

PENNISETUM ADVENA SP. NOV.
(POACEAE: PANICEAE): A COMMON
ORNAMENTAL GRASS THROUGHOUT
THE SOUTHERN UNITED STATES

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ABSTRACT

Pennisetum advena Wipff & Veldkamp, a common ornamental grass in the southern United States, is described and illustrated. A key is provided to separate it from similar taxa (*P. macrostachys*, *P. orientale*, and *P. setaceum*). *Pennisetum advena* is readily distinguished from *P. setaceum*, its closest putative relative, by vegetative, inflorescence, fascicle, and spikelet characters.

RESUMEN

Se describe e ilustra *Pennisetum advena* Wipff & Veldkamp, una gramínea ornamental frecuente en el sur de los Estados Unidos. Se ofrece una clave para separarla de taxa similares (*P. macrostachys*, *P. orientale*, y *P. setaceum*). *Pennisetum advena* se distingue fácilmente de *P. setaceum*, la especie más próxima, por los caracteres vegetativos, de la inflorescencia, del fascículo y de la espiguilla.

Pennisetum Rich., a genus of ± 80 species, is found in tropical, subtropical, and temperate regions (Clayton & Renvoize 1986). It occupies a diverse range of habitats, including riparian, savanna, desert, forest, and montane. Of the ± 80 species, 40 are known to occur in the New World. Twenty-six of the 40 are native to México, Central and/or South America, 14 are introduced into the New World. Seventeen species have been introduced into the United States. This genus contains species that are important as grain (cereals) [e.g. *P. glaucum* (L.) R.Br.], forage [e.g. *P. ciliare* (L.) Link, *P. flaccidum* Griseb., *P. glaucum*, *P. orientale* Willd. ex Rich., and *P. purpureum* Schumach.], soil binding and lawns (e.g. *P. clandestinum* Hochst. ex Chiov.; and orna-

mentals [e.g. *P. advena* Wipff & Veldkamp, *P. alopecuroides* (L.) Spreng., *P. macrostachys* (Brongn.) Trin., *P. orientale*, *P. purpureum*, *P. setaceum* (Forssk.) Chiov., and *P. villosum* R.Br. ex Fresen.].

Aposporous apomixis has been reported in Old World species of *Pennisetum* [e.g. *P. advena* (reported under the name *P. setaceum* purple-type, by Simpson & Bashaw 1969), *P. ciliare*, *P. flaccidum*, *P. orientale*, *P. setaceum*, and *P. villosum*]. Research is still needed to understand the intricate morphological patterns and relationships, that are complicated by the presence of aposporous apomixis. The genus is morphologically and nomenclaturally complex and is in need of revision. In some cases the relationship of *Pennisetum* to allied genera (e.g. *Cenchrus* L.) is unresolved.

Since *Pennisetum* is not native in the United States, it is not well known to American agrostologists. This, in part, has lead to the overlooking of *P. advena* as a distinct species which has become a common ornamental grass in the United States. This overlooked species will be referred to as *P. setaceum* 'Rubrum,' its current horticultural name.

The first record of *P. setaceum* 'Rubrum' in the United States was reported by Hitchcock (1916) as a form of *P. ruppelii* Steud. (= *P. setaceum*). Hitchcock (1916) wrote, "A half-hardy form with dark purplish foliage and purplish crimson spikes has recently been intro. under the name *P. cupreum*. It does not reproduce reliably from seed." The name *P. 'cupreum'* is a horticulture name and was never validly published [see also the index to Bailey (1917), where *P. 'cupreum'* is cited as a horticultural name and a form of *P. ruppelii*]. The use of *P. cupreum* Hitchc. (or Hitchc. ex L.H. Bailey) is incorrect, since Hitchcock and other authors have only accepted it as a horticulture name for a "form" or "horticultural variety" of *P. setaceum* and not as a validly published combination (Greuter et al. 1994: Article 34.1). Since its introduction in 1916, *P. setaceum* 'Rubrum' has since become one of the most popular ornamental grasses in the United States (Greenlee 1992). Darke (1994) commented that *P. setaceum* 'Rubrum' might not belong to *P. setaceum*.

Simpson and Bashaw (1969) published cytological and reproductive characteristics of *P. setaceum*. The two morphological types of plants studied were designated as "green" or "purple." The description of the "purple" type appeared to refer to *P. setaceum* 'Rubrum'. Fortunately, Simpson (Texas Agricultural Experiment Station, Stephenville, Texas) had maintained a clone of this plant in a greenhouse. In 1987, Kenneth Hignight and the senior author were able to examine this plant and confirmed that it was *P. setaceum* 'Rubrum'. So began a 10-year search for a valid scientific name for *P. setaceum* 'Rubrum'.

In 1987, a specimen of *P. setaceum* 'Rubrum' sent to the Royal Botanical Gardens (K) was reported as being "similar" or "with affinities" to *P. macrostachys*, a robust species from Malesia which also has purple leaves. This research into *P. setaceum* 'Rubrum' continued as time permitted. In November 1992,

while working on the treatment of *Pennisetum* for the forthcoming *Manual of North American Grasses*, photographs of the plate of *Gymnotrix macrostachys* Brongn. (= *Pennisetum macrostachys*) in Duperrey (1829) and of the type specimen from the Muséum National d'Histoire Naturelle (P), were obtained. Upon examination, it was obvious that *P. setaceum* 'Rubrum' and *P. macrostachys* were not the same taxon. *Pennisetum macrostachys* has only antrorsely scaberulous bristles in a fascicle, one spikelet per fascicle, and a puberulous inflorescence axis. *Pennisetum setaceum* 'Rubrum' has two kinds of bristles in a fascicle; an inner series of plumose, ciliate bristles and an outer series of antrorsely scaberous bristles, 1–3 spikelets per fascicle and a papillose pubescent inflorescence axis.

Germplasm of *P. macrostachys* from National Germplasm Center in Georgia was obtained. This accession (PI 354266), originally collected in New Guinea (Malesia), is actually a green form of *P. setaceum* 'Rubrum'. In 1995, the senior author sent a specimen of *P. setaceum* 'Rubrum' to the junior author, who is an authority on the grasses of Malesia. The junior author spent two years searching for the validly published name for this taxon. Also, in 1995, W.D. Clayton (K) was contacted for assistance, but he too was not able to put a name to this mysterious taxon.

After years of unsuccessful searching for a satisfactory identification and careful examination of the species of *Pennisetum* known to science, we believe that this is an undescribed species.

***Pennisetum advena* Wipff & Veldkamp, sp. nov. (Fig. 1).** **TYPUS:** UNITED STATES. TEXAS. Brazos Co.: Cultivated at Texas A&M University, College Station, Texas, commonly used ornamental grass in the area, 18 Sep 1990, *Joseph K. Wipff 1723* (HOLOTYPE: L; ISOTYPES: K, MO, US, UTC).

Pennisetum advena a *P. setaceo* cognatio sua proxima ut videtur facile distinctum in folii laminis 6–11 mm latis planis costa non-incrassata, culmo in nodis aeriis plerumque iterum ramoso, inflorescentiae medio involucris 10–17 per sectionem 1 cm ramo primario 1–2 mm longo, involucri setarum serie interiore setis 8–16 ciliatis vel plumosis, gluma primaria 0.5–1 mm longa, flore inferiore staminato.

Plants perennial (annual in temperate climates), cespitose, without rhizomes or stolons. *Culms* 100–150 cm tall, erect; *nodes* glabrous, usually with some secondary branching at aerial nodes. *Leaves:* (measurements taken from the 2nd and 3rd uppermost leaves); *sheaths* glabrous, margins ciliate; *ligules* 0.5–0.8 mm long, a ciliate membrane; *blades* 33–52 cm long, 6–11 mm wide, flat, burgundy (rarely green), mid-vein not noticeably thickened, margins antrorsely scaberulous and ciliate at base. **Panicles** 23–32 cm long, 30–58 mm wide, flexuous and drooping, burgundy (rarely pale or whitish-green); *central axis* terete, pubescent with papillose trichomes. **Fascicles (Involucres):** 10–17 per 1 cm section (mid-inflorescence), with 1–3 spikelets. *Primary branch* 1–2 mm long (the length from base of branch to uppermost bristle (primary bristle). *Fascicle stalk (or stipe)* 0.5–1.1 mm long [the length

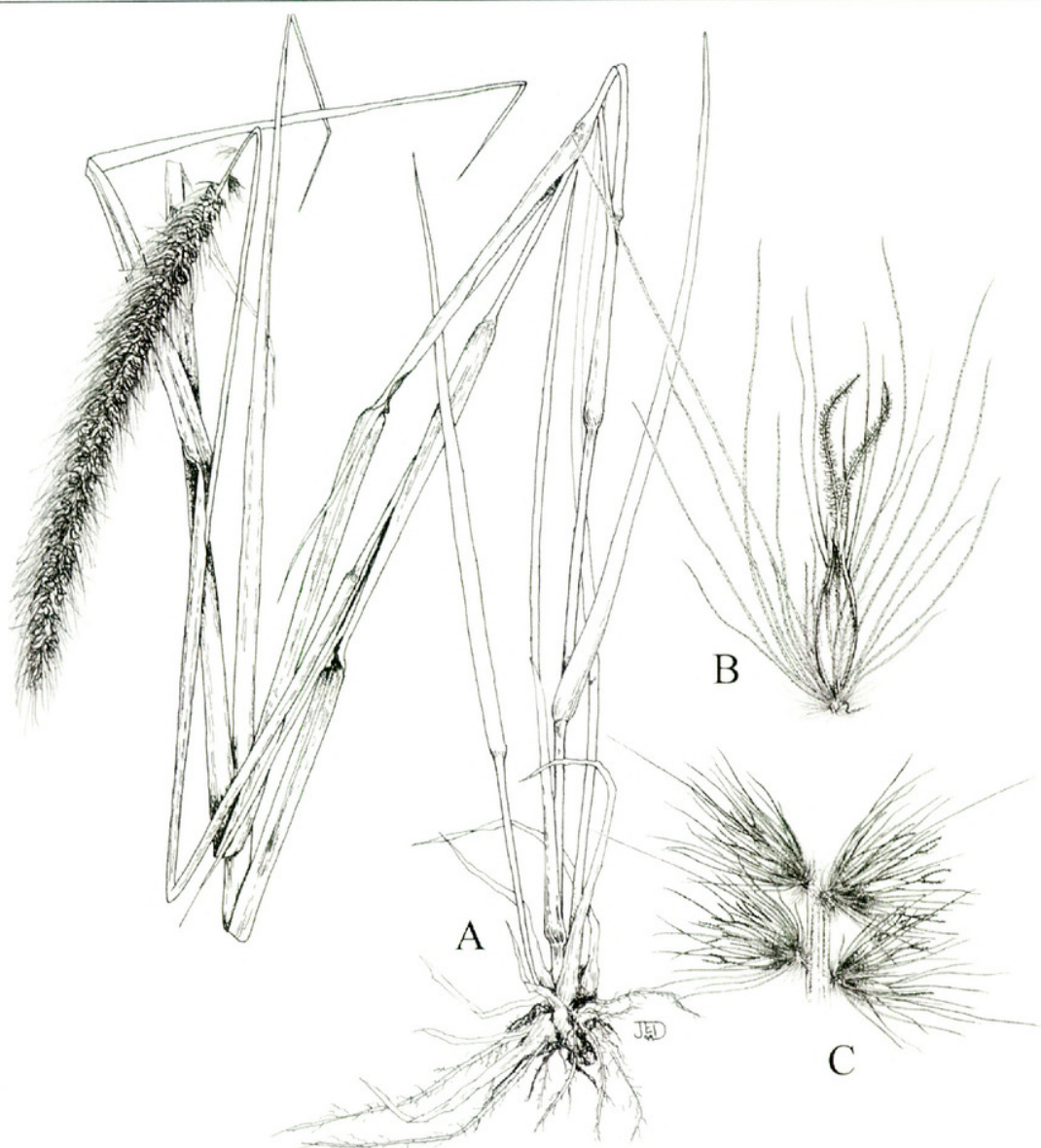


FIG. 1. *Pennisetum advena* (Wipff 1723). A. Habit. B. Fascicle. C. 1 cm section of panicle showing central axis and fascicle arrangement.

from base of primary branch to first (or lowermost) bristle]. *Primary bristle* 21.3–33.6 mm long, noticeably longer than the other bristles, papillose ciliate. Two types of bristles in fascicle: an *outer bristles series* of 43–68 bristles, 1.2–18.5 mm long, antrorsely scaberulous; an *inner bristles series* of 4–10 bristles, 11.7–25 mm long, papillose ciliate. *Spikelets* subsessile or pedicelled in fascicle. **Central Spikelet** 5.3–6.5 mm long; *pedicel* 0.1–0.3 mm long. *Glumes* unequal; *first glume* 0.5–1 mm long, 0-veined; *second glume* 1.9–3.6 mm long, 0–1-veined, about 1/2 as long as spikelet; **Lower Floret** staminate. *First lemma* 4.7–6.1 mm long, 5(–6)-veined. *Palea* 4.5–5.0 mm long.

Anthers 3, 2–2.5 mm long. **Upper Floret:** *second lemma* 5.2–6.1 mm long, 5-veined. *Palea* 4.7–5.6 mm long, 2-veined. *Anthers* 3, 2.5–2.7 mm long. *Caryopses* infrequently produced in United States plants.

Chromosome number.— $2n = 54$ [reported under the name *P. setaceum* purple-type (Simpson & Bashaw 1969)].

Method of reproduction.—aposporous apomixis [reported under the name *P. setaceum* purple-type (Simpson & Bashaw 1969)].

Phenology.—May until first freeze.

Distribution.—Cultivated throughout the United States. Will not persist in areas where winter temperatures fall below freezing for any length of time. In areas with below freezing temperatures, it is used as an annual and replanted every year or moved into a greenhouse. In southern Florida, Texas, and California, and Hawaii it will persist, but rarely escapes.

Etymology.—The specific epithet, *advena*, is Latin for “visitor” or “stranger”; referring to its mistaken identity and unknown origin. It is believed to have originated from the Old World.

KEY TO SIMILAR TAXA OF *PENNISETUM*

1. Fascicle with two types of bristles: an inner series (bristles closest to spikelet) with bristles long-ciliate, and an outer series of antrorsely scaberulous bristles. Primary bristle noticeable longer than other bristles in fascicle. Fascicles with 1–10 spikelets per fascicle. Inflorescence axis pubescent 2
1. Fascicle with all bristles antrorsely scaberulous. Fascicles with only 1 spikelet per fascicle. Primary bristle not noticeably longer than other bristles in fascicle. Inflorescence axis puberulous ***P. macrostachys***
2. Mid-culm leaf blades (3–)3.5–11 mm wide, flat, green or burgundy; mid-vein not noticeably thickened 3
2. Mid-culm leaf blades 2–3.5 mm wide, convolute or folded, green; mid-vein noticeably thickened ***P. setaceum***
3. Culm nodes pubescent. Plants with rhizomes. Ligule 1–2 mm long. Fascicles white. Outer bristle series of fascicle with 0–24 terete, scaberulous bristles. Leaf blades green. Inflorescence erect or arching ***P. orientale***
3. Culm nodes glabrous. Plants without rhizomes. Ligule less than 1 mm long. Fascicles burgundy (rarely pale green). Outer bristle series of fascicle with 43–58, terete, scaberulous bristles. Leaf blades burgundy (rarely green). Inflorescence flexuous and drooping ***P. advena***

Pennisetum advena is readily distinguished from *P. setaceum*, its closest putative relative, by the following characters. *Pennisetum advena*: 1) leaf blades 6–11 mm wide; flat, mid-vein not thickened; 2) usually with secondary branching at aerial culm nodes; 3) 10–17 fascicles per 1 cm section (mid-inflorescence); 4) primary branch of fascicles (mid-inflorescence) 1–2 mm long; 5) inner bristle series of fascicle with 4–10 ciliate or plumose bristles; 6) first glume 0.5–1 mm long; and 7) lower floret staminate. *Pennisetum setaceum*: 1) leaf blades 2–3.5 mm wide, convolute, mid-vein conspicuously thickened; 2)

no secondary branching at aerial culm nodes; 3) 8–10 fascicles per 1 cm section (mid-inflorescence); 4) primary branch of fascicles (mid-inflorescence) 2.3–4.5 mm long; 5) inner bristle series of fascicle with 8–16 ciliate or plumose bristles; 6) first glume absent (rarely present, up to 0.3 mm long); and 7) lower floret neuter (rarely staminate).

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