

# On the identity and occurrence of *Cyperus pseudoalatus* and *Cyperus richardii* (Cyperaceae) in India

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**Abstract:** *Cyperus pseudoalatus* (Wad.Khan & R.D. Taur) Kottaim. (*Kyllinga pseudoalata* Wad.Khan & R.D.Taur) is reduced to a synonym of *Cyperus tenuifolius* (Steud.) Dandy, with critical discussion. Based on a careful scrutiny of the protologues and type images of *Kyllinga bulbosa* P.Beauv., *K. tenuifolia* Steud. and *Cyperus richardii* Steud., it is confirmed that the plants reported earlier from India and Sri Lanka as *Kyllinga bulbosa* (*Cyperus richardii*) are likely misidentified and represent *Cyperus tenuifolius*.

**Keywords:** *Cyperus tenuifolius*, *Kyllinga bulbosa*, *Kyllinga pseudoalata*, Nomenclature, Synonym, Type.

## Introduction

The section *Kyllinga* (Rottb.) J.Kern of the subgenus *Cyperus* of *Cyperus* L. is characterised by a capitate inflorescence of compressed spikelets with deciduous rachillae, di-stigmatic styles and laterally compressed achenes with one edge towards the rachilla. Kükenthal (1935–1936) and Kern (1974) treated *Kyllinga* as a subgenus but, based on the above distinguishing morphological characters, *Kyllinga* Rottb. has been treated as a distinct genus by many Cyperologists (Clarke, 1893–1894; Koyama, 1985; Kukkonen, 2001; Dai *et al.*, 2010). Clarke (1893–1894) included six species of *Kyllinga* in *The Flora of British India*, all found within the present political boundaries of India, and Karthikeyan *et al.* (1989) reported seven species, one subspecies and two varieties. Govindarajalu and

Ramani (1994) and Wadoodkhan (2015) added several new taxa, bringing the total number of taxa in India to 19, comprising 11 species, two subspecies and six varieties. However, Prasad (2017) synonymized two species, namely *Kyllinga eglandulosa* Govind. & Ramani and *K. pluristaminea* Govind. & Ramani. Larridon *et al.* (2013, 2014) provided a broad circumscription for the genus *Cyperus* based on molecular phylogenetic data, wherein the allied genera including *Kyllinga* were merged with the genus. Though there are distinct morphological characters to segregate *Kyllinga* as a distinct genus, in the larger interest of plant taxonomists across the world, it is treated here as a section of subgenus *Cyperus* of genus *Cyperus* (*s.l.*), as recognised by Larridon *et al.* (2014).

While studying the specimens of *Cyperus* from India, the holotype of *Kyllinga pseudoalata* Wad. Khan & R.D.Taur (= *Cyperus pseudoalatus* (Wad.Khan & R.D.Taur) Kottaim.) housed at CAL was examined along with its protologue. A careful examination revealed that the holotype of *K. pseudoalata* is a misidentified specimen of *Cyperus tenuifolius* (Steud.) Dandy (= *K. tenuifolia* Steud.). Therefore, the correct nomenclature of the species is provided here along with original bibliographic citations and details of the holotype of *K. pseudoalata*. Additionally, after a careful study of the protologues and types of both *Kyllinga bulbosa* P.Beauv. and *Cyperus richardii* Steud., it is confirmed that the plants that were reported from India and Sri Lanka as *K. bulbosa* (= *Cyperus richardii*) are likely

misidentified and actually represent specimens of *Cyperus tenuifolius* (= *K. tenuifolia*).

### Taxonomic Treatment

*Cyperus tenuifolius* (Steud.) Dandy in Exell, Cat. Vasc. Pl. S. Tome 363. 1944. *Kyllinga tenuifolia* Steud., Syn. Pl. Glumac. 2: 69. 1855; Karthik. *et al.*, Fl. Ind. Enum. Monocot. 61. 1989. *Type*: SENEGAL, *s.d.*, F.M.R. Leprieur *s.n.* (holo P [P00070267 digital image!]).

*Kyllinga pseudoalata* Wad.Khan & R.D.Taur in Wad.Khan, Cyperaceae W. Ghats, W. Coast & Maharashtra 274. 2015. *Cyperus pseudoalatus* (Wad. Khan & R.D.Taur) Kottaim., Int. J. Curr. Res. Biosci. Pl. Biol. 6(10): 38. 2019, *syn. nov.* *Type*: INDIA, Tamil Nadu, Tiruchirappalli district, near Bharathidasan University, 9.11.2003, R.D. Taur 472 (holo CAL [CAL0000025458!]).

*Kyllinga triceps* Rottb., Descr. Icon. Rar. Pl. 14, t. 4, f. 6. 1773, *nom. illeg.*; C.B.Clarke in Hook.f., Fl. Brit. India 6: 587. 1893.

*Kyllinga* (as *Killingia*) *bulbosa* auct. non P.Beauv. 1804: T.Koyama in Dassan., Revis. Handb. Fl. Ceylon 5: 245. 1985; V.P.Prasad & N.P.Singh, J. Econ. Taxon. Bot., Addit. Ser. 21 (Sedges Karnataka) 236. 2002. Fig. 1

Perennials with short rhizomes. Culms tufted, up to 27 cm tall, *c.* 1 mm thick. Leaves 1.5–2 mm broad, minutely scabrous on the margins towards apex. Inflorescence an ovoid head of 3–5 sessile glomerules bearing numerous spikelets, 12–15 × 12–13 mm. Involucral bracts 3 or 4, the lowest up to 12 cm long, spinulose-scabrous on the margins towards apex. Central glomerule ovoid, up to 9 × 7 mm; lateral ones sub-globose, up to 6 × 6 mm. Spikelets 2.5–3 × *c.* 0.8 mm. Achene-bearing glume *c.* 2 mm long, acuminate at apex. Stamens 2; filaments elongate up to 2.5 mm; anthers oblong, *c.* 0.5 mm long. Style *c.* 0.7 mm long; stigmas slightly longer, up to 0.9 mm long. Achene laterally compressed, biconvex, oblong, *c.* 1.3(–1.5) × 0.5 mm, apiculate, yellowish-brown.



Fig. 1. *Kyllinga pseudoalata* Wad.Khan & R.D.Taur: a. Holotype (Reproduced with permission from the Director, Botanical Survey of India); b. Inflorescence—enlarged; c. Spikelet; d. Glume (side view); e. Stamen; f. Immature achene with style and stigmas; g. Mature achene (a-g from R.D. Taur 472; c-g: photos by V.P. Prasad).

*Notes*: While describing *K. pseudoalata*, the authors compared it with *K. eglandulosa* Govind. & Ramani and the African species *K. alata* Nees. However, a study of the type of *K. pseudoalata* revealed that the characters match very well with those of *C. tenuifolius* (= *K. tenuifolia*), except the slightly bigger spikelets and achenes. It is not at all related to *K. eglandulosa*, the type of which is a short immature specimen of *K. melanosperma* Nees (= *C. melanospermus* (Nees) Valck.Sur.) (Prasad, 2017). *Kyllinga alata*, distributed in tropical and southern Africa, bears a head comprising a single glomerule, 4–6.5 mm long spikelets and 1.6–1.8 mm long blackish achenes. In contrast, the inflorescence in the type of *K. pseudoalata* is an ovoid head of 3–5 glomerules, spikelets 2.5–3 mm long, achenes *c.* 1.3(–1.5) mm long and yellowish-brown. Since almost all the characters match those of *C. tenuifolius* and slightly larger spikelets and achenes are only

minor variations, *K. pseudoalata* (= *C. pseudoalatus*) is treated here as a synonym of *C. tenuifolius*.

*Kyllinga tenuifolia* is at times treated as a synonym of *K. bulbosa* P.Beauv. (Prasad & Singh, 2002, 2019) or *vice versa* (Karthikeyan *et al.*, 1989). However, after checking the protologue and the accompanying illustration of *K. bulbosa* (Beauvois, 1805), it is concluded that the plants reported from India and Sri Lanka as *K. bulbosa* do not match with its type, but look like the type of *K. tenuifolia*. According to the protologue, the culm is solitary in *K. bulbosa*, however, the plants reported as *K. bulbosa* from India (Prasad & Singh, 2002, 2019) and Sri Lanka (Koyama, 1985) are tufted. In Cyperaceae, solitary culms are usually found when the rhizome is creeping. Moreover, the figure in the accompanying illustration (Fig. a of Pl. VIII) of the protologue does not match the Indian plants determined as *K. bulbosa* or *K. tenuifolia*, particularly the bulbous base. Govaerts *et al.* (2021) treated *K. bulbosa* as a synonym of *C. richardii*. Carter *et al.* (2016) provided an illustration and photographs of *C. richardii* showing the bulbous base of the plant and other characteristics useful for the identification of this species. In the protologue of *C. richardii*, Steudel (1854) says that the spikelets are 4 or 5-flowered. However, in the Indian and Sri Lankan plants, the spikelets have only a single flower. Therefore, it is confirmed that the plants reported from India and Sri Lanka as *K. bulbosa* P.Beauv. (= *C. richardii* Steud.) are likely misidentified and actually represent *C. tenuifolius* (Steud.) Dandy (= *K. tenuifolia* Steud.). Hence, the occurrence of *C. richardii* (*K. bulbosa*) in India and Sri Lanka needs to be confirmed by undertaking further studies.

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