

Representative example of pink pappusgrass

NOTICE OF RELEASE OF

MAVERICK GERMPLASM PINK PAPPUSGRASS

SELECTED CLASS OF NATURAL GERMPLASM

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ABSTRACT

A selected germplasm of pink pappusgrass (*Pappophorum bicolor* Fourn. [Poaceae]) has been released for rangeland seeding, highway rights-of-way revegetation, and wildlife habitat restoration plantings in south Texas. Maverick Germplasm pink pappusgrass is a blend of 7 accessions selected from an evaluation at multiple sites in the intended area of use. Selections were made based on multi-year evaluation of plant characteristics and germination tests of seed collected from each location. Following selection, components of the germplasm were increased in isolation and blended following harvest to ensure seed was included from each of the selected accessions. Accessions included in the blend originate from 7 different counties and distinct soil types. This germplasm represents the first commercial release of pink pappusgrass, an important component of native rangeland plant communities in south Texas.

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KEY WORDS

Pappophorum bicolor, Texas, Poaceae

NOMENCLATURE

Plants: USDA NRCS (2009a)

Major Land Resource Areas: USDA NRCS (2006)

COLLABORATORS

South Texas Natives, Caesar Kleberg Wildlife Research Institute, Texas A&M University, Kingsville, Texas; USDA Natural Resources Conservation Service E “Kika” de la Garza Plant Materials Center, Kingsville, Texas; Texas AgriLife Research, Beeville and Uvalde, Texas; Rio Farms Inc, Monte Alto, Texas; and Rancho Blanco, Laredo, Texas.



Species | *Pappophorum bicolor* Fourn.

Common name | pink pappusgrass

Accession number | 9093444

Seven accessions, evaluated at multiple sites, have been blended to create a selected germplasm of pink pappusgrass for seeding on rangelands and rights-of-way, and to restore wildlife habitat.

Maverick Germplasm pink pappusgrass (*Pappophorum bicolor* Fourn. [Poaceae]) was released as a Texas Selected Native Plant Germplasm in 2010. Maverick Germplasm will be identified by the USDA Natural Resources Conservation Service (NRCS) accession number 9093444. Pink pappusgrass is a widespread native grass species found throughout the Gulf Prairies and Marshes, Sand Sheet, and Rio Grande Plain ecoregions and southern portions of the Edwards Plateau, and eastern Trans-Pecos Mountains and Basins ecoregions of Texas, and adjacent areas of northern Mexico. It is often a codominant native grass species of grassland and savanna plant communities in south Texas (Meyer and Brown 1985) with grass species (Poaceae) such as Arizona cottontop (*Digitaria californica* (Benth.) Henr.), bristlegrasses (*Setaria* P. Beauv.), gramas (*Bouteloua* Lag.), windmillgrasses (*Chloris* Sw.), and false Rhodesgrass (*Trichloris* Fourn. ex Benth.). Pink pappusgrass provides fair forage for livestock (Hatch and others 1999). It commonly grows on gravelly and sandy soils (Hatch and Pluhar 1993) and is also found on saline range sites (Fanning and others 1965).

JUSTIFICATION

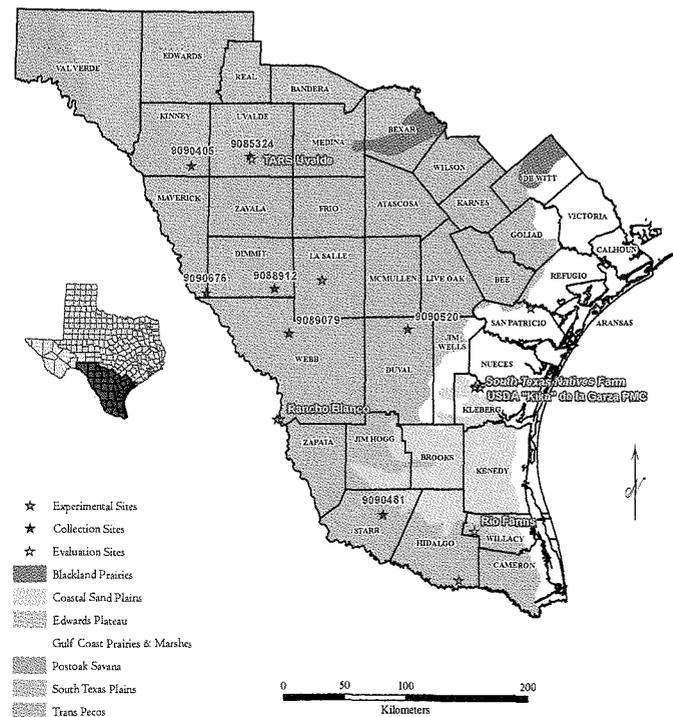
Wild harvests of pink pappusgrass seed have been occasionally marketed by commercial seed producers in south Texas; however, prior to this release, tested, source-identified seed of pink pap-

pusgrass was not available for restoration and revegetation use. Landowners, government agencies, and conservation programs in south Texas have a critical need for certified native seed with known origin, quality, and adaptation.

COLLECTION SITE INFORMATION

Accessions constituting Maverick Germplasm pink pappusgrass were collected from native plants at 7 locations in south Texas. Original collections were hand-harvested during 2000–2004 from stands encountered in extensive seed collection

efforts in the region. Collections were cleaned, assigned individual accession numbers, and stored for evaluation. Maverick Germplasm components originate from private ranches in Maverick, Webb, Kinney, Uvalde, Dimmit, Starr, and Duval counties and from Jimenez gravelly loam, Moglia clay loam, Ector Stony clay, unknown silty clay loam, Brundage fine sandy loam, McAllen fine sandy loam, and Pernitas fine sandy loam soil types (USDA NRCS 2009b).



Courtesy of CKWRI Wildlife Research Technologies Laboratory

DESCRIPTION

Maverick Germplasm pink pappusgrass is a warm-season perennial bunchgrass that grows 60 to 91 cm (24 to 36 in) tall. Basal circumference of mature plants is 25 to 38 cm (10 to 15 in) with the canopy commonly 38 to 60 cm (15 to 24 in) wide. Individual leaves are 43 to 60 cm (17 to 24 in) long and 0.5 to 1.5 cm (0.25 to 0.75 in) wide. Foliage is dark green in color, covered in a waxy cuticle, and stem nodes are purple. Seedheads are 15 to 22 cm (6 to 9 in) in length with purple or pink-tinged individual spikelets. Pink pappusgrass will produce seeds and foliage year-round in south Texas if adequate soil moisture is present and freezing temperatures do not occur. Maverick Germplasm has some variation in height, seedhead density, and foliage density because of the blending of accessions. Seed maturation and general growth stage of all 7 accessions is extremely similar. Accessions that make up the release were increased by plantings grown from original seed collections; transplants of each accession were spatially isolated from one another and from wild populations of *Pappophorum*. Seed harvested from these isolated fields is blended after harvest by equal percentage of pure live seed (PLS) to constitute Maverick Germplasm Breeder Seed, which is distributed to commercial seed growers. Accessions included in the release have superior performance in several ecolog-

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ical and agronomic performance categories, and have a higher proportion of full seed combined with lower seed dormancy than that of other collections of pink pappusgrass evaluated. Pink pappusgrass and other *Pappophorum* species are assumed to have an apomictic or self-pollinated mode of reproduction. Chromosome number is reported as $2n = 100$ (Gould 1975). Genetic recombination among different populations is thought to be limited (Garner and others 2006). This assumption supports the release of a blend of populations for use across a broad geographic area, as single populations may be poorly adapted to some sites (ecotypic specialists) or well adapted to a wide range of sites (ecotypic generalist). Our evaluation of accessions indicated that both types of adaptation may exist in the species.

METHOD OF SELECTION

Seed of 70 original collections of *Pappophorum* obtained from south Texas was planted in the greenhouse in winter 2004. The accessions included pink pappusgrass (55), whiplash pappusgrass (*P. vaginatum* Buckley) (6) (see Smith and others 2010), and mixed collections of both species (9). Because these 2 species grow together in similar habitats (Reeder 2008), all accessions were evaluated together. Sixty-eight of the 70 collections produced enough plants for the establishment of 2 replications of 10 plants for evaluation plots at 3 Texas locations (60 plants/accession total) in 2005. These transplants were grouped in randomized split block evaluation plots at Rio Farms (near Monte Alto on sandy loam soil), Texas AgriLife Research Station–Uvalde (near Uvalde on silty clay loam soil), and Rancho Blanco (near Laredo on silt loam soil). Additional seedlings were planted in nursery plots at the E “Kika” de la Garza Plant Materials Center (near Kingsville on clay soil). Evaluation sites represent

a variety of soils where pappusgrasses occur, and broad climatic variability in rainfall and temperature. This variety of evaluation sites was desired to facilitate selection of pappusgrass accessions that performed well across the south Texas region and to identify plant material that might be superiorly adapted to all sites or to a single location for inclusion in a commercial release.

Evaluation data were collected monthly in 2005 by visually ranking the performance of the accessions in a number of categories relating to plant performance and commercial seed production potential. All plantings were fully irrigated in 2005 to ensure establishment and expression of growth potential and seed production of each accession. Ripe seed was harvested from each accession at each evaluation location during the growing season and tested for seed germination (3 replications of 50 seeds per accession per site) during the winter of 2005–2006. In 2006, plots were not irrigated allowing accessions to be evaluated under natural conditions. Exceptional-to-extreme drought conditions at most of the evaluation sites prevented collection of seed for testing in 2006 but facilitated evaluation of the accessions under adverse growing conditions common in the region.

Analysis of evaluation data and germination test results revealed accessions with good plant performance at all sites, others with good performance at a single site, and considerable variation in proportion of full seed and seed dormancy. Final selections to be evaluated further included 3 accessions that performed well at all sites, superior performing accessions from each site (3), and one accession with an exceptionally high proportion of full seed and low seed dormancy. Averaged across all evaluations, selected accessions collectively have more full seed, higher percentage seed germination (low seed dormancy), and greater seed production potential than nonselected accessions.

Advanced evaluation plots of the 7 selected accessions were planted in iso-

lated seed increase blocks for further evaluation in 2007. Timing of seed maturity, seedhead height, and performance in an intensive production setting were monitored closely to ensure that commercial production of these selections would be possible. All accessions exhibited similar seedhead heights and maturity dates that would facilitate growing them as blended germplasm in a common field. Seed was harvested from these plots to compare seed dormancy and germination of the accessions in a common setting and to assess seed yield potential. This seed was also used to grow 0.13 ha (0.34 ac) breeder seed blocks of each accession to produce seed for the released blend. All seed increase plots were grown in isolation because conclusive evidence of the reproductive biology of *Pappophorum* is unavailable. Following harvest, seed of each breeder field was tested for quality, blended in equal quantities based on percentage of pure live seed (PLS), and distributed to commercial seed producers as Foundation Seed. Only seed harvested from plantings of Foundation Seed can be used to establish certified seed production fields.

Extensive seeding trials of pappusgrasses were conducted in the development of Maverick Germplasm. Mixtures of pink and whiplash pappusgrass were seeded in experiments at 4 locations from 2005–2008. Best results have been obtained when pappusgrasses were seeded at a rate of 3.4 kg PLS per ha (3.0 lb PLS per ac). Pappusgrasses emerge best from seed in early-mid fall in south Texas. Seed can be covered with a talc-based coating to facilitate planting, as uncoated seed is difficult to plant and meter accurately. Both broadcast and drill seedings have produced acceptable results. The inclusion of both Maverick Germplasm and Webb Germplasm whiplash pappusgrass in seed mixes is recommended to ensure good performance on most sites.

ECOLOGICAL CONSIDERATION

Pink pappusgrass is a naturally occurring species in Texas and planting it would therefore not constitute an introduction of an exotic species into local ecosystems. Any negative impacts to other native plant species would likely be minimal to non-existent. Availability of ecotypic seed of this species provides an additional native species for revegetation and restoration seed mixes in the region; it also provides a native species useful in efforts to diversify exotic grass-dominated habitats and thereby increase habitat quality for wildlife. Maverick Germplasm is anticipated to be used extensively in highway rights-of-way plantings in the region, potentially replacing the use of exotic species such as buffelgrass (*Pennisetum ciliare* (L.) Link [Poaceae]) in roadside seed mixes.

ANTICIPATED CONSERVATION USE

Maverick Germplasm will be useful for rangeland, highway right-of-way, and upland wildlife habitat plantings. It has demonstrated good competitive ability in areas dominated by the exotic plants buffelgrass and Kleberg's bluestem (*Dichanthium annulatum* (Forssk.) Stapf [Poaceae]) and may be useful in efforts to restore or diversify these areas to improve native ecological conditions.

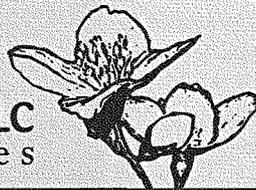
ANTICIPATED AREA OF ADAPTATION

Maverick Germplasm is known to be adapted to the region south of lat 29°27'N, bounded by the Gulf of Mexico on the east, and Rio Grande River to the west and south. This area encompasses major land resource area (MLRA) 83A-E and 150. Good adaptation and performance is likely in adjacent areas, such as MLRA 42, 81A, 81B, and 81D.

AVAILABILITY OF PLANT MATERIALS

Foundation Seed is produced by South Texas Natives and distributed through the Texas Foundation Seed Service to commercial growers. Limited quantities of seed for research and evaluation purposes are available on request from South Texas Natives (stn@tamuk.edu).

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