

## *Cenchrus ciliaris* L., A Newly Naturalized Grass in Taiwan

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**ABSTRACT:** *Cenchrus ciliaris* L. is reported as a newly naturalized grass in Taiwan. Its description, line drawing and a key to the species of *Cenchrus* of Taiwan are provided.

**KEY WORDS:** *Cenchrus ciliaris*, Naturalized grass, Poaceae, Taiwan.

### INTRODUCTION

Poaceae is one of the largest families of vascular plants in the world as well as in Taiwan. *Cenchrus* L., a genus belonging to the tribe Paniceae of Poaceae, comprises 22 species and is distributed throughout the tropical and warm temperate globally (Watson and Dallwitz, 1992; Liu, 2000). Only one species of the genus, *C. echinatus* Vahl, was recognized in Taiwan by Hsu (1975, 1978) and Liu (2000). Recently, a newly naturalized species, *C. ciliaris* L., was found from southern Taiwan. The genus *Cenchrus* can be distinguished from its closely related genus, *Pennisetum*, by their inflorescence bristles: those of *Pennisetum* are separate definitely while those of *Cenchrus* are flexuous or more often spinous, more or less flattened and united below (at least the inner whorl), the degree of union varying from a small basal disc to a deep cupule (Clayton and Renvoize, 1986). The inner whorl bristles of *C. ciliaris* are only slightly fused and this make it look like a *Pennisetum*. That is the reason why some authors (e.g., Hitchcock, 1951) treated this species as *Pennisetum ciliare* (L.) Link. Nevertheless, some recent molecular phylogenetic studies provided very strong support that the species belonged to *Cenchrus*. Doust and Kellogg (2002a and 2002b) have constructed a chloroplast DNA phylogeny of the three main genera, *Setaria*, *Pennisetum* and *Cenchrus*, of the panicoid "bristle clade." In their result *Cenchrus*, including *C. ciliaris*, is monophyletic, but both *Setaria* and *Pennisetum* are paraphyletic. Thus we adopt the name, *C. ciliaris*, for the species. Its description, line drawing and a key to the species of Taiwanese *Cenchrus* are provided.

### TAXONOMIC TREATMENT

#### Key to species

1. Involucral bristles flattened and connate at base, forming a spiny bur ..... *C. echinatus*
1. Involucral bristles only slightly connate at base, not forming a spiny bur ..... *C. ciliaris*

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**Cenchrus ciliaris L.**, Mantissa Plantarum 2: 302. 1771; Clayton, Davidse, Gould, Lazarides and Soderstrom, A Revised Handbook to the Flora of Ceylon 8: 109. 1994. 水牛草 Fig. 1

*Pennisetum ciliare* (L.) Link, Hortus Regius Botanicus Berolinensis 1: 213. 1827; Hitchcock, Manual of the Grasses of the United States (2nd ed., revised by A. Chase), 730. 1971.

Perennials. Culms erect, 10-50 cm tall, 1-4 cm wide. Leaf blades herbaceous, flat, linear, 3-25 cm long, 4-10 mm wide, acuminate at apex, glabrous to slightly hairy on both surfaces. Leaf sheaths laterally compressed and keeled, glabrous to sparsely pilose. Ligule a fringe of hairs, 2-20 mm long. Inflorescence a dense and cylindrical panicle, 2-14 cm long, 0.5-2 cm thick. Spikelets solitary or clustered, sessile, surrounded by two whorls of bristles; bristles ciliate, the inner longer and thicker than the outer, with one conspicuously longer one. Spikelet with 2-florets, one base sterile (sometimes male) and one fertile, lanceolate, acute at apex, 2-5.5 mm long, moderately dorsally compressed. Lower and upper glumes similar, hyaline, ovate, glabrous, acute at apex, with equal length of spikelets, (3-) 5-nerved. Lemma and palea of fertile floret similar, chartaceous, 2-5 mm long, ovate, glabrous and shining. Anthers 3, 1.3-1.7 mm long. Stigma 2, plumose, terminally exerted. Caryopsis obovoid, 1-1.3 mm long, glabrous, dorsally compressed.

Native to the Mediterranean region, Africa, Arabia, Canary Islands, Malagasy, Indonesia, northern India, and Pakistan (Watson and Dallwitz, 1992). It was introduced to Australia, United States and Mexico as a pasture grass and had become an invasive weed (Williams and Baruch, 2000). Cultivated in Taiwan as a pasture grass, escaped and naturalized in southern Taiwan.

Specimen examined: Kaohsiung: Tengchih, *Chih-Hui Chen 4324* (TESRI); Linyuan, *Ting-Yi Tzi 740* (NSYSU). Pingtung: Kenting, *Chang-Sheng Kuoh t121503* (NCKU).

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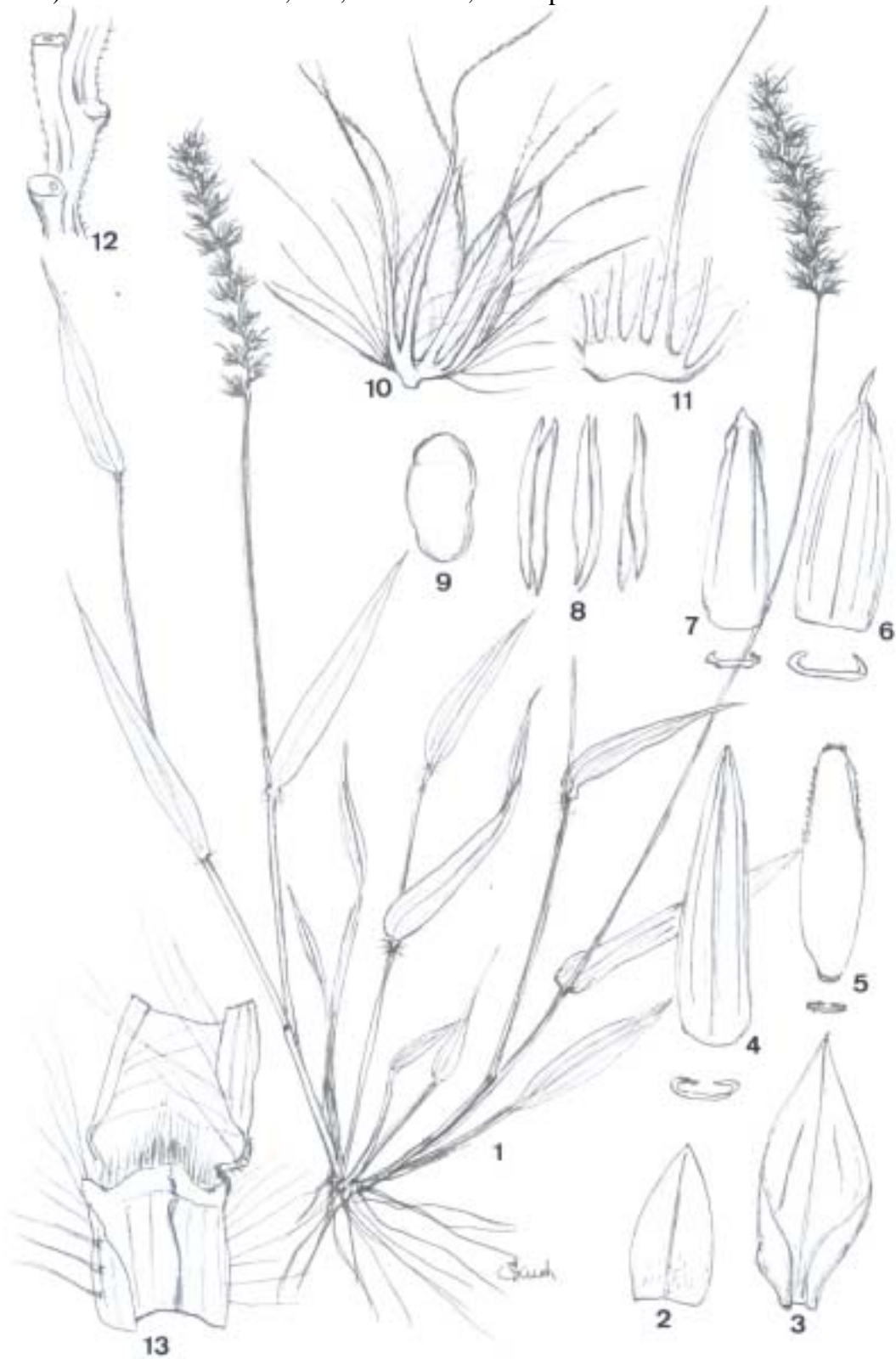


Fig. 1. *Cenchrus ciliaris* L. 1: Habit. 2: Lower glume. 3: Upper glume. 4: Lower lemma. 5: Lower palea. 6: Upper lemma. 7: Upper palea. 8: Anthers. 9: Caryopsis. 10: Bur. 11: Part of inner whorl of bristles. 12: Part of

rachis. 13: Part of leaf, note the ciliate ligule.

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## 台灣新歸化禾草 - 水牛草

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### 摘 要

本文報導新近發現於台灣的新歸化禾本科植物 - 水牛草 (*Cenchrus ciliaris* L.)，文中並提供該物種之描述、手繪圖及台灣產蒺藜草屬植物之檢索表。

關鍵詞：水牛草、歸化種、禾本科、台灣。

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