

TEXAS A&M UNIVERSITY – KINGSVILLE
CAESAR KLEBERG WILDLIFE RESEARCH INSTITUTE
TEXAS NATIVE SEEDS
KINGSVILLE, TEXAS

And

UNITED STATES DEPARTMENT OF AGRICULTURE
NATURAL RESOURCES CONSERVATION SERVICE
JAMES E. “BUD” SMITH PLANT MATERIALS CENTER
KNOX CITY, TEXAS

And

SUL ROSS STATE UNIVERSITY
BORDERLANDS RESEARCH INSTITUTE
ALPINE, TEXAS

And

TEXAS AGRILIFE RESEARCH CENTER
STEPHENVILLE, TEXAS

And

TARLETON STATE UNIVERSITY
WILDLIFE, SUSTAINABILITY, AND ECOSYSTEM SCIENCES
STEPHENVILLE, TEXAS

NOTICE OF RELEASE OF MENARD GERMPLASM PURPLE THREEAWN SELECTED PLANT MATERIAL

Texas A&M University – Kingsville, Kingsville, Texas; Caesar Kleberg Wildlife Research Institute; *Texas Native Seeds* (TNS); U.S. Department of Agriculture (USDA); Natural Resources Conservation Service (NRCS); James E. “Bud” Smith Plant Materials Center, Knox City, Texas; the Sul Ross State University Borderlands Research Institute, Alpine, Texas; Texas AgriLife Research Center, Stephenville, Texas; and Tarleton State University Wildlife, Sustainability, and Ecosystem Sciences, Stephenville, Texas, announce the release of a selected plant material of purple threeawn (*Aristida purpurea* Nutt.) for the south, central, and west Texas ecoregions.

This plant will be referred to as Menard Germplasm purple threeawn and is released as a selected plant material class of certified seed (natural track). Seed of Menard Germplasm purple threeawn will be identified by USDA NRCS accession number 9112388.

This alternative release procedure is justified because there are no existing commercial sources of tested and adapted purple threeawn for the south, central, and west Texas ecoregions. The potential for immediate use is high especially for critical site revegetation, rights-of-way, erosion control, inclusion in range seeding mixes, and wildlife plantings.

A. Proposed Variety Name and Temporary Designation:

MENARD GERMPLASM PURPLE THREEAWN

B. Family, kind, genus and species:

Family: Poaceae

Kind: purple threeawn

Genus and species: *Aristida purpurea* Nutt.

C. Origin and breeding history of the variety:

Collection Site Information: All accessions comprising Menard Germplasm purple threeawn were collected from native populations originating from the Central Prairies, Rolling Plains, Edwards Plateau, Rio Grande Plains, Coastal Sand Plains, and Gulf Coast Prairies and Marshes ecoregions (Figure 1).

Accession **9086245** was collected from the road right-of-way off County Road 432 on 12/04/2001 by Forrest Smith of the South Texas Natives project of TNS. This collection originated from a Leming loamy fine sand in Jim Wells county near 27° 25' 28" latitude and 98° 11' 10" longitude. This site is classified as a loamy sand ecological site (MLRA 83A; Web Soil Survey Staff 2014).

Accession **9093644** was collected from the road right-of-way along Highway 83 on 05/18/2011 by Colin Shackelford of the West Texas Native Seeds project of TNS. This accession originated from a Tarrant soil in Menard county near 30° 58' 57" latitude and 99° 47' 44" longitude. This site is classified as a Low Stony Hill ecological site (MLRA 081B-Edwards Plateau, Central Part; Web Soil Survey Staff 2014).

Accession **9107901** was collected from a private ranch in Hood County on 06/16/2011 by Mia McCraw of the West Texas Native Seeds project of TNS. This accession originated from a Venus clay loam soil near 32° 32' 47" latitude and 97° 41' 7" longitude. This site is classified as a clay loam ecological site (MLRA 085-Grand Prairie; Web Soil Survey Staff 2014).

Accession **9086291** was collected from the James Daughtrey Wildlife Management Area in McMullen county on 04/27/2002 by Forrest Smith and Cody Lawson. This accession originated from a Coleman fine sandy loam near 28° 31' 21" latitude and 98° 27' 30" longitude. This site is classified as a sandy loam ecological site (MLRA 083A-Northern Rio Grande Plain; Web Soil Survey Staff 2014).

Accession **9088598** was collected from the road right-of-way off Highway 181 in Bee county by Forrest Smith and Cody Lawson on 05/21/2002. This accession originates from a Clareville sandy clay loam near 28° 21' 6" latitude and 97° 43' 20" longitude. This site is classified as a clay loam ecological site (MLRA 083A-Northern Rio Grande Plain; Web Soil Survey Staff 2014).

Breeding history: Plants evaluated in the initial trials were grown from the original seed collections in order to maintain the genetic makeup of respective lines. Breeder seed of each accession was grown in isolation from the original seed collections and from wild populations of purple threeawn; furthermore, no intentional breeding, selection, or genetic manipulation has been used in the development of these accessions. Each accession in the release should maintain the genetic integrity of the parent population. Plant stature, flowering time, and seed maturation are similar among the selected accessions.

D. Objective description of the variety:

Description: Purple threeawn is a slender densely caespitose perennial bunchgrass. Culms range from 9.5 to 35.5 inches (25 to 90 cm) tall. Leaves are mostly basal with blades 1.0 to 9.5 inches (3.0 to 25 cm) in length, 0.03 to 0.08 inches (0.07-0.2 cm) wide, typically involute, but the bases remain flat. Inflorescences usually contain a sparingly branched panicle. Glumes are unequal with the lower glume shorter than the upper and are light to dark brown or purple in color. Awns range from 2.4 to 5.5 inches (6.0 to 14 cm) in length with the central awn being thicker than the lateral awns. Caryopses are about 0.24 to 0.55 inches (0.66 to 1.4 cm) long, tan to chestnut in color with approximately 4,813,240 seeds per pound (Barkworth et al. 2007 and Shaw 2012). Purple threeawn is widespread across western North America, extending from Canada into Mexico, and is found on a wide variety of soils (Barkworth et al. 2007).

Potential Uses: Menard Germplasm purple threeawn is recommended for critical area plantings, erosion control, and right-of-way plantings due to its fibrous root system, ability to establish and persist in low moisture situations, and abundant seed production making it a pioneering species following disturbance (Loflin and Loflin 2006). This species is included in range seeding mixes for most soil types. Although listed as poor forage it is often utilized by cattle prior to seed development (Everitt et al 2011), and nesting habitat for bobwhite quail (Lehmann 1946).

E. Evidence

Method of Breeding and Selection:

Initial Evaluation

Menard Germplasm was evaluated as accession numbers 908858, 9086291, 9093644, 9107901, and 9086245 as part of a common garden of purple threeawn (*Aristida* spp.) collected between 2000 – 2010. Purple threeawn was collected from the south, west, and central Texas regions collected by TNS, and available collections from the USDA NRCS Plant Materials Program. A total of 33 populations of native purple threeawn were evaluated. These initial evaluations were conducted from 2012 – 2013 by personnel from the TNS project of the Caesar Kleberg Wildlife Research Institute. Sites used for evaluation included the TNS Farms at the Caesar Kleberg Wildlife Center in Kingsville, Texas; Rio Farms near Monte Alto, Texas; the USDA NRCS Plant Material Center near Knox City, Texas; and the Texas AgriLife Research Center near Stephenville, Texas. These four sites represent the variation in soils and climates along north-to-south and east-to-west gradients encompassing the natural distribution of purple threeawn in the area of intended use (Tables 1-4).

Accession 9088598 performed exceptionally well at all four evaluation sites when averaging vigor, foliage density, seed production, and forage production rankings. It had the highest active germination of seed collected from evaluations in Stephenville, Texas, was 5th highest in seed collected from Rio Farms, and had over 90% active germination in seed collected from Kingsville, Texas.

Accession 9093644 had the second highest active germination and third highest average ranking among all accessions in Stephenville, Texas; and consistently scored in the top 5 for plant vigor at all evaluation locations. This accession was also selected because of its westernmost location.

Accession 9107901 was third in active germination at Stephenville, Texas, and in the top 25% at Rio Farms, and had over 90% active germination in seed collected from Kingsville, Texas. Accession 9107901 was also in the top 5 for plant vigor at Rio Farms, and in the top 5 for foliage density and forage production in Knox City, Texas. This accession was selected because of its northernmost location.

Accession 9086291 was one of the top performers in Kingsville, Texas with over 90% active germination, highest vigor score, and top 5 in foliage density and production. This accession was also in the top 5 for averaged ranking at Rio Farms (Monte Alto, Texas). Along with good plant characteristics at southern evaluation sites it was in the top 5 for seed production at the two northernmost evaluation sites of Stephenville, Texas and Knox City, Texas.

Accession 9086245 was selected for its plant performance in Kingsville, Texas where it had the best vigor and seed production rankings. At this location it also had the highest active germination. It was in the top 10 for the same categories in evaluations conducted at Rio Farms. Along with this accession's high-performance ranking, it was selected for its origin, filling in a gap on a north south gradient with the other selected accessions.

Table 1. Data collected from purple threeawn evaluations during the 2012 and 2013 growing seasons at the Caesar Kleberg Wildlife Research Institute in Kingsville, Texas.

Accession	Plant Vigor*	Foliage Density*	Seed Production*	Forage Production*	Plant Height (cm)	Germination Percent (%)
9086245	2.8	3.5	3.0	3.2	50.3	100.0
9086291	2.8	3.3	3.5	3.4	45.0	96.3
9088598	3.4	3.6	3.3	3.5	56.0	90.0
9093644	3.0	3.8	4.0	3.7	50.9	65.1
9107901	3.5	4.2	5.7	4.9	42.0	90.5
Turner VNS*	3.3	3.7	3.3	3.3	49.1	60.0

*Note: Plant vigor, foliage density, seed production and forage production are based on ocular estimates where 1 = best and 10 = poor. Turner VNS is commercial variety sold by Turner Seed, Breckenridge, Texas.

Table 2. Data collected from purple threeawn evaluations during the 2012 and 2013 growing seasons at Rio Farms near Alto, Texas.

Accession	Plant Vigor*	Foliage Density*	Seed Production*	Forage Production*	Plant Height (cm)	Germination Percent (%)
9086245	2.7	3.7	3.4	3.5	49.3	89.2
9086291	2.7	2.7	3.4	2.9	43.7	84.7
9088598	2.6	3.2	2.9	2.9	49.7	93.0
9093644	2.6	3.2	3.8	3.1	47.6	30.3
9107901	2.6	2.9	3.7	3.1	49.4	88.5
Turner VNS*	3.2	3.3	3.8	2.9	48.6	88.8

*Note: Plant vigor, foliage density, seed production and forage production are based on ocular estimates where 1 = best and 10 = poor. Turner VNS is commercial variety sold by Turner Seed, Breckenridge, Texas.

Table 3. Data collected from purple threeawn evaluations during the 2012 and 2013 growing seasons at the USDA NRCS Plant Materials Center near Knox City, Texas.

Accession	Plant Vigor*	Foliage Density*	Seed Production*	Forage Production*	Plant Height (cm)	Germination Percent (%)
9086245	4.7	3.7	3.4	4.8	23.2	9.0
9086291	4.8	3.9	2.7	5.2	23.4	0.0
9088598	4.4	3.9	2.8	4.4	29.1	10.3
9093644	4.3	4.1	3.8	4.1	29.1	8.7
9107901	4.3	3.9	3.8	4.6	26.2	5.0
Turner VNS*	4.3	3.7	3.4	4.8	26.7	0.0

*Note: Plant vigor, foliage density, seed production and forage production are based on ocular estimates where 1 = best and 10 = poor. Turner VNS is commercial variety sold by Turner Seed, Breckenridge, Texas.

Table 4. Data collected from purple threeawn evaluations during the 2012 and 2013 growing seasons at the Texas A&M AgriLife Research Center in Stephenville, Texas.

Accession	Plant Vigor*	Foliage Density*	Seed Production*	Forage Production*	Plant Height (cm)	Germination Percent (%)
9086245	4.5	4.0	3.0	5.2	23.5	27.0
9086291	4.3	4.3	2.7	5.2	23.1	21.6
9088598	4.1	4.1	2.9	4.5	26.2	54.0
9093644	4.0	4.0	3.3	4.5	26.9	42.3
9107901	4.5	4.6	3.4	5.0	25.7	42.0
Turner VNS*	4.2	4.1	2.6	5.1	24.9	33.0

*Note: Plant vigor, foliage density, seed production and forage production are based on ocular estimates where 1 = best and 10 = poor. Turner VNS is commercial variety sold by Turner Seed, Breckenridge, Texas.

Seed Increase

Seed was harvested from isolated seed increase plots (averaging 1000 plants per accession) on 36-inch bedded rows with a target plant population of 14,000 plants per acre (plants established

using transplants spaced at 1-ft.) in 2015-2017. Estimated seed yield of 10 pounds pure live seed per acre.

Seed Production, Harvest, and Cleaning

Seed fields of Menard Germplasm are established from transplants planted into a bedded, prepared seed bed or flat ground. Well maintained production field produces a marketable seed crop in the first year. Seed is best harvested with a Flail-vac or other brush type harvester. If a Flail-vac is used it is recommended that the old seed heads are removed by mowing between seed crops to ensure a uniform stand and stimulate a second seed crop. Little to no cleaning is required following harvest with a Flail-vac. Removal of awns increases flowability in a drill or broadcast seeder.

G. Area of Adaptation

Menard Germplasm is likely to perform best in the Rio Grande Plains, Gulf Coast Prairies and Marshes, Edwards Plateau, Rolling Plains, Cross Timbers, and Blackland Prairies ecoregions. Menard Germplasm may also be adapted to areas of the Trans Pecos and Post Oak Savannah ecoregions; however, additional plantings are needed to verify its full range of adaptation.

H. Procedure for maintaining stock classes of seed

The parent populations of each component of Menard Germplasm is maintained by TNS. Generation (G) 0 seed, equivalent to Breeder seed, is seed harvested from isolated plantings of the parent lines. G0 seed is made up of equal amounts (by %PLS, +/- 10%) of each of the 5 accessions. G0 seed will be distributed to commercial growers. Growers may use Generation 1 and Generation 2 seed for commercial increase. Increase of Menard Germplasm beyond G2 seed is prohibited. G1 (equivalent to Foundation) and G2 (equivalent to Certified) seed fields have a seven-year production limitation.

I. Additional restrictions, etc.

All commercial seed fields of Menard Germplasm must be located in Texas, and isolated from other cultivated varieties and wild populations of *Aristida purpurea* by a minimum of 900 feet. Release of Menard Germplasm is limited to growers whose production bids are awarded with preference given to those who provide production locations meeting isolation requirements.

Will application be made to the Plant Variety Protection Office? YES__ NO_X__

If YES, will the application specify that the variety is to be sold by variety name only as a class of certified seed? YES__ NO__

Ecological Considerations and Evaluation: An Environmental Evaluation of Plant Materials Releases was completed using guidelines established by NRCS and the best available information for this species. Results of this evaluation determined that Menard Germplasm purple threeawn was suitable for release based on the criterion contained in this document. This conclusion is mainly because purple threeawn 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 on other native plant species would likely be minimal to non-existent. Also, release of this species will make available an additional native species for rangeland planting, will provide a good source of forage for cattle, and provide ecological benefits by maintaining and contributing to saline habitats that are often difficult to revegetate.

Conservation Use: Menard Germplasm purple threeawn is recommended for upland wildlife plantings, critical site revegetation, right-of-way plantings, and inclusion in range seeding mixes in the Rio Grande Plains, Coastal Sand Plains, Gulf Coast Prairies and Marshes, Edwards Plateau, Rolling Plains, Cross Timbers, and Blackland Prairies ecoregions.

Availability of Plant Materials: Breeder Seed is maintained by Texas Native Seeds project or the Caesar Kleberg Wildlife Research Institute. G0 seed is available to qualified growers under license agreement stipulating production requirements.

References:

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- Soil Survey Staff, Natural Resources Conservation Service, United States Department of Agriculture. Web Soil Survey. Available online at <http://websoilsurvey.nrcs.usda.gov/>. Accessed [02/04/2015].

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Figure 1. Collection sites (yellow pins) and evaluation sites (blue pins) used in the development of Menard Germplasm.

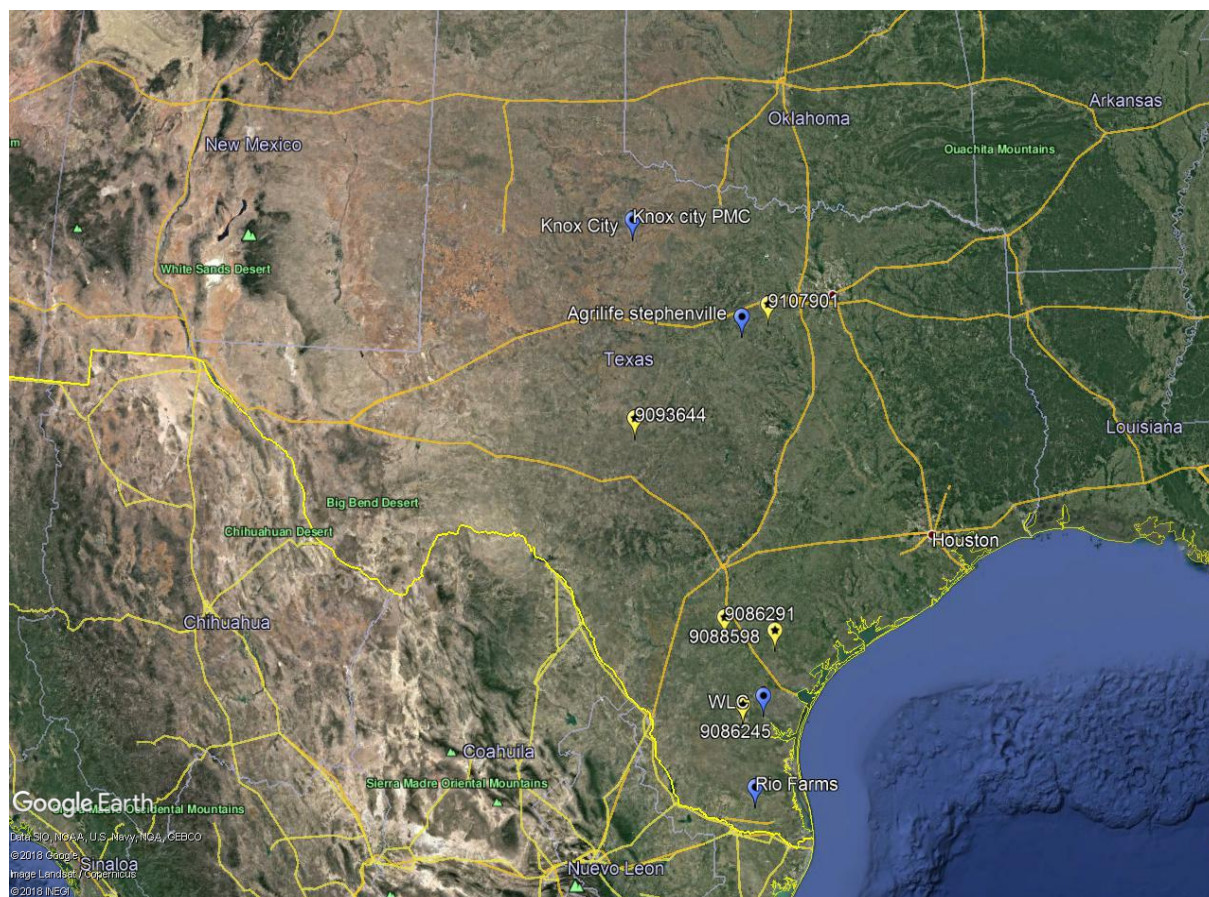


Figure 2. A representative plant of Menard Germplasm purple threeawn.



MARKETING PLAN
MENARD GERMPLASM PURPLE THREEAWN

June 2020

Finalize and obtain approval for release and print supporting documents (fact sheet and brochure).

Spring 2020

Distribute commercial seed to seed dealers to establish seed production fields.

Fall 2020

Have seed of Menard Germplasm commercially available.

SEED AVAILABILITY/SEED PRODUCTION ESTIMATE

As of January 2018, 12 lbs. of pure live seed of Menard Germplasm purple threeawn is in storage at the *Texas Native Seeds* facility in Kingsville, Texas. In addition, a 0.1-acre seed increase field is established at Texas Native Seeds farm in Kingsville. Established production should yield 5 lbs. PLS annually to be used for increase.

Signatures for release of:
MENARD GERMPLASM PURPLE THREEAWN
Aristida purpurea Nutt.

Dr. David G. Hewitt
Leroy Denman, Jr. Endowed Director of Wildlife Research
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Date

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