

*Cenchrus ciliaris* L.  
(syn. *Pennisetum ciliare* L. Link)  
buffelgrass, anjangrass, African foxtail grass

*Cenchrus ciliaris* L. is a non-native pasture grass used widely in Texas and northern Mexico. An invasive species, it is established in many other parts of the southwestern USA. It appears this plant's range is expanding northward: the first records for it in Orange and Riverside Counties (California) were published in 1996 (Sanders, 1996). *C. ciliaris* can strongly modify communities it invades--in Arizona it is carrying wildfires through habitats not adapted to fire, and in Texas, Hawai'i and Australia it is displacing native species.

**Description:**

*Cenchrus ciliaris* L. (Poaceae -- the grass family) is a perennial bunchgrass with erect culms 10-150 cm tall. It can form thick mats or tussocks with dense, usually stoloniferous root systems. The leaf blades are bluish-green in color, 3-30 cm long, with soft hairs on the upper surface. The inflorescence is generally cylindrical in outline, 2-14 cm long, and can be purple, gray or yellowish. The spikelets are solitary or clustered, and are surrounded by numerous bristles. The seeds spread by the wind and by sticking to animal fur.

The genus *Cenchrus* is very similar to the genus *Pennisetum*. They can be differentiated by the inflorescence bristles: those of *Cenchrus* are fused while those of *Pennisetum* are separate. The bristles of *C. ciliaris* are fused, but not as much as in other *Cenchrus* species.

**Scientific and Common Names:**

The genus name, *Cenchrus*, was derived from the Greek *kegchros*, meaning millet. Synonyms for *Cenchrus ciliaris* are numerous. The most common synonyms are "*Pennisetum ciliare* L. Link" and "*P. cenchroides* (L.) Rich." See the Missouri Botanical Gardens website (2) for a complete list.

**Impacts:**

This invader forms dense thickets that displace native species. For example, in Hawai'i, *C. ciliaris* was planted for erosion control but is now replacing the native pili grass (*Heteropogon contortus*). The species biodiversity in alien-dominated communities is lower than the biodiversity in native pili grass communities (Daehler and Carino, 1998). *Cenchrus ciliaris* was also noted as one of the threats for the federally endangered species *Ambrosia cheiranthifolia* and *Lesquerella thamnophila* (8, 9).

Evidence of possible allelopathy was determined by Nurdin and Fulbright (1990). Leachates from the leaves and roots of *C. ciliaris* were shown to reduce germination rates of seeds and the radicle length of *Desmanthus illinoensis* (Illinois bundleflower) and *Cassia fasciculata* (partridge pea). The phytotoxic effect of leachates from *C. ciliaris* might explain why it is such a good invader and could also impact native species revegetation after control of buffelgrass.

*Cenchrus ciliaris* has the dramatic ability to carry fire in ecosystems where fire does not normally play a role. By changing the fire regime in this way, *C. ciliaris* can transform Sonoran

Desert cactus forests into grasslands within several years of its introduction (van Devender, *et al.*, 1997).

*C. ciliaris* is adaptable; it grows well in heavy, limestone, and sand soils, can tolerate low pH, and is drought tolerant. It can withstand heavy grazing and is extremely fire resistant. It has no serious pest problems except for a recently discovered fungal blight caused by the heterothallic ascomycete fungus *Magnaporthe grisea* (10). Since *Cenchrus ciliaris* reproduces by apomixis (an asexual method of seed production), there is very little genetic diversity in its stands. Therefore, strains of *Cenchrus ciliaris* that are resistant to *Magnaporthe grisea* are not likely to develop naturally. Until disease resistant strains are developed, the blight will continue to cause enormous damage to *Cenchrus ciliaris* pastures in Texas.

### **Native Range:**

*Cenchrus ciliaris* is native to Africa, Arabia, Canary Islands, Malagasy, Indonesia, northern India, and Pakistan.

### **Range as an Invader:**

*Cenchrus ciliaris* has been introduced into many tropical and subtropical areas, where it can be found from sea level to 2000 m. *C. ciliaris* requires summer moisture and is not cold tolerant. It is believed that *C. ciliaris* was first introduced to Australia (1870-1880) via the harnesses of Afghan camels. Introduction into the USA first occurred in 1948, and it has been detected in the USA in California, Arizona, New Mexico, Texas, Louisiana, Mississippi, Florida, Missouri, New York, Hawai'i (the islands of O'ahu, Maui, and Hawai'i), Puerto Rico and the US Virgin Islands (7). *C. ciliaris* has been found in South America and the West Indies.

*Cenchrus ciliaris* is widely promoted by the Mexican government as a forage grass, and is estimated to cover more than one million hectares in the state of Sonora (van Devender, *et al.*, 1997). It is also valued as a pasture grass in Texas. The widespread use of this grass for pasture increases its opportunities to spread from cultivation.

### **Control:**

1. The long, dense root mass makes manual removal difficult. All pieces of the root must be removed or resprouting may occur.
2. Flooding to control *C. ciliaris* is unlikely to be practical or effective. Five days of flooding resulted in no loss of buffelgrass in Australia, while twenty days of flooding resulted in a loss of 20-85% (depending upon the cultivar). Taller varieties seem to be more flood-tolerant. Cutting or grazing before flooding may increase control.
3. *C. ciliaris* withstands cutting and grazing. Cutting or grazing the grass 5-10 cm from the ground only increased plant growth.
4. Buffelgrass quickly recovers after fire and may respond with an increase in cover.
5. In greenhouse studies 14 d old *C. ciliaris* plants were susceptible to injury from triclopyr (0.3-2.2 kg/ha), picloram (0.6-2.2 kg/ha), hexazinone (0.3 kg/ha), 2,4-D (0.6-2.2 kg/ha) and dicamba (1.1-2.2 kg/ha). Mortality of *C. ciliaris* only occurred when treated with 2.2 kg/ha of hexazinone. Regrowth was halted in all treatments. Older plants (90 days old) were less affected by the treatments. Reduction in plant weight occurred only in the 2.2 kg/ha of triclopyr and 0.3-2.2 kg/ha of hexazinone treatments. Older plants quickly recovered except

in the hexazinone treatments. Mayeux, Jr. and Hamilton (1983) found that 2,4-D (2 kg ae/ha), dicamba (2 kg ae/ha), and picloram (2 kg/ha) did not have a negative effect on buffelgrass production.

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