: 47, 1903; Kern in Reinwardtia 6: 49, 1961. *F. velata* R. Br. Prodr. Fl. Nov. Holl. 227, 1810. *F. aestivalis*, var. *esquarrosa* (Makino) Koyama in J. Fac. Sci. Univ. Tokyo III, 8: 116, 1961.

Tufted, puberulous annuals; culms 6-13 cm long, erect, slender. Leaves 4-9 cm long with pubescent sheaths. Umbels lax, compound or decompound; bracts few, unequal, foliaceous. Spikelets sessile or pedicelled, linear, ellipsoid, acute; rachilla slender, pitted but pits not deep. Glumes ± 2 mm long, oblong, obtuse, brownish, concave; keel prominent with a distinct brown band, with one nerve on each side, excurrent into a short stout mucro. Stamen 1 with brown, oblong, sagittate anther. Styles bifid, villous, with long, pendent, basal hairs which appress the nut to half of its length; style arms glabrous. Nuts ± 0.8 mm long, pale straw-coloured, ovate or ovate-oblong, shortly stipitate, biconvex.

Reclaimed areas of salt lakes, Korlahalli 166, September (CAL).

Like *F. aestivalis* (Retz.) Vahl, this species also forms rosettes and is very much like it, but somewhat larger and the spikelets are always erect. This variety can be distinguished from *F. aestivalis* in the following way:

Spikelets tortuose; styles glabrous	...	...	...	<i>F. aestivalis</i>
Spikelets not tortuose; styles villous with long basal, pendent hairs	...	...	...	<i>F. squarrosa</i> var. <i>esquarrosa</i>

FOR EASTERN INDIA:

Cyperus alulatus Kern in Reinwardtia 1: 463, f. 1, 1952. *C. iria* var. *rectangularis* Kuekenh. in Pfreich. 101: 152, 1935.

Glabrous, annual herbs with slender, triquetrous culms up to 20 cm long. Leaves flaccid and with

recurved margins. Umbels compound; rays 8, each 2-3.5 cm long; bracts 5, foliaceous. Spikelets \pm 3 mm long, compressed, spreading at right angles, ovate; rachilla angular, hispid, flexuous. Glumes \pm 2 mm long, scarcely imbricate, concave, orbicular, emarginate at apex; keel prominent, curved, spinulose at the back; nerves 7, one of them stands apart. Stamens 2. Styles 3-fid. Nuts \pm 1.5 mm long, obovate, brown, triquetrous, concave on the faces, densely punctated, shortly stipitate, mucronate at apex.

Ultadanga, *Korlahalli* 378, August (CAL).

Though a distinct species, closely resembles *C. iria*; the spikelets spreading at right angles to the hispid rachis, spinulose back of keel and 7-nerved glumes of which one nerve standing apart are characteristic of this species. This species is confined to India. Kuekenenthal reported it from N. W. Himalaya, Punjab; further Kern recorded it from Kashmir, U. P., Central India, Maharashtra.

Cyperus laevigatus Linn. Mant. Pl. 2: 179, 1771; Clarke in J. Linn. Soc. 21: 77, t. 3, f. 20-21, & t. 4, f. 33, 1884; Kuekenenth. in Pfreich. 101: 321, f. 5 EH, 1936. *Juncellus laevigatus* (Linn.) Clarke in Hook. f. Fl. Brit. Ind. 6: 593, 1893; Blatt. & McC. in J. Bombay nat. Hist. Soc. 37: 34, 1935.

This species is abundant in sandy beds in Salt lakes; it thrives well even in the marshy habitats along the margins of Salt lakes and also often seen in pure stand of water. A variable plant, can be easily distinguished from other species of the subgenus *Juncellus* by its creeping habit, bright green colour of fleshy terete culms, involucrete leaves and the heads appearing lateral because of one of the bracts which is erect and gives the appearance of being in continuation of the culm.

Reclaimed areas of salt lakes, *Korlahalli* 51 & 639, August-September.

For description see Kuekenenthal (*l.c.*) and Clarke (1884).

Cyperus bulbosus Vahl, Enum. Pl. 2: 342, 1806; Clarke in Hook. f. Fl. Brit. Ind. 6: 611, 1893; Kuekenenth. in Pfreich 101: 125, f. 15, C-E, 1935. *C. jeminicus* Retz. Obs. 4: 11, 1786, non Rottb. 1773; Clarke in J. Linn. Soc. 21: 178, 1884.

This species differs from *C. rotundus* in being bulbous and having linear-lanceolate, acute spikelets.

Garia, *Korlahalli* 664, September (CAL).

For description see Kuekenenthal (*l.c.*) and Clarke (*l.c.*).

Cyperus difformis Linn. var. ***breviglobosus*** Kuekenenth. in Pfreich. 101: 246, 1936.

This variety differs from the typical variety in having slender culms with narrow leaves and bearing condensed capitate heads composed of shorter spikelets.

Salt lakes, *Korlahalli* 672, September (CAL).

Cyperus pumilus Linn. var. ***membranaceus*** (Vahl) Kuekenenth. in Pfreich. 101: 376, 1936; Kern in Reinwardtia 3: 50, 1954. *C. membranaceus* Vahl, Enum. Pl. 2: 330, 1806. *C. pumilus* f. *membranaceus* (Vahl) Clarke in J. Linn. Soc. 21: 44, 1884.

Salt lakes, *Korlahalli* 371, August (CAL).

For description see Kuekenenthal (*l.c.*) and Kern (*l.c.*).

FOR W. BENGAL:

Cyperus flavidus Retz. Obs. 5: 13, 1789.

For synonyms see the nomenclature part of this paper.

A polymorphic species. The rigid culms and the curved spikelets are characteristic of this species. My specimens are extremely reduced and they did not match with any of the herbarium sheets of *C. flavidus* in CAL. Though externally these specimens seem to belong to a different taxon, the floral characters suggested it to be *C. flavidus*; my views were confirmed by J. H. Kern. In his opinion these specimens are one of the numerous forms of this extremely polymorphous species.

Salt lakes, *Korlahalli* 54, September (CAL).

For description see Kuekenenthal (*l.c.*) and Clarke (1884).

Fimbristylis cymosa R. Br. 228, 1810; Kern in Reinwardtia 6: 39, 1961. *F. spathacea* Roth, Nov. Pl. Sp. 24, 1821; Clarke in Hook. f. Fl. Brit. Ind. 6: 640, 1893; Cooke, Fl. Bombay 3: 396, 1958 (Repr. ed.)

A variable species in its leaves, inflorescence and spikelets.

Salt lakes, *Korlahalli* 56 & 637, July-September (CAL).

For description see Cooke (*l.c.*).

CRITICAL NOTES

Cyperus alopecuroides Rottb.

Cyperus alopecuroides Rottb. in the generally accepted sense is a variable plant. Till now no subdivision of this complex has been attempted. In and around Calcutta, I have come across two dis-

tinct races of this species: the first of these races is confined to Salt lakes and is more robust. This race, in my opinion, differs from the typical *Rottboellian alopecuroides* is not having cylindrical spikes and spikelets compressed (this fact has been verified in the field) and spreading at right angles to the naked rachis. The second race is more common and is always less robust; this differs from the typical *alopecuroides* in having lanceate, narrow, terete ash-grey coloured spikelets; though basically distichous, the glumes appress the rachilla thereby enveloping the next glume in series to a greater extent; the rachilla is slender with faint hyaline margins. In the first race the flowers are consistently digynous whereas in the second both di- and trigynous flowers occur; I have failed to find nut formation in the second race. Preliminary acetocarmine studies of pollen grains indicate that they are non-viable. Intensive studies based on specimens from different regions may lead to recognition of these two races into distinct taxa.

Cyperus corymbosus Rottb., *C. pangorei* Rottb. and *C. bengalensis* Spreng.

Santapau in Rec. Bot. Surv. Ind. 16: 267, 1958 [Flora of Khandala (2nd edition)] under *Cyperus pangorei* writes "There is some confusion in the literature as regards this plant and its relation to *C. corymbosus* Rottb. ..." As remarked by him there is much confusion about *C. corymbosus* and closely allied *C. pangorei* and *C. bengalensis*. Fischer in Flora of Madras has merged *C. bengalensis* with *C. corymbosus*, but Kuekenenthal treats it as a variety (*longispiculatus*) of the latter (Pfreich. 101: 82, 1935). Blatter & McCann (J. Bombay nat. Hist. Soc. 37: 270, 1935) have gone to the extent of merging both *C. bengalensis* and *C. pangorei* with *C. corymbosus* on the grounds that "... there are barely any differences worthy of specific rank..."

On a herbarium specimen of *C. pangorei* (Wallich 3351, CAL) Clarke in May, 1883 remarked "I formerly followed Boeckler and other Cyperologists in sorting these critical Cyperaceae by their length of bracts and leaves. I am now satisfied these must not be treated as absolute characters though indicative in a general way. We must either find further characters for these critical species or unite them into one". However, during his studies on Indian species of *Cyperus* (L. Linn. Soc. 1884) he has distinguished *C. bengalensis* from *C. corymbosus* on the grounds that its culms are triquetrous at apex, has narrow divaricate straw-coloured spikelets.

Further he comments on *C. pangorei*, "This plant, abundant in India, is the authentic *C. tegetum* Roxburgh; it differs decisively from *C. corymbosus* in the much more distant glumes which in the dried specimens have the margins incurved and not overlapping".

I feel that Clarke's treatment of recognising them as three distinct species is convincing. Shortly creeping rhizomes, absence of stolons and remotely placed glumes will distinguish *C. pangorei* from the other two species. *C. pangorei* is quite distinct and is less allied to either *C. corymbosus* or *C. bengalensis* than the latter two between themselves; it is more difficult to distinguish the latter two than to distinguish *C. pangorei* from them. In *C. bengalensis*, the culms are triquetrous at apex and they are not articulate when dry; whereas, in *C. corymbosus* the culms are not triquetrous at apex but may be obscurely trigonous and generally they are more or less articulate when dry. Generally the bracts are very short in the former and are more than half as long as the inflorescence in the latter. These characters are overlapping and as such they are "indicative in a general way". However, the spikelets do differ in these two species: they are divaricate, narrower and straw-coloured in *C. bengalensis*; the width of the spikelets is more and they are dark brown coloured and are not divaricate in *C. corymbosus*.

I have found the following key useful in distinguishing the three species:

Rhizomes shortly creeping; glumes somewhat remote	... ..	<i>pangorei</i>
Rhizomes long creeping, often stoloniferous; glumes not remote but mostly densely imbricate:		
Spikelets divaricates, narrow, straw-coloured; culms triquetrous at apex and not articulated when dry	... ..	<i>bengalensis</i>
Spikelets not divaricate, broader, brownish; culms not triquetrous at apex and often articulated when dry	<i>corymbosus</i>

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