

REVISION OF EREMOCHLOA (GRAMINEAE–ANDROPOGONEAE–ROTTBOELLIINAE)

A.G. BUITENHUIS & J.F. VELDKAMP¹

Nationaal Herbarium Nederland, Universiteit Leiden branch,
P.O. Box 9514, 2300 RA Leiden, The Netherlands

SUMMARY

The genus *Eremochloa* Buse (Gramineae) is revised. Eleven species (2 new) and two varieties are recognized. For one species a new name was necessary. The genus appears to be most similar to *Rhynchachne* Desv. of the Andropogoneae–Rottboelliinae.

Key words: *Eremochloa*, Andropogoneae, Gramineae.

INTRODUCTION

Eremochloa was first described by Buse (1854) based on a specimen in the Junghuhn herbarium collected by Ludwig Horner in the grasslands ('prairien Padanglawas') near Portibi, Tapanuli, Sumatra, which he named after its discoverer: *E. horneri* Buse. In his comments he mentioned *Nardus ciliaris* L. (1753), and suggested that this might very well belong to his new genus (in his personal copy, now in L, he noted that his remarks on the Linnaean species ought to be deleted). In fact, as was pointed out by Munro (1862: as *Ischaemum leersioides* Munro, a synonym) the taxa proved to be conspecific, and the correct name is *E. ciliaris* (L.) Merr.

Eremochloa is a rather curious name for a grass growing in Sumatran grasslands, for the Greek words 'eremos' and 'chloe' translate to 'desert grass'. Backer (1936) has suggested 'grass of a dry sunny place'.

As far as the application of the name *Eremochloa* to this genus is concerned, there is a small complication, previously outlined by Veldkamp et al. (1986: 293):

"Brongniart (1831) when he described *Coelorachis* as a 'new' genus, identified the only species with *Aegilops muricata* Retz., now *Eremochloa muricata* (Retz.) Hack. His description and plate, however, were based on two specimens from Malesia, and from these it is clear that he misidentified them. So, what is the type of *Coelorachis*? Some will argue that since the combination *C. muricata* was based on *Aegilops muricata*, the type specimen of that name is also the type of the generic name *Coelorachis*. The result of this is then that *Coelorachis* must replace the name *Eremochloa* Buse, as the latter dates from 1854. This is obviously a most undesirable consequence, as *Coelorachis* will then be used in a sense different from general and ancient custom. Supporters of this line of reasoning will surely favour a proposal for conservation of

1) Corresponding author: e-mail veldkamp@nhn.leidenuniv.nl

Coelorachis. Logically, they then should regard Brongniart's original material, the base for his description and plate, as the preferred lectotype.

Others, taking a different line, will regard the protologue to consist of two discordant elements: the material on which the description and plate were based, and the reference to the basionym. The combination *Coelorachis muricata* will then still remain a synonym of *Eremochloa muricata*, of course, but the description and plate can be referred to as *Coelorachis muricata* auct. non Brongn., and *this* will be considered to be the type of the generic name.

The result of both actions is the same, but the last option is the least involved and therefore to be preferred: the type of the name *Coelorachis* must be sought among the two collections seen and described by Brongniart."

The number of species in the genus varies between authors. Bor (1952) in his notes on this genus, suggested that there are six species, mainly confined to Southeast Asia. Pohl (1980) is more correct when he writes that there are c. 10. All other literature suggests any number between 6 and 10.

As said, Linnaeus described the first species but so completely misplaced it in *Nardus* L. that it remained an overlooked name for a long time.

Retzius (1781) described another one, first in *Aegilops* L., but soon (1783) recognizing this error, placed it in *Rottboellia* L.f., which was a surprisingly good observation in view of the subsequently assumed relationships maintained for about one and a half centuries.

Rottler (1803) annotated a specimen as "genus proprium Manisuri proximum", *Manisuris* L. then being a waste basket for rottboellioid taxa.

Notwithstanding these early suggestions, for nearly 150 years various authors regarded the genus close to or even part of *Ischaemum* L., e.g. Trinius (1832), Buse (1854), Steudel (1854, in an unnamed section of *Andropogon* L. including *Ischaemum*), Munro (1860), and Bentham (1881, as *Ischaemum* sect. *Pectinaria* Benth.). Hackel (1887) raised sect. *Pectinaria* to generic level, but in the generally overlooked Errata retracted the name for the older *Eremochloa*, making the first an invalid generic name. In his phylogenetic tree (1889, t. 2) he joined *Eremochloa* directly to *Ischaemum*, but (p. 261) noted similarities to *Apocopsis* Nees and *Rottboellia*, also.

Hitchcock (1935) apparently was the first to agree with Retzius and recognizing its rottboellioid nature placed it between *Manisuris* and *Hackelochloa* Kuntze. The first then was still a taxonomic dustbin, the latter has now been reduced to *Mnesithea* by Veldkamp et al. (1986). Most subsequent authors agreed with Hitchcock, e.g. Keng (1939) who regarded it as highly specialized whether it was placed in the Ischaemeae or Rottboellieae, but included it after *Ratzeburgia* Kunth, linked to that by *E. ophiuroides* (Munro) Hack. In his phylogenetic diagram he derived both from *Mnesithea*. Veldkamp et al. (1986) reduced *Ratzeburgia* to *Mnesithea* as well.

Pilger (1940, 1954) included *Eremochloa* in the Rottboelliinae J. Presl next to *Hemarthria* R.Br. Like Hackel, Bor (1952) saw a strong resemblance to *Apocopsis*, but mentioned a number of important differences, e.g. structure of the inflorescence, appendages of the lower glume of the sessile spikelet, awned second lemma, number of stamens, and presence of lodicules, from which it is clear that the two are actually not

much related at all and that any similarities are due to convergencies. He made no reference to the Rottboelliinae at all.

For completeness' sake Roberty (1960) must be mentioned, who in a quite novel notion reduced the genus to the monotypic section *Eremochloa* of *Sehima* Forssk., included in the *Ischaemastrae* Stapf. However, because of the available epithet *Pectinaria* his use of *Eremochloa* at this level is superfluous. Subsequently he divided the single species into 8 subvarieties.

It must be noted that all the new infraspecific combinations in this work are invalid being in contradiction with Art. 2 and 5 of the Code (1994) (Roberty, p. 25: "we have adopted an intraspecific hierarchy in which the usual terms have been maintained ... but with a new meaning (!) ... Subspecies, varieties, subvarieties therefore have become temporary groups of incompletely defined forms, not successively subordinated (!), but allied by the degree of division presently visible in the species concerned.")

Clayton (1973) in a numerical analysis of the awnless genera of the Andropogoneae (= Rottboelliinae) found *Eremochloa* in the *Coelorachidastrae* close to *Rhytachne* Desv. Clayton & Renvoize (1986) depicted it as derived from *Coelorachis* (t. 24, p. 355).

The 'diagnose' option of INTKEY (cf. Dallwitz, 1980; Watson et al., 1986) gave as closest genera in decreasing morphological similarity *Glyphochloa* Clayton, *Manisuris*, *Phacelurus* Griseb., *Pseudovossia* A. Camus, *Rhytachne*, *Ratzeburgia*, and *Mnesithea* of the Rottboelliinae. *Apocopsis* differed in such a great number of characters that its relationship (except as a member of the Andropogoneae) is obviously remote.

Kellogg & Birchler (1993) in a cladistic analysis of the same data confirmed the rottboellioid relationship. They found *Eremochloa* closely associated with but not part of the Rottboelliinae. Together with *Rhytachne* the two are sisters of the rottboellioid assemblage containing the Rottboelliinae and 'Maydeae' Harv. By the way, in this analysis *Sehima* stands at the root of all Andropogoneae.

In our view, because of the disarticulating rhachis, the dorsoventrally compressed sessile spikelets, the very reduced pedicelled ones, and the absence of any trace of a lemmatal awn, the genus is most certainly rottboellioid. The analysis of Clayton on one side, and Kellogg & Birchler and our own on the other, suggest that *Rhytachne* is possibly the most suitable outgroup for further analysis. Even so, some resemblance to *Mnesithea* is present. If a single joint of *M. glandulosa* (Trin.) de Koning & Sosef is taken [also suggested by Clayton & Renvoize (1986: 365) as *Coelorachis glandulosa*], an identification with *Eremochloa* is highly suggestive: the marginal tubercles on the lower glume of the sessile spikelet might well be a premonition of the spines found in *Eremochloa*, which may be quite short and inconspicuous in *E. ophiuroides*, anyway (see Pohl, 1980: t. 78). See also the note on *R. mutica* Llanos under *E. muricata*.

In view of the analysis this resemblance seems most likely a convergence. In *Mnesithea* the compound inflorescence is quite different, and the first floret is sterile to epaleate. [Veldkamp et al. (1986) erroneously stated for *Eremochloa* (key p. 301, lead 4b) that the first floret would be sterile, and (lead 9a) the rhachis tough, not fragile.] It may be noted that the sculpture of the first glume of the sessile spikelet in the species of *Mnesithea* is extraordinarily variable, and the presence of the marginal tubercles could well be a variation on a theme.

DISTRIBUTION

Some species have disjunct distributions, of which we note:

Eremochloa bimaculata: N Thailand, C Cambodia, Vietnam to N Central China, then 'jumping' to the Western Province of Papua New Guinea and northern Australia. The disjunction crossing the Wallace Line (in whatever definition) is reminiscent of that of *Germainia capitata* Balansa & Poitr., which also occurs in Indochina and S China, and then in the Aru Islands, scatteredly in New Guinea, and so far once in Queensland. Another example is *Hemarthria pratensis* (Balansa) Clayton from Thailand to Vietnam and the Western Province of Papua New Guinea.

Eremochloa ciliatifolia was described from S Burma, otherwise we have only seen it from S Vietnam.

Eremochloa eriopoda: NE Thailand to Vietnam, then 'jumping' to SE Celebes, reminiscent of the distribution of *Aponogeton lakhonensis* A. Camus.

Eremochloa muricata: S India, Sri Lanka, 'jumping' to Burma and Thailand, and again to Cape Flattery, Cook District, Queensland, Australia. The latter place is quite remote and very little visited, so human introduction seems unlikely. It was only found once, and the native tribesmen do not know it. The collector, Mr. I.B. Staples (Mareeba), thought a possible mix-up with Indian collections most unlikely (Mr. J. Clarkson, MBA, in litt.).

Eremochloa petelotii: we have seen only 3 collections from three different countries: E Thailand, C Cambodia, and C Vietnam. As it is said to be common in rice fields this scattered distribution is most likely due to undercollecting.

METHODS

The compilation and subsequent analysis of the data was greatly aided by the use of the DELTA (Dallwitz, 1980; Watson et al., 1986) and affiliated MS-DOS programs: TAXASOFT (by E.J. Gouda, Utrecht) for the general management of the data, INTKEY (L. Watson & M. Dallwitz, vs. 3.14, 1998) for various analyses, comparisons, and diagnoses, and DEDIT and KCONI (R.J. Pankhurst, vs. 1995, 1992, resp.) for the construction of the keys.

EREMOCHLOA

Eremochloa Buse in Miq., Pl. Jungh. (Feb. 1854) preprint 17; (Aug. 1854) 357; Bor, Kew Bull. 1 (1952) 309. — *Sehima* Forssk. sect. *Eremochloa* Roberty, Boissiera 9 (1960) 317, nom. superfl. (see next). — Type: *Eremochloa horneri* Buse [= *Eremochloa ciliaris* (L.) Merr.].

Ischaemum L. sect. *Pectinaria* Benth., J. Linn. Soc., Bot. 19 (1882) 71. — *Pectinaria* Benth. ex Hack. in Engl. & Prantl, Nat. Pflanzenfam. 2, 2 (1887) 26, 126, nom. inval. — Lectotype: *Ischaemum ophiuroides* Munro [= *Eremochloa ophiuroides* (Munro) Hack.], here designated. *Sehima* auct. non Forssk.

Caespitose perennials, branching extra-vaginally at base. Ligule collar-shaped, membranous. Blades flaccid, linear. Inflorescence a spike-like, simple, solitary, espatheate

raceme. Raceme rhachis undulate, joints disarticulating, clavate, terete, without a basal callus-knob. Spikelets paired, second. Sessile spikelets imbricate, not embedded in the joints, bisexual, dorsoventrally compressed. Glumes very dissimilar, awnless. Lower glume 2-keeled, 4–9-nerved, submarginally setose, setae scaberulous. Upper glume ovate, acute, keeled, 3-nerved, nerves distally with transverse veinlets. First floret paleate, male. First lemmas more or less equalling the second ones, entire, 0-nerved. Second lemma awnless. Palea as the lemma. Lodicules 2, free, fleshy, glabrous. Stamens 3 (see note). Styles free to their bases. Stigmas 2, red. Fruit small, not grooved, dorsoventrally compressed, smooth. Embryo large. *Pedicels* free of the rhachis. Pedicelled spikelets absent, or more or less reduced to a subule, rarely better developed, and exceptionally 2-flowered with the first floret male, the second one bisexual (once in *E. bimaculata*, once in *E. ophiuroides*), anthers 3. $\times = 9$ (*E. ophiuroides*).

Distribution — 11 species from India and Sri Lanka to S China, southwards through Indochina, to Australia. In Malesia only in the Western Province of Papua New Guinea (*E. bimaculata*, *E. ciliaris*) and a few places in Sumatra, Peninsular Malaysia, Singapore, Luzon, Aru Isl., Irian Jaya (*E. ciliaris*), and Celebes (*E. ciliaris*, *E. eriopoda*).

Note — The stamens are nearly always 3, but in the only floret of *E. lanceolata* that contained any, there were 2. These were young and a third one did not seem to have been already lost, but this count needs confirmation. Therefore the number of stamens is omitted in the descriptions.

KEY TO THE TAXA

- 1a. Lower glume apex without apical wings 2
- b. Lower glume apex with apical wings 6
- 2a. Pedicel subulate 3
- b. Pedicel oblique-obovoid 4
- 3a. Cataphylls woolly hairy. Culm nodes appressed ciliate. Sheaths glabrous. Ligule ciliolate. Blades 1.5–4 mm wide, glabrous, margins glabrous, acumen cuspidate. Lower glume setae flattened at base. — NE & E Thailand to Vietnam, Celebes **5. *E. eriopoda***
- b. Cataphylls glabrous. Culm nodes glabrous. Sheaths hirsute. Ligule glabrous. Blades c. 1 mm wide, pilose, margins pilose, acumen acute. Lower glume setae terete. — Blades 3–6 cm long. Spikelets 3.4–3.6 by 1.5–2.5 mm. E Thailand **6. *E. lanceolata***
- 4a. Ligule ciliolate. Joints at base with a ring of short cilia. — Spikelets 1.6–5 mm long. Not in Sri Lanka 5
- b. Ligule glabrous. Joints glabrous. — Blades 2–5 mm wide, acumen acute to cuspidate. Joints 2.9–4.7 mm long. Lower glume setae often slightly expanded at base. Anthers in second floret 2.1–2.5 mm long. Pedicelled spikelet reduced to a subule. S India, Sri Lanka **9. *E. pectinata***
- 5a. Blades folded, acumen acute to cuspidate. Joints 0.9–3 mm long. Lower glume setae flattened at base. Anthers in second floret 1.2–2.1 mm long. Pedicelled spikelet absent. — Blades 2–6 mm wide. Burma to SE China, Malesia, N Australia introduced in California **3. *E. ciliaris***

- b. Blades flat, acumen retuse. Joints 3–3.4 mm long. Lower glume setae terete, often slightly expanded at base. Anthers in second floret c. 2.6 mm long. Pedicelled spikelet present. — Blades 5–10 mm wide. S Burma, S Vietnam **4. *E. ciliatifolia***
- 6a. Joints glabrous 7
- b. Joints at base with a ring of short cilia 9
- 7a. Blade margins glabrous, pilose, or pectinate at base. Lower glume setae straight, longest ones 0.9–1.7 mm long. Pedicel 3–5.2 mm long, 0.7–1.2 times as long as the sessile spikelet. — Blades folded or flat 8
- b. Blade margins scabrous. Lower glume setae hook-like, longest ones 0.5–0.7 mm long. Pedicel 7.5–8.7 mm long, 1.2–1.9 times as long as the sessile spikelet. — Blades flat. Setae terete. Joints 2–2.2 mm long. E Thailand, C Cambodia **10. *E. petelotii***
- 8a. Culms, sheaths, and blades pilose. Spikelets 3.7–3.9 mm long. Lower glume with small apical wings. Upper glume 3.7–3.9 mm long. Pedicel subulate, 3–3.4 mm long. — Blades 2–3 mm wide. N & NE Thailand **1. *E. attenuata***
- b. Culms, sheaths, and blades glabrous, or blades pilose at base with bulbous-based hairs, margins glabrous or pectinate at base. Spikelets 4.5–5 mm long. Lower glume with large apical wings. Upper glume 4.5–4.9 mm long. Pedicel oblique-obovoid to broadly ellipsoid, 4.8–5.2 mm long. — S India, Sri Lanka, Burma, Thailand: C, SW, Peninsular **7. *E. muricata***
- 9a. Culms basal internodes hollow. Spikelets ovate to ellipsoid. Lower glume setae straight, flattened at base, longest ones 0.6–2.5 mm long 10
- b. Culms basal internodes with marrow. Spikelets ovate-oblong. Lower glume setae hook-like, terete, longest ones 0.2–0.3 mm long. — Vietnam to C and S China, introduced as a lawn grass elsewhere (Bombay, Malawi, S USA, Caribbean, Hawaii) **8. *E. ophiuroides***
- 10a. Blades acumen acute. Longest setae of the first glume shorter than the width of the glume. — Thailand to China, Australia **2. *E. bimaculata***
- b. Blades acumen cuspidate. Longest setae of the first glume as long as to longer than the width of the glume. — Sri Lanka **11. *E. zeylanica***

1. *Eremochloa attenuata* Stapf ex Buitenhuis, *spec. nov.* — Fig. 1

A congeneribus culmis pilosis, internodiis basalibus cavis, vaginis laminae marginibus pilosis, articulis glabris, spiculis 3.7–3.9 mm longis, glumae primae setis teretis saepe basi paulo dilatatis, longissimis glumae latitudine brevioribus, pedicello subulato, spicula pedicellata involuta differt. — Typus: *Kerr 8686* (holo BM; P).

Rhizome slender. Cataphylls glabrous. Culms 0.16–0.42 m long, branching extravaginally at base, basal internodes hollow, pilose, nodes glabrous. Sheaths pilose. Ligule 0.4–0.6 mm long, ciliolate. Contra-ligule absent. Blades folded, 7–13 cm by 2–3 mm, obtuse, acumen acute, pilose, at base with bulbous-based hairs, margins pilose. *Racemes* solitary, straight, 9–16 cm long. Joints 2–3 mm long, 0.5–0.7 times as long as the sessile spikelet, glabrous. Spikelets ovate, 3.7–3.9 by 1.9–2 mm. *Lower glume* glabrous or sparsely puberulous, 7–9-nerved, nerves distally with transverse veinlets, setae straight, terete, often slightly expanded at base, longest ones 1.4–1.7 mm long, shorter

than the width of the glume, apex with small apical wings, acumen acute. Upper glume 3.7–3.9 mm long, keeled in the middle in the lower half and along the margins, glabrous, 3-nerved, nerves distally with transverse veinlets. Anthers in first floret c. 1.5 mm long, in second floret c. 2.2 mm long. Fruit ellipsoid. *Pedicel* subulate, 3–3.4 mm long, 0.75–0.9 times as long as the sessile spikelet. Pedicelled spikelet absent.

Distribution — Thailand: N (Chiang Mai: Doi Sutep), NE (Udawn: Kao Krading).

Habitat — Open grassy ground, dry dipterocarp forest; c. 1200 m altitude.

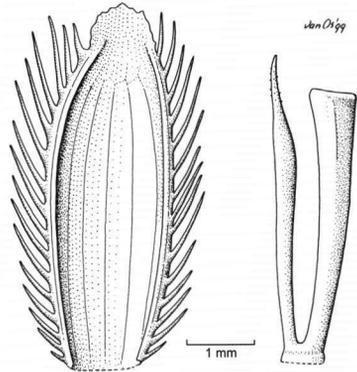


Fig. 1. *Eremochloa attenuata* Stapf ex Buitenhuis. Lower glume from inside; joint with remnant of pedicelled spikelet [Kerr 8686, BM].

2. *Eremochloa bimaculata* Hack. — Fig. 2

Eremochloa bimaculata Hack. in A.DC., Monogr. Phan.

6 (1889) 265. — [*Sehima ciliare* (L.) Roberty subvar.

bimaculatum Roberty, Boissiera 9 (1960) 317, nom. inval.] — Type: Griffith KD 6774 [holo B†, fragm. in L; G (fide Roberty, 1960), K].

Eremochloa muricata auct. austr., non Hack.

Rhizome slender. Cataphylls glabrous. Culms 0.1–0.65 m long, branching extra-vaginally at base, basal internodes hollow, glabrous or sometimes hirsute, nodes glabrous to ciliate. Sheaths glabrous to hirsute. Ligule 0.5–1 mm long, ciliolate. Contra-ligule absent. Blades folded, 2–20 cm by 1–3 mm, obtuse, acumen acute, glabrous or pilose, sometimes at base with bulbous-based hairs, margins glabrous to pilose, sometimes pectinate at base. *Racemes* solitary, straight, 7–27 cm long. Joints 1.5–10 mm long, 0.5–1.4 times as long as the sessile spikelet, at base with a ring of short cilia, hairs 0.1–0.3 mm long. Spikelets ovate to elliptic, 2.8–6.5 by 1.2–2.2 mm. *Lower glume* glabrous to sparsely puberulous, 5–8-nerved, nerves not anastomosing or distally with transverse veinlets, setae straight, flattened at base, longest ones 0.6–1.5 mm long, much shorter than the width of the glume, apex with small apical wings, acumen acute. Upper glume 2.8–6.3 mm long, keeled in the middle in the lower 1/2 to 2/3 and along the margins, glabrous, 3-nerved, nerves distally with transverse veinlets. Anthers in first floret 1–1.8 mm long, in second floret 1.6–2.3 mm long. Fruit ellipsoid. *Pedicel* obliquely obovoid, 1.6–10 mm long, 0.5–1.33 times as long as the sessile spikelet. Pedicelled spikelet 0.1–5 mm long, reduced to a very short rudiment, or a subule, or present as a well-developed spikelet.

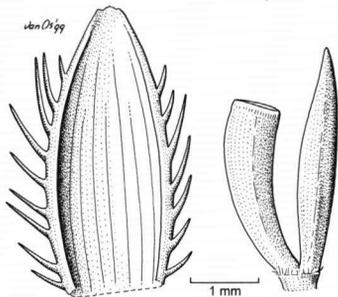


Fig. 2. *Eremochloa bimaculata* Hack. Lower glume from inside; joint with remnant of pedicelled spikelet [Griffith KD 6774, K].

Distribution — Burma (?), Thailand: N (Lampang), E (Si Saket), SE (Chantaburi), C Cambodia: (Kompong Chhnang), Vietnam: widespread, China: N Central (Sichuan), S Central

(Yunnan, Guizhou), SE (Hubei), Malesia: Papua New Guinea (Western Prov.); Australia: Queensland, New South Wales (N Coast, Northern Tablelands, NW Slopes).

Habitat — Savannah forests, deciduous dipterocarp-oak forest, secondary forest, partial clearings, near dry watercourse, rice fields, common on open, grassy, wet, badly drained sandy soil (disturbed, e.g. by fire) or on clay, near swamp, e.g. with *Banksia*, *Calocedrus*, *Casuarina*, *Cunninghamia*, *Eriachne*, *Eucalyptus*, *Hypoxis*, *Lo-belia*, *Melaleuca*, *Panicum*, and *Pteridium*, somewhat salt tolerant; 0–1600 m altitude.

Notes — The unknown reviewer reported the species for Burma without further specification. It is noted for its disjunct distribution with the Australian specimens being slightly different from the Continental Asian ones. Also, the New Guinea material, which one would expect to be like the Australian, is, on the contrary, ‘typical’ Asian. The representatives differ more or less as follows, which seems insufficient to distinguish two taxa.

- Longest setae of first glume 0.7–1.5 mm long. Pedicel 1.6–3.6(–4.5) mm long, 0.5–0.8 times as long as the sessile spikelet. Pedicelled spikelet c. 0.1 mm long
..... **E. bimaculata** s.s.
- Longest setae of first glume c. 0.6 mm long. Pedicel 4.9–10 mm long, 0.8–1.33 times as long as the sessile spikelet. Pedicelled spikelet (0.1–)1–5 mm long . .
..... **E. bimaculata** in Australia.

Once a completely developed second glume was seen (*Hubbard 5162*, L, from Queensland, Darling Downs District).

3. Eremochloa ciliaris (L.) Merr. — Fig. 3

Eremochloa ciliaris (L.) Merr., Philipp. J. Sci. 1, Suppl. (1906) 331. — *Nardus ciliaris* L., Sp. Pl. 1 (1753) 53. — *Eremochloa ciliaris* (L.) Merr. var. *genuina* A. Camus, Fl. Indo-Chine 7 (1922) 291, nom. inval. — [*Sehima ciliare* (L.) Roberty, Boissiera 9 (1960) 317 (incl. subvar. *ciliare*), nom. inval.] — Lectotype: *Herb. Linn. 73.7* (holo LINN, microfiche IDC), here designated.

Eremochloa horneri Buse in Miq., Pl. Jungh. 3 (Feb. 1854) preprint 17; (Aug. 1854) 357. — [*Sehima ciliare* (L.) Roberty subvar. *horneri* Roberty, Boissiera 9 (1960) 318, nom. inval.] — Type: *Horner 137* (holo L, no. 908.98-77, photo in BRI).

[*Ischaemum pectinatum* auct. non Trin.: Nees in Meyen, Nova Acta Phys.-Med. Acad. Caes. Leop.-Carol. Nat. Cur. 19, Suppl. (1841) preprint 68; (1843) 200, pro specim. *Meyen s.n.*] — *Andropogon falcatus* Nees ex Steud., Syn. Pl. Glumac. 1 (July 1854) 369. — *Ischaemum falcatum* Nees ex Thwaites, Enum. Pl. Zeyl. (1864) 436, pro comb. — *Eremochloa falcata* Hack. in A. DC., Monogr. Phan. 6 (1889) 263. — [*Sehima ciliare* (L.) Roberty subvar. *falcatum* Roberty, Boissiera 9 (1960) 318, nom. inval.] — Type: *Meyen s.n.* (holo B†; Herb. Trinius 86.1, LE, fragm., IDC microfiche BT16/1).

Ischaemum leersioides Munro [in Seem., Bot. Voy. Herald. (1857) 424, nomen], Proc. Amer. Acad. Arts 4 (1860) 363. — *Eremochloa leersioides* (Munro) Hack. in A. DC., Monogr. Phan. 6 (1889) 264. — [*Eremochloa leersioides* (Munro) Hack. var. *genuina* A. Camus, Notul. Syst. (Paris) 3 (1914) 86, nom. inval. — Lectotype: *C. Wright s.n.* (holo K n.v.; L, no. 908.90-1813, P), here designated; ‘Hong Kong’].

Eremochloa malayana Ridl., Mat. Fl. Malay Penins. 3 (1907) 155. — Type: *Ridley 5154* (holo SING).

Eremochloa leersioides (Munro) Hack. var. *gigantea* A. Camus, Notul. Syst. (Paris) 3 (1914) 87. — *Eremochloa ciliaris* (L.) Merr. var. *gigantea* A. Camus, Fl. Indo-Chine 7 (1922) 291. — Type: *Eberhardt 1890* (holo P).

- Eremochloa leersioides* (Munro) Hack. var. *pygmaea* A. Camus, Notul. Syst. (Paris) 3 (1914) 87. — *Eremochloa ciliaris* (L.) Merr. var. *pygmaea* A. Camus, Fl. Indo-Chine 7 (1922) 291. — Lectotype: *Bauche* 97 (holo P); here designated.
- Eremochloa leersioides* (Munro) Hack. var. *thorelii* A. Camus, Notul. Syst. (Paris) 3 (1914) 87. — *Eremochloa ciliaris* (L.) Merr. var. *thorelii* A. Camus, Fl. Indo-Chine 7 (1922) 291. — Type: *Thorel s.n.* (holo P).
- Eremochloa ciliaris* (L.) Merr. var. *elata* Reeder, J. Arnold Arbor. 29 (1948) 351. — Type: *Brass* 7808 (holo US).

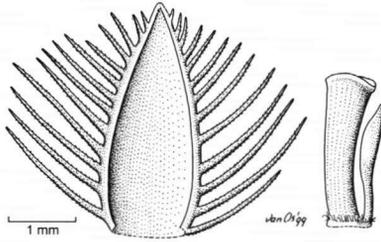


Fig. 3. *Eremochloa ciliaris* (L.) Merr. Lower glume from inside; joint with remnant of pedicelled spikelet [Horner 137, L].

Rhizome slender. Cataphylls glabrous or appressed ciliate. Culms 0.11–1.2 m long, branching extra-vaginally at base, basal internodes with marrow, or hollow or solid, glabrous or sometimes hirsute, nodes glabrous, ciliate or appressed ciliate. Sheaths glabrous to pilose. Ligule 0.4–1.2 mm long, ciliolate. Contra-ligule absent or represented by a hairy zone. Blades folded, 2–23 cm by 2–6 mm, obtuse, acumen acute to cuspidate, glabrous to pilose, at base with bulbous-based hairs, margins glabrous to pilose, pectinate at base. Racemes 1–3 together, straight to falcate, 4.5–43 cm long. Joints 0.9–3 mm long,

0.22–0.75 times as long as the sessile spikelet, at base with a ring of short cilia, hairs 0.05–0.7 mm long. Spikelets ovate to ovate-oblong, 1.6–5 by 1–3 mm. Lower glume glabrous to sparsely puberulous, obscurely 6- or 7-nerved, nerves distally with transverse veinlets, setae straight, flattened at base, longest ones 1–5 mm long, much longer than the width of the glume, apex without apical wings, acumen acute. Upper glume 1.3–5 mm long, keeled in the middle in the lower half and along the margins, glabrous to puberulous in the lower half, 3-nerved, nerves distally with transverse veinlets. Anthers in first floret 0.5–2 mm long, in second floret 1.2–2.1 mm long. Fruit ellipsoid. Pedicel oblique-obovoid, 0.8–3.75 mm long, 0.5–1 times as long as the sessile spikelet. Pedicelled spikelet absent.

Distribution — Burma (Pegu valley); Thailand: N (Chiang Mai, Phitsanulok), NE (Loei, Nong Khai, Udon Thani), E (Chaiyaphum, Surin, Roi Et), C (Sing Buri, Bangkok), SE (Chon Buri, Trat), SW (Uthai Thani, Ratchaburi), Peninsular (Surat Tani, Phangnga, Trang, Songkhla, Satun, Narathiwat); Laos; Cambodia: W (Kompong Chhnang), N (Stung Treng); Vietnam: N (Lang Son, Hai Phong, Kouainak, Hue, Tourane), S (Saigon); China: S Central (Yunnan, Guangzhou, Guangxi, Hainan), SE (Guangdong, Fujian, Macao, Hong Kong); Taiwan (once in Changhua, fide Fl. Taiw. 5); Malesia: Sumatra (Padangsidempuan, Kota Pinang), Peninsular Malaysia (Kedah, Kelantan, Pahang), Singapore, Philippines (Luzon), Celebes, Aru Isl., Irian Jaya, Papua New Guinea (Western Prov.), Australia: Northern Queensland (Torres Strait (Badu Isl., Moa Isl.)), Cook Distr.; once found in the USA [‘collected before a Chinese warehouse at S. Francisco 1862’, *Anonymous s.n.*, MO; *Bolander* according to Turber in Nash, Fl. N. Am. 17 (1909) 95].

Habitat — Prairies and grasslands, deciduous dipterocarp or pine forests, disturbed areas in primary forest; 70–1210 m altitude.

Uses — Said to have none [Backer in Heyne, *Kruidachtige grassen van Nederlandsch-Indië* (1922) 43; Burkill, *Dict. Econ. Prod. Malay Penins.* (1935) 935; Gilliland, *Rev. Fl. Malaya* 3 (1971) 277].

Notes — In *Rahmat Si Toroes 3437* (Sumatra East Coast) the normally solitary spike is split into a fascicle of spikes.

Ms. Camus and Reeder have distinguished some varieties, but due to the general wide variability these cannot be maintained [as was also implied by Schmid, *Agron. Trop. (Nogent-sur-Marne)* 13 (1958) 183–184].

4. *Eremochloa ciliatifolia* Hack. — Fig. 4

Eremochloa ciliatifolia Hack. in A. DC., *Monogr. Phan.* 6 (1889) 265. — [*Ischaemum helferi* Munro, *Cat. Griffith, Falconer & Helfer Pl.* (1865) 65, nomen]. — *Eremochloa helferi* Munro ex Hack. ex Hook. f., *Fl. Brit. India* 7 (1896) 141, nom. superfl. — [*Sehima ciliare* (L.) Roberty subvar. *ciliatifolium* Roberty, *Boissiera* 9 (1960) 318, nom. inval.]. — Type: *Griffith KD 6776* (holo B; K, L, MO, US).

Rhizome slender. Cataphylls are glabrous. Culms 0.2–0.6 m long, branching extra-vaginally at the base, basal internodes solid, glabrous or pilose, nodes ciliate. Sheaths glabrous, or margins pilose. Ligule c. 0.4 mm long, ciliolate. Contra-ligule absent or represented by a hairy zone. Blades flat, 4–15 cm by 5–10 mm, obtuse, acumen retuse, glabrous to pilose, margins glabrous to pilose. *Racemes* solitary, straight, 4–7 cm long. Joints 3–3.4 mm long, 0.75–0.8 times as long as the sessile spikelet, at the base with a ring of short cilia, hairs 0.4–0.8 mm long. Spikelets ovate, 4–4.1 by c. 2.2 mm. *Lower glume* glabrous, 4- or 5-nerved, nerves distally with transverse veinlets, setae straight, terete, often slightly expanded at base, longest ones 2.8–3.2 mm long, much longer than the width of the glume, apex without apical wings, acumen acute. Upper glume 3.9–4 mm long, keeled in the middle over the entire length and along the margins or in the lower half and along the margins, glabrous, 3-nerved, nerves distally with transverse veinlets. Anthers in first floret c. 2 mm long, in second floret c. 2.6 mm long. Fruit ellipsoid. *Pedicel* oblique-obovoid, 2.2–2.4 mm long, 0.9–1.4 times as long as the sessile spikelet. Pedicelled spikelet reduced to a subule, 1.3–3.2 mm long.

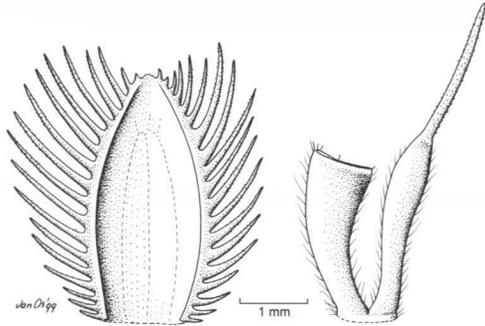


Fig. 4. *Eremochloa ciliatifolia* Hack. Lower glume from inside; joint with remnant of pedicelled spikelet [*Griffith KD 6776*, L].

Distribution — S Burma, S Vietnam (Baie de Cameran, Phu Khanh Prov., Dac Lac Prov., Lang Bian Range, 83 km S of Pleiku; 15 km E of M'Drak).

Habitat — Grasslands, dipterocarp woodland with *Heteropogon contortus* (L.) Roem. & Schult. dominant in the understorey, soil sandy or gravely loam, pH 6.0, locally dominant, c. 500 m altitude.

Note — Note the disjunct distribution.

5. *Eremochloa eriopoda* C.E. Hubb. — Fig. 5

Eremochloa eriopoda C.E. Hubb. in Hook., Icon. Pl. (1939) t. 3376. — Type: Kerr 8354 (holo K).

Rhizome slender. Cataphylls are woolly hairy. Culms 0.19–0.72 m long, branching extra-vaginally at base, basal internodes hollow or solid, glabrous, nodes appressed ciliate. Sheaths glabrous. Ligule 0.25–0.7 mm long, ciliolate. Contra-ligule absent. Blades flat or folded, 2.5–30 cm by 1.5–4 mm, obtuse, acumen cuspidate, glabrous, margins glabrous. *Racemes* 1–3 together, straight, 3.5–18 cm long. Joints 1.1–2.2 mm long, 0.25–0.6 times as long as the sessile spikelet, at base with a ring of short cilia, hairs 0.1–0.5 mm long. Spikelets ovate, 3.3–5 by 1.5–2.5 mm.

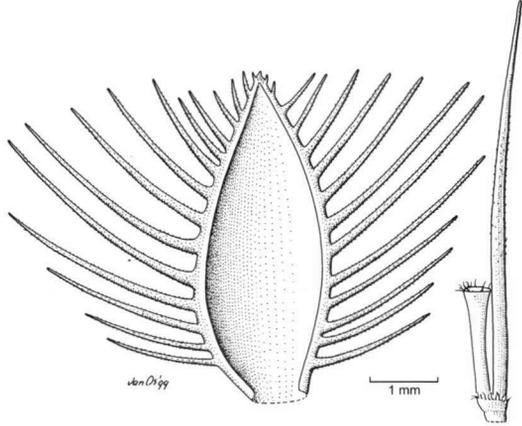


Fig. 5. *Eremochloa eriopoda* C.E. Hubb. Lower glume from inside; joint with remnant of pedicelled spikelet [Murata et al. T-49670, L].

Lower glume glabrous or sparsely puberulous, 5- or 6-nerved, nerves distally with transverse veinlets, setae straight, flattened at base, longest ones 1.8–3.75 mm long, longer than the width of the glume, apex without apical wings, acumen acute. Upper glume 3.4–5 mm long, keeled in the middle in the lower half and along the margins, glabrous, 3-nerved, nerves distally with transverse veinlets. Anthers in first floret 1.3–1.8 mm long, in second floret 1.8–2.3 mm long. Fruit ellipsoid or ellipsoid-oblong. *Pedicel* subulate, 3.3–5.8 mm long, 0.8–1.3 times as long as the sessile spikelet. Pedicelled spikelet absent.

Distribution — Thailand: NE (Nong Khai), E (Si Sa Ket, Ubon Ratchathani); Cambodia: C (Kompong Thom); Laos: N Central (Bolikhamsai); Vietnam: N (Hue), S (Kontum); Malesia: SE Celebes (Rumia).

Habitat — Open rocky area in dry deciduous forest, on sandy (saline) soils, edge of high or secondary tropical seasonal rain forest; 40–210 m altitude.

Note — The distribution has a curious disjunction between SE Asia and SE Celebes.

6. *Eremochloa lanceolata* Buitenhuis, *spec. nov.* — Fig. 6

A congeneribus cataphyllis glabris, culmi internodiis basalibus cavis, nodis glabris, vaginis hirsutis, ligula glabra, laminis c. 1 mm latis pilosis, articulis 1.2–1.3 mm longis spicula sessili c. 0.4-plo longioribus, glumae primae setis teretibus longissimis 2–3.5 mm longis, apice inalato, flosculi inferioris antheris 2 (?), pedicello subulato, c. 5 mm longo, spicula sessili c. 1.5-plo longiore differt. — Typus: *Nanakorn 1253* (holo NY; BKF n.v.).

Cataphylls glabrous. Culms 0.3–0.45 m long, branching extra-vaginally at base, basal internodes hollow, glabrous, nodes glabrous. Sheaths hirsute. Ligule c. 0.5 mm long, glabrous. Contra-ligule absent. Blades folded, 3–6 cm by c. 1 mm, obtuse, acumen acute, pilose, margins pilose. *Racemes* 1 or 2 together, straight, 5–15 cm long. Joints

1.2–1.3 mm long, 0.4 times as long as the sessile spikelet, at base with a ring of 0.3 mm long hairs. Spikelets ovate, 3.4–3.6 by c. 1.5 mm. *Lower glume* glabrous or sparsely puberulous, 5- or 6-nerved, nerves distally with transverse veinlets, setae straight, terete, longest ones 2–3.5 mm long, much longer than the width of the glume, apex without apical wings, acumen acute. Upper glume 3.4–3.6 mm long, keeled in the middle in the lower half and along the margins, glabrous, 3-nerved, nerves distally with transverse veinlets. Anthers in first floret 2 (see note sub generic description), 1.6–1.7 mm long, none seen in the second floret. Fruit ellipsoid or ellipsoid-oblong. *Pedicel* subulate, c. 5 mm long, c. 1.5 times as long as the sessile spikelet. Pedicelled spikelet absent.

Distribution — Thailand: E, Ubon Ratchathani ('Ubol'), Phataem Historic Park.

Habitat — On dry sandy soils, in open areas. Edge of dry dipterocarp forest; about 150 m altitude.

Note — Only known from the type.

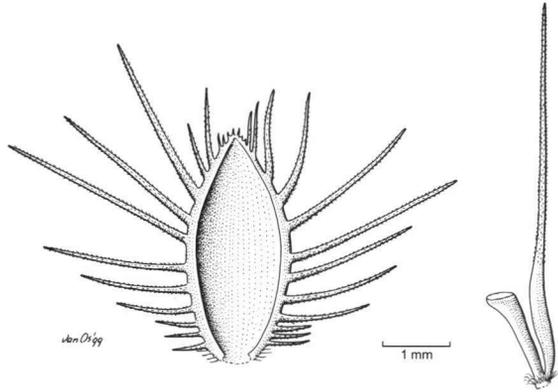


Fig. 6. *Eremochloa lanceolata* Buitenhuis. Lower glume from inside; joint with remnant of pedicelled spikelet [Nanakorn 1253, NY].

7. *Eremochloa muricata* (Retz.) Hack. — Fig. 7

Eremochloa muricata (Retz.) Hack. in A. DC., Monogr. Phan. 6 (1889) 262. — *Aegilops muricata* Retz., Observ. Bot. 2 (1781) 27. — *Rottboellia muricata* Retz., Observ. Bot. 3 (1783) 12. — *Coelorachis muricata* Brongn. in Duperrey, Voy. Monde, Phan. (1831) 64, t. 14. — [*Sehima ciliare* (L.) Roberty subvar. *muricatum* Roberty, Boissiera 9 (1960) 318, nom. inval.]. — Type: König s.n. [holo LD; C, K; see Slageren, Wild wheats: a monograph of Aegilops L. and Amblyopyrum (Jaub. & Spach) Eig (1994) 429].

Ischaemum pectinatum Trin., Mém. Acad. Imp. Sci. St. Pétersbourg, VI, Sci. Math. 2 (1832) 296. — Lectotype: Wallich Burm. Cat. 1015 in Herb. Trinius 95.3 (holo LE, IDC microfiche BT 16/1, see note), designated here.

Eremochloa truncata W. C. Wu, J. S. China Agric. Univ. 9, 4 (1988) 46. — Type: Huang Ya-Wen Oct. 1985 (holo Herb. South China Agric. Univ.).

Rhizome slender. Cataphylls glabrous. Culms 0.12–0.7 m long, branching extravaginally at base, basal internodes hollow or solid, glabrous, nodes glabrous or ciliate. Sheaths glabrous. Ligule 0.1–1 mm long, ciliolate. Contra-ligule absent. Blades flat or folded, 2–25 cm by 2–7 mm, obtuse, acumen acute or cuspidate, glabrous or pilose, at base with bulbous-based hairs, margins glabrous or pectinate at base. *Racemes* 1–4 together, straight, 8–32 cm long. Joints 2.6–3.9 mm long, 0.6–0.7 times as long as the sessile spikelet, glabrous. Spikelets ovate or ovate-oblong, 4.5–5 by 1.8–2.2 mm. *Lower glume* glabrous, 5–7-nerved, nerves distally with transverse veinlets, setae straight, terete, often slightly expanded to flattened at base, longest ones 0.9–1.5 mm

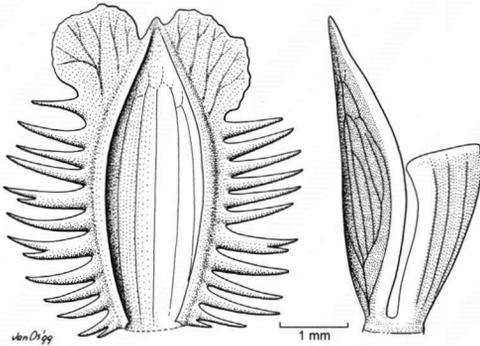


Fig. 7. *Eremochloa muricata* (Retz.) Hack. Lower glume from inside; joint with remnant of pedicelled spikelet [CP 3848 (*Thwaites*), L].

long, (much) shorter than the width of the glume, apex with large apical wings, acumen acute. Upper glume 4.5–4.9 mm long, keeled in the middle over the entire length and along the margins or in lower 2/3 and along the margins, glabrous, 3-nerved, nerves distally with transverse veinlets. Anthers in first floret (0.7–)2.6–2.8 mm long, in second floret (0.7–)2.2–3.2 mm long. Fruit ellipsoid. *Pedicel* obliquely obovoid or broadly ellipsoid, 4.8–5.2 mm long, 0.9–1.2 times as long as the sessile spikelet. Pedicelled spikelet absent.

Distribution — India: Tamil Nadu, Chingleput Prov.; Sri Lanka: Maradan Maduwa, N Central Province, Peradeniya; Burma: N (Mandalay), C (Toungoo); Thailand: C (Lop Buri), SW (Ratchaburi), Peninsular (Nakhon Si Thammarat); Australia: Cook District (Cape Flattery).

Habitat — In damp places under shade in patches of woods and scrub jungle on open sandy soil, on red sandy clay soil, grassy pan drying up, dry deciduous dipterocarp forest; 0–400 m altitude.

Notes — Sheet 95.2 of the Trinius herbarium is labeled as the type of *Ischaemum pectinatum*. Drawing and analyses show that it is *E. muricata*. There are references on it to *Aegilops ciliaris* König and herbarium Willdenow 2282, which is *Eremochloa pectinata* Buitenhuis, q.v. These notes are to be regarded as an attempt at identification.

Trinius stated that his species came from Burma, and 95.3 is the only one available with that provenance. It is labeled *Rottboellia pectinata* Wallich *Birm. Cat. 1015*, a series of collections gathered in 1826–1827 but no duplicate could be located in the Wallich Herbarium in K (Dr. S.A. Renvoize, K, pers. comm.). It is not *Wallich Cat. 8867* as might be inferred from the citation in the Flora of British India, as that collection was by Wight and therefore came from somewhere in India. 95.3 does not quite match the description, as there are 3, not 4 inflorescences, but by want of any better this will have to do.

Eremochloa truncata appears to be merely a juvenile form.

The supposed occurrence of this species in Australia is based on misidentified material of *Bailey* (Herb. USDA), *Clarkson* (2930), *Forsyth* (10.98), *Kenny* (1856), and *Suttie* (April 1937) belonging to *E. bimaculata*.

Rottboellia muricata was mentioned for the Philippines by Fern.-Villar [in Blanco, *Fl. Filip.*, ed. 3, 4 (1882) 314] as a correction of *R. mutica*, a nom. nud. mentioned by Llanos [Mem. Real Acad. Ci. Exact. Madrid 4 (1858) 497, reprinted in Fern.-Villar (1880: 99, 108)]. As *E. muricata* has not been reported for the Philippines this name more likely belongs to *Mnesithea glandulosa* (Trin.) de Koning & Sosef to which the epithet '*muricata*' had been misapplied by Brongniart (1831, see our introduction) in which he was followed by several others.

8. *Eremochloa ophiuroides* (Munro) Hack. — Fig. 8

Eremochloa ophiuroides (Munro) Hack. in A.DC., Monogr. Phan. 6 (1889) 261. — *Ischaemum ophiuroides* Munro, Proc. Amer. Acad. Arts 4 (1860) 363 ('*ophiuroides*', see note 1). — [*Sehima ciliare* (L.) Roberty subvar. *ophiuroides* Roberty, Boissiera 9 (1960) 318, nom. inval.]. — Type: C. Wright s.n. (holo K n.v.; A no. 00023680; NY, P; US no. 727969), 'Whampoa'.

Eremochloa ophiuroides (Munro) Hack. var. *longifolia* Hayata, Icon. Pl. Formos. 7 (1918) 78, t. 46. — Type: T. Soma, Aug. 1914 (holo TI? n.v.).

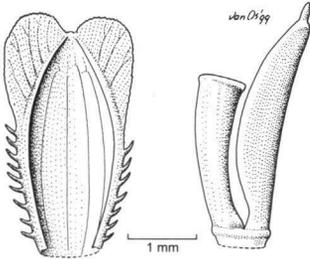


Fig. 8. *Eremochloa ophiuroides* (Munro) Hack. Lower glume from inside; joint with remnant of pedicelled spikelet [C. Wright s.n., A].

Rhizome slender. Cataphylls glabrous. Culms 0.07–0.25 m long, branching extra-vaginally at base, basal internodes with marrow, glabrous, nodes ciliate. Sheaths glabrous. Ligule 0.1–0.3 mm long, ciliolate. Contra-ligule absent. Blades flat or folded, 0.5–15 cm by 2–3 mm, obtuse, acumen obtuse or cuspidate, glabrous or pilose, at base with bulbous based hairs, margins glabrous or pectinate at base. Racemes 1–3 together, straight, 4–12 cm long. Joints 2–2.3 mm long, 0.65–0.7 times as long as the sessile spikelet, at base with a ring of 0.1–0.2 mm long hairs. Spikelets ovate-oblong, 3.1–3.7 by 1.1–1.5(–1.8) mm. Lower glume glabrous, 5–7-nerved, nerves distally with transverse veinlets, setae hook-like, terete, the longest ones 0.2–0.3 mm long, much shorter than

the width of the glume, apex with small apical wings, acumen acute or obtuse-acute. Upper glume 3.1–3.4 mm long, keeled in the middle over the entire length and along the margins, glabrous, 3-nerved, nerves distally with transverse veinlets. Anthers in first floret c. 0.5 mm long, in second floret c. 1.6 mm long. Fruit ellipsoid or ellipsoid-oblong. Pedicel oblique-obovoid, 2.8–3.5 mm long, 0.9–1 times as long as the sessile spikelet. Pedicelled spikelet absent or present, 0–3.4 mm long, sometimes with a complete spikelet. $2n = 18$ [Brown, Bull. Torrey Bot. Club 77 (1950) 74].

Distribution — Vietnam: N (Phuong Mai, Hanoi); China: NW (Xinjiang), N Central (Sichuan), S Central (Hainan, Guizhou, Guangxi), SE (Anhui, Hubei, Hunan, Fujian, Jiangsu, Guangdong, Hong Kong, Macao, Shanghai, Zhejiang); Taiwan; introduced elsewhere, e.g. Malawi (on trial in Zomba), India (Bombay) (see note), Japan (Kanagawa), USA (Alabama, S Carolina, Florida, Georgia, Louisiana, E Texas, Virginia), Bermuda, Costa Rica, Honduras, Puerto Rico, Hawaii (Kauai).

Habitat — In bushy steppe, dry grassland or savannah, moist bank at foot of mountain, sandy roadside, seashore, weed in plantations, in *Quercus*, *Liquidambar*-*Pinus* forest, mixed with *Axonopus*, abandoned rice fields, preferring clayey soil which has been trampled and grazed on by cattle, locally dominant; 350–1200 m altitude.

Uses — Cultivated as a lawn grass and escaping. Apparently somewhat salt tolerant.

Vernacular names — Ngau shik ts'o (China: 'cow eat grass'), Centipede grass (E).

Notes — The original spelling of the epithet is '*ophiuroides*', but everywhere else, even on the label of the isotypes seen it is spelled as '*ophiuroides*', and is therefore best regarded as a misprint. The usual spelling is therefore maintained here (see e.g. Backer, 1936: 409).

In India it was collected at the Bhabha Atomic Research Centre (B.A.R.C.), Bombay, where it most likely was introduced as a lawn grass. Once a completely developed second glume was seen (*Tanaka & Shimada 11143*, E, no. E00051804), and once a nearly complete developed one (*Chuang 4392*, Little Quemoy, A).

At first it was very tempting to recognize a var. *longifolia* for many specimens seemed to have longer blades and slightly longer spikelets. However, after having studied the representatives in American herbaria, we agree with Hsu [Fl. Taiwan 5 (1978) 645], who already joined the two varieties.

9. *Eremochloa pectinata* Buse ex Buitenhuis, *nom. nov.* — Fig. 9

Aegilops ciliaris J. König [ex Rottler, *Neue Schriften Ges. Naturf. Freunden Berlin* 4 (1803) 210, in syn.] ex Roem. & Schult., *Syst. Veg.* 2 (1817) 772 [see Slageren, *Wild wheats: a monograph of Aegilops L. and Amblyopyrum* (Jaub. & Spach) *Eig* (1994) 426]. — Type: *Rottler s.n. via Klein 792 in Herb. Willdenow 2282* [holo B, microfiche IDC 7440; photocopy in L; E (no. 00051790); *Herb. Banks?*, BM, cf. *Index Herb.* II, 4 (1976) 553].

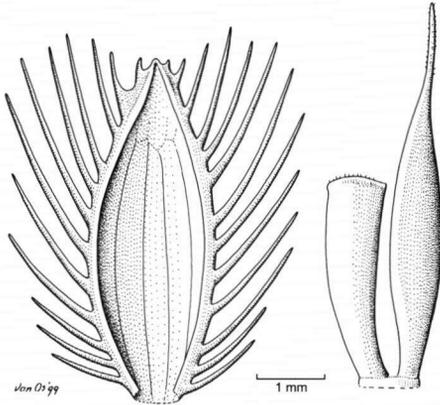


Fig. 9. *Eremochloa pectinata* Buse ex Buitenhuis. Lower glume from inside; joint with remnant of pedicelled spikelet [E, *Rottler s.n.*, E].

Rhizome slender. Cataphylls appressed ciliate. Culms 0.35–0.65 m long, branching extra-vaginally at base, basal internodes with marrow or hollow, glabrous, nodes glabrous or appressed ciliate. Sheaths glabrous. Ligule 0.5–0.9 mm long, glabrous. Contra-ligule absent. Blades flat or folded, 2–20 cm by 2–5 mm, obtuse, acumen acute or cuspidate, glabrous or pilose, at base with bulbous-based hairs, margins glabrous or pectinate at the base. *Racemes* 1 or 2 together, straight, 7–35 cm long. Joints 2.9–4.7 mm long, 0.6–0.9 times as long as the sessile spikelet, glabrous. Spikelets ovate or obovate, 4.5–5.5 by 1.6–2.2 mm. *Lower glume* glabrous or

sparingly puberulous, 5–7-nerved, nerves distally with transverse veinlets, setae straight, terete, often slightly expanded at base, longest ones 1.5–2.5 mm long, as long as to longer than the width of the glume, apex without apical wings, acumen acute. Upper glume 4–5 mm long, keeled in the middle in the lower half and along the margins, glabrous, 3-nerved, nerves distally with transverse veinlets. Anthers in first floret 1.4–2.3 mm long, in second floret 2.1–2.5 mm long. Fruit ellipsoid or ellipsoid-oblong. *Pedicel* oblique-obovoid, 2.8–5 mm long, 0.95–1.2 times as long as the sessile spikelet. Pedicelled spikelet reduced to a subule, 1.3–3 mm long.

Distribution — S India: Muritsur; Sri Lanka: Uva Province, Monaragala District.

Habitat — Gregarious on gentle slopes on greyish white shallow sand on granite with dense short grasses; 30–150 m altitude.

Note — This species was discovered by Rottler as early as 1799 in S India, but it was named *Aegilops ciliaris* by König. However, Rottler (1803) astutely did not accept

König's name ("die nicht wohl zu dieser Gattung gebracht werden kann") and regarded it to belong to a "genus proprium Manisuri proximum". Willdenow had edited Rottler's paper adding numerous remarks of his own, but made no comments on this one. Roemer & Schultes (1817) therefore accepted *A. ciliaris* and so doing validated the epithet. In the mid-19th century Buse already had recognized another specimen (*Moon s.n.*, L no. 908.98-52) to represent a distinct species and labeled it *Eremochloa pectinata*. He never published this, however. As '*ciliaris*' is unacceptable in *Eremochloa* because of the earlier *E. ciliaris* (L.) Merr., Buse's manuscript name is used here.

10. *Eremochloa petelotii* Merr. — Fig. 10

Eremochloa petelotii Merr., Univ. Calif. Publ. Bot. 10 (1924) 423. — Type: *Pételot* 247 (holo UC, photo & fragm. in A, US; photo in K; P).

Eremochloa muricata auct. non Hack.

Rhizome slender. Cataphylls glabrous. Culms 0.4–0.78 m long, branching extra-vaginally at base, basal internodes solid, glabrous, nodes glabrous. Sheaths glabrous. Ligule 0.3–0.6 mm long, ciliolate. Contra-ligule absent. Blades flat, 2–20 cm by 2–8 mm, obtuse, acumen acute, glabrous (see note), margins scabrid. *Racemes* 1–5 together, straight, 10–30 cm long. Joints 2–2.2 mm long, 0.33–0.5 times as long as the sessile spikelet, glabrous. Spikelets ovate, 4.6–6 by 1.7–2 mm. *Lower glume* sparsely puberulous, 5- or 6-nerved, nerves distally with transverse veinlets, setae hook-like, terete, longest ones 0.5–0.7 mm long, shorter than the width of the glume, apex with small to large apical wings, acumen acute. Upper glume c. 4.3 mm long, keeled in the middle in lower 2/3 and along the margins, glabrous, 3-nerved, nerves distally with transverse veinlets. Anthers in the first floret c. 0.9 mm long, in the second floret c. 1.4 mm long. Fruit ellipsoid. *Pedicel* ovate-subulate, 7.5–8.7 mm long, 1.25–1.9 times as long as the sessile spikelet. Pedicelled spikelet absent.

Distribution — Thailand: E (Nakhon Ratchasima); C Cambodia (Kompong Chhnang), C Vietnam (Binh Thuy, ? Can Tho, see note).

Habitat — Moist places, often inundated, common in paddy field; c. 250 m altitude.

Notes — Hô (1993: 902) mentioned only 3 species for Vietnam: *E. ciliaris*, *E. muricata*, and *E. ophiuroides*. We have, moreover, seen *E. bimaculata* (widespread), *E. ciliatifolia* (locally dominant), *E. eriopoda* (once in both N and S), *E. petelotii* (3 collections seen, one from C Vietnam), but not *E. muricata*.

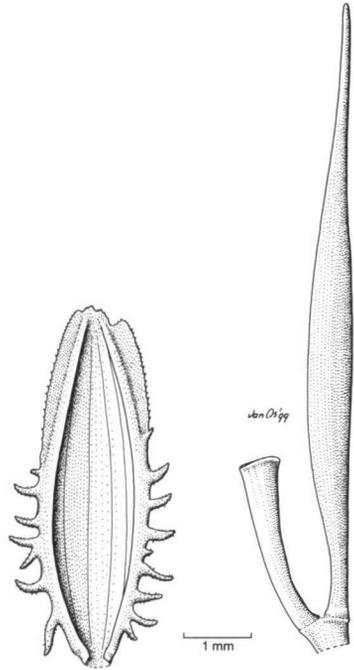


Fig. 10. *Eremochloa petelotii* Merr. Lower glume from inside; joint with remnant of pedicelled spikelet [*Pételot* 237, P].

His *E. muricata* from Can Tho appears distinct because of its exceptional tall culms (c. 1.6 m long), rather long glabrous ligules, long leaves (40–50 cm long), hairy at base. The presence of large apical wings on the lower glume and the shape and relative length of the pedicel are most reminiscent of *E. petelotii*, of which we have seen only 3 collections and may therefore well be more variable than described above.

11. *Eremochloa zeylanica* (Hack. ex Trimen) Hack. — Fig. 11

Eremochloa zeylanica (Hack. ex Trimen) Hack. in A.DC., Monogr. Phan. 6 (1889) 263. — [*Ischaemum falcatum* auct. non Thwaites: Nees ex Thwaites, Enum. Pl. Zeyl. (1864) 436, pro specim.]. — *Ischaemum zeylanicum* Hack. ex Trimen, Syst. Cat. Fl. Pl. Ceylon (1885) 104. — [*Sehima ciliare* (L.) Roberty subvar. *zeylanicum* Roberty, Boissiera 9 (1960) 318, nom. inval.]. — Lectotype: CP 3322 (*Thwaites*) (holo W; G?, K, L, fragm., PDA n.v., US); here designated.

Rhizome slender. Cataphylls glabrous. Culms 0.15–0.7 m long, branching extra-vaginally at the base, basal internodes hollow, glabrous, the nodes glabrous. Sheaths glabrous. Ligule 0.3–0.6 mm long, ciliolate or glabrous. Contra-ligule absent. Blades flat or folded, 2–15 cm by 2–5 mm, abruptly acute or obtuse, acumen cuspidate, glabrous, margins glabrous. Racemes 1–3 together, straight, 7–26 cm long. Joints 2.3–3.3 mm long, 0.6–0.75 times as long as the sessile spikelet, at base with a ring of 0.1–0.3 mm long hairs. Spikelets ovate, 3.9–5.7 by 1.4–2.3 mm. Lower glume glabrous, 5–7-nerved, nerves distally with transverse veinlets, setae straight, flattened at base, longest ones 1.2–2.5 mm long, as long as to much longer than the width of the glume, apex with small apical wings, acumen acute. Upper glume 3.5–4.5 mm long, keeled in the middle over the entire length or in the lower half and along the margins, glabrous, 3-nerved, nerves distally with transverse veinlets. Anthers in first floret 1.2–2.1 mm long, in second floret 1.9–2 mm long. Fruit ellipsoid, or ellipsoid-oblong. Pedicel oblique-obovoid, 3–4.7 mm long, 0.6–0.9 times as long as the sessile spikelet. Pedicelled spikelet 0.1–0.3 mm long, a very short rudiment.

Distribution — Sri Lanka.

Habitat — Wet ground; altitude unknown.

Note — Very similar to *E. bimaculata*, but differing in its distribution and some morphological characters, as is shown by the key.

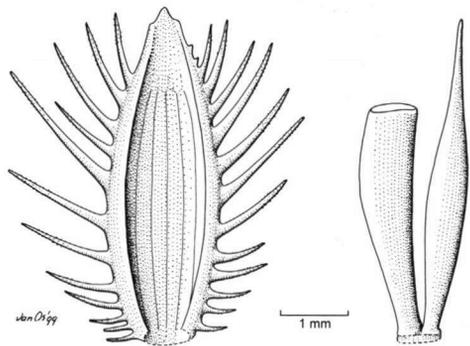


Fig. 11. *Eremochloa zeylanica* (Hack. ex Trimen) Hack. Lower glume from inside; joint with remnant of pedicelled spikelet [CP 3322 (*Thwaites*), W].

EXCLUDED OR DOUBTFUL TAXA

1. *Eremochloë bigelovii* S. Watson in C. King, Bot. (fortieth parallel) 5 (1871) 382, t. 40, f. 1–9 (*Eremochloë thurberi* S. Watson, nom. alt.). — *Blepharidachne bigelovii*

Hack. in A.DC., Monogr. Phan. 6 (1889) 261. — Lectotype: *C. Wright 2028* (holo A; K, NY), here designated = ***Blepharidachne bigelovii*** (S. Watson) Hack.

Note — The correct citation for the generic name is *Blepharidachne* Hook. ex Hack. in Engl. & Prantl, Nat. Pflanzenfam. 2, 2 (1887) 126. The remark that ‘Hook.’ is a typographical error for ‘Hack.’ is unproven [Hitchcock, USDA Bull. 772 (1920) 78]. This was repeated in the revision made by J.H. Hunz. & Anton, Brittonia 31 (1979) 446–453. The lectotype is *B. kingii* (S. Watson) Hack.

2. *Eremochloë kingii* S. Watson in C. King, Bot. (fortieth parallel) 5 (1871) 382, t. 40, f. 10–16. — *Blepharidachne kingii* Hack. in A.DC., Monogr. Phan. 6 (1889) 261. — Type: *S. Watson 1300* (holo GH; US) = ***Blepharidachne kingii*** (S. Watson) Hack.

3. *Eremochloa ophiuroides* (Munro) Hack. var. *longispicula* W.C. Wu, J. S. China Agric. Univ. 6, 2 (1985) 35. — Type: *Huang Ya-Wen July 1983* (holo Herb. South China Agric. Univ.).

No material was seen of this; the diagnosis and provenance suggests *E. bimaculata*.

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INDEX TO COLLECTIONS

Only numbered or dated collections have been included. Numbers between brackets were not seen, but their identities seemed clear. (T) = type material.

<i>Eremochloa</i>	lan = <i>E. lanceolata</i>
att = <i>E. attenuata</i>	mur = <i>E. muricata</i>
bim = <i>E. bimaclulata</i>	oph = <i>E. ophiuroides</i>
cil = <i>E. ciliaris</i>	pec = <i>E. pectinata</i>
clt = <i>E. ciliatifolia</i>	pet = <i>E. petelotii</i>
eri = <i>E. eriopoda</i>	zey = <i>E. zeylanica</i>

- Alden et al. 59: bim — d'Alleizette June 1908: oph; June 1909: bim; June 1911 (8013): cil; 387: cil.
- Balansa 26 June 1885: cil; 12 Sept. 1885: cil; 28 Oct. 1886: clt; 12 Dec. 1886: cil; 366: cil; 367: cil; 368: cil; 4800: cil — Barber 2626: mur — B.A.R.C. 2 (10-5-1974): oph — Bartholomew et al. 1399: oph; 2248: oph — Bauche 97 (T): cil — Belson 1930: bim — Blackburn March 1966: cil — Blake 7102: bim; 7177: bim; 9403: bim; 11151: bim — Bodinier 931: cil; 1235: oph; 1357: oph; 2740: oph — Bois 657: cil — Bon 6 Sept. 1881: cil; 13 Aug. 1883: cil; 14 Aug. 1892: cil; 478: cil; 1663: oph; 5153: cil — Boorman 11-1912: bim — Boufford et al. 21652: oph; 23028: oph; 23076: oph; 23104: oph — Bourne 52: mur; 3589: mur; 14879: mur — Brass 5743: bim; 7808 (T): cil; 7849: cil; 8408: bim; 18242: bim — Brumbach 7303: oph; 8634: oph — Bryson 12066: oph — BS 7832 (Ramos): cil; 8109 (Ramos): cil; 10041 (Merrill): oph; 20268 (Merrill): oph — Burkill 3294: cil — But 44: cil; 61: oph; 86: oph; 102: cil; 112: cil; 207: oph; 321: cil.
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- 6215: oph; 6760: oph; 7815: cil; 8711: oph — Chow H.-C. 1790: oph; 3314: oph; 8748: oph — Chuang 4200: cil; 4392: oph — Chun W.Y. 3113: cil — Chung H.H. 5224: oph; 6593: oph; 7300: cil — Clarkson 2930: bim; 4194: bim; 7793: cil; 8642: bim — Clarkson & Neldner 9285: cil — Clayton 5181: mur; 5200: mur; 5233: mur; 5560a: mur — Clemens Feb. 9/43: bim; Feb. 16/43: bim; March 11/43: bim; Oct. 29/43: bim; Nov. 17/43: bim; Apr. 20–30/44: bim; 3025: cil; 31946: bim; 43153: bim — Comte 5051: oph — CP 3322 (Thwaites) (T): zey; 3848 (Glenie): mur — Crutchfield 5585: oph.
- Dalziel Aug. 1900: oph — Delavay 6930: bim — Demaree 32030: oph; 33319: oph — Deramus 738: oph — Dietrich 93: bim.
- Eberhardt 1890: cil; 2144: cil; 2217: cil — Elbert 3081A: eri; 3082: cil — Engleman 5 Oct. 1968: oph — Everist 956: bim.
- Faircloth 3037: oph; 5451: oph; 5648: oph — Ferris 11910: cil — Floto 7304: bim — Forbes 497: cil — Forsyth 10.98: bim — Fosberg et al. 50750: mur — Frey-Wyssling 188: cil — Fung H. 18477: oph; 19950: oph; 20262: cil; 20268: oph; 20356: cil; 21032: oph.
- Garnett 318: cil — Gaudichaud 1836–37: cil — Geesink et al. 6518: cil — Germain 1 April 1880 (18): cil — Gilliland 5167: cil — Gillison Nov. 1957: bim — Godefroy 194: cil — Godfrey 57457: oph — Griffith KD 6774 (T): bim; 6776 (T): clt — Guinet 31: bim — Gunness 2286: cil.
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- Jackson 1931: bim — Jaheri 4/4/1901: cil.
- Kanehira & Hatusima 13169: cil — Kauffmann 1918: oph — Keng Y.-L. 1881: oph; 2500: oph; 6181: oph — Kenny 1856: bim — KEP 46859 (Symington): cil — Kerr 1937: eri; 1938: cil; 7243: cil; 8354 (T): eri; 8465: cil; 8686 (T): att; 9033: mur; 13073: cil; 13459: mur; 13716: cil; 15960: cil; 19046: cil; 19273: cil; 19583: bim; 20627: mur; 21328: cil — KLU 176 (Lo & Mahmud): cil — Knarayavaswouri 4000: mur — Koyama T-61479: cil — Koyama et al. 15523: cil — K'tung 5964: cil — Kuntze 3364: cil — Kuo CM 5493: oph; 6248: oph — Kurz 1129: cil.
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zeylanicum Hack. ex Trimen 11

Nardus ciliaris L. 3

- Pectinaria* Benth. ex Hack. [p. 402]
Rottboellia muricata Retz. 7
Sehima Forssk.
 sect. *Eremochloa* Roberty [p. 402]
ciliare (L.) Roberty
 subvar. *bimaculatum* Roberty 2
 subvar. *ciliare* 3
 subvar. *ciliatifolium* Roberty 4
 subvar. *falcatum* Roberty 3
 subvar. *horneri* Roberty 3
 subvar. *muricatum* Roberty 7
 subvar. *ophiuroides* Roberty 8
 subvar. *zeylanicum* Roberty 11
Sehima auct. [p. 402]