

UNITED STATES DEPARTMENT OF AGRICULTURE
NATURAL RESOURCES CONSERVATION SERVICE
PLANT MATERIALS CENTER
KINGSVILLE, TEXAS

and

TEXAS AGRICULTURAL EXPERIMENT STATION
BEEVILLE, TEXAS

and

TEXAS A&M UNIVERSITY
KINGSVILLE, TEXAS

NOTICE OF RELEASE OF KIKA648 GERMPASM PLAINS BRISTLEGRASS
SELECTED PLANT MATERIAL

The Natural Resources Conservation Service (NRCS), U.S. Department of Agriculture (USDA), Texas A&M University-Kingsville, and the Texas Agricultural Experiment Station at Beeville, Texas announce the release of a selected plant material of plains bristlegrass (*Setaria vulpiseta* (Lam.) Roemer & J.A. Schultes) for the south Texas ecoregion. Kika648 Germplasm was tested under the accession number 9029648 and 648.

As a selected plant material, this plant will be referred to as Kika648 Germplasm plains bristlegrass. Kika648 Germplasm is released as a selected plant material class of certified seed (natural track).

This alternative release procedure is justified because there are no existing Texas commercial sources of tested and adapted plains bristlegrass. The potential for immediate use is high especially for upland wildlife plantings and for range seeding mixes.

Collection Site Information: Accession 9029648 was originally collected from Webb county in 1982 from native plants located near Laredo, Texas, at 27° 42' N. latitude and 99° 24' W. longitude (MLRA 83). It was growing on a Catarina clay soil type with a 1% slope. Collection site elevation was 152 meters (500 feet) and average annual precipitation for this location is 50 centimeters (19.5 inches).

Description: Plains bristlegrass is a native perennial bunch grass with stiffly erect stems. Mature foliage height ranges from 60 to 120 centimeters (2 to 4 feet) tall, turning a pale yellow color. Stems are in dense clumps. The leaf blades are narrow, 5 to 6 millimeters wide and 8 to 25 centimeters long, with abundant pilose hairs on the upper surface. It has a ligule that is densely hirsute with hairs 2 to 4 mm long. The inflorescence is densely flowered in a compressed panicle commonly 7 to 12 centimeters long and 0.7 to 1.5 cm thick. The bristles, by which it gets its common name, are 6 to 7 mm long. Anthers exude first from the floret, and the anthers and stigmas appear white in color. Spikelets are small and globose at maturity, seldom longer than 2 mm. The chromosome number is $2n=54$. The plants produce seed from May

through November. Plains bristlegrass is found mainly in the southern portions of the state of Texas.

Potential Uses: Kika648 Germplasm is recommended for upland wildlife plantings and in range seeding mixes. It can be used in many types of conservation plantings, such as streamside buffers and filter strips.

Method of Breeding and Selection:

Initial evaluation: Initial evaluations of Kika648 Germplasm began in 1984 at the USDA-NRCS E. "Kika" de la Garza Plant Materials Center (PMC), Kingsville, Texas. A total of 96 accessions of bristlegrass (*Setaria* spp.) were collected from throughout the state of Texas and were included in the study. From these initial evaluations, accessions 9038819 and 9038820 were determined to be the best accessions of bristlegrass for survival, vigor, growth form and development, and disease resistance.

An advanced evaluation plot was established at the PMC in 1994 that consisted of four replications of ten plants each of 9038819, 9038820, 9003939 (Arizona release) and a Texas "common" commercial source. In 1996, we took biweekly seed harvests to determine total seed yield. We also evaluated the plots for total biomass production and survival in October 1996. However, despite numerous trials to get active germination above 10%, work with bristlegrass was abandoned due to poor germination results.

In 2001, in conjunction with the development of the South Texas Natives Project, interest was revived in plains bristlegrass and a new initial evaluation was started. Nine collections of bristlegrass were transplanted to field plots at the PMC in April and May 2001. Seed was collected from these nine accessions at the end of 2001 and germination tests were performed in June 2002. All nine accessions exhibited very poor germination results. Another 5 accessions were added to the field nursery in November 2001. Thirteen of the fourteen accessions had good field survival and growth through the winter of 2001.

Seed was collected from all fourteen of the 2001 plantings during the summer of 2002. A germination test was run on this harvest in March 2003. All accessions again exhibited poor germination (data not shown).

The field plot was evaluated for plant performance from May to December of 2002. Only five of the fourteen collections planted in the plot exhibited above average performance in field characteristics (Table 1). Only accession 9038819-Bexar exhibited above average seed retention, but it also exhibited above average lodging problems. All accessions exhibited average seed shattering problems. In addition, all seedheads in the field plot became infested with fungi in October 2002.

Table 1. Bristlegrass Initial Field Evaluation at Kingsville, Texas in 2002

Accession Number	Origin (County)	% Survival	Foliage Density*	Seed Production*	Seed Shatter*
9029587	Webb	96	6.0	5.6	6.2
9029605	Val Verde	78	6.0	4.0	7.2
9029636	Live Oak	96	5.2	4.6	5.4
9029648	Webb	92	5.0	6.2	6.2
9029667	La Salle	90	6.3	6.8	7.8
9029677	Karnes	100	5.8	6.0	5.0
9029678	Mc Mullen	90	5.3	5.8	6.8
9029679	Mc Mullen	90	6.3	5.2	5.4
9038708	Goliad	96	5.5	5.0	7.0
9038713	Duval	42	6.5	5.2	6.0
9038715	Duval	88	5.0	4.0	7.8
9038819	Bexar	94	5.8	5.8	4.4
9038820	Willacy	96	7.3	6.8	6.0
9038833	Frio	96	6.5	4.0	5.4

*Ocular estimate (1 = Best)

Sixteen more collections were added to the field evaluation plot in April 2003, increasing the total number of field accessions to 30. The field plot of plains bristlegrass was evaluated for plant performance from May to August of 2003 (Table 2). Two of the collections planted in 2001 in the field plot exhibited above average seed production (Accessions: 9038708-Goliad & 9029667-La Salle), and two of the new accessions planted in 2003 (Accessions: 9088932-Duval & 9086210-Kenedy) exhibited above average vigor. All accessions exhibited average seed shattering problems. All seed heads in the entire field plot became infested with fungi again in October 2003.

In February of 2003, South Texas Natives took half of the 2002 seed harvest from the 14 accessions in the PMC field evaluation plot and seeded it in the greenhouse. The resulting plants were taken to the Texas Agricultural Experiment Station at Beeville and planted out that spring on weed mat. Seed was harvested from these accessions in 2003 by three different methods: (1) fallen seed was swept off the weed mat (referred to as mat harvest), (2) the seed heads were cut off the plants and allowed to dry on tarps, then fallen seed was collected (referred to as tarp harvest), and (3) seed that still remained on the plants after drying on the tarp was stripped off the plants using a brush machine (referred to as plant harvest). Dr. Ocumpaugh evaluated these accessions at Beeville and chose 6 accessions he thought warranted further study (Accessions: 9038820-Willacy, 9038715-Duval, 9029677-Karnes, 9029667-LaSalle, 9038819-Bexar, and 9029648-Webb).

Table 2. Bristlegrass Initial Field Evaluation at Kingsville, Texas in 2003

Accession Number	Origin (County)	% Survival	% Regrowth	Plant Vigor*	Foliage Density*	Uniformity*	Seed Production*	Seed Shatter*
9029648	Webb	100	50	5.0	5.0	5.0	5.3	5.0
9029677	Karnes	98	50	5.0	5.0	6.7	5.3	5.0
9038820	Willacy	98	50	5.7	5.0	5.0	5.0	5.0
9038819	Bexar	92	50	5.3	6.0	5.0	5.3	5.0
9029679	McMullen	100	50	5.0	5.0	5.0	5.3	5.0
9038713	Duval	98	50	6.3	6.3	5.3	6.3	5.0
9038833	Frio	96	50	5.3	6.0	5.0	6.7	5.0
9029636	Live Oak	98	50	5.3	5.7	5.0	5.3	5.0
9038708	Goliad	98	50	6.0	5.0	5.0	4.7	5.0
9029667	La Salle	94	50	5.7	5.0	5.0	4.7	5.0
9038715	Duval	100	50	5.0	5.0	5.0	5.0	5.0
9029605	Val Verde	88	50	6.0	6.0	5.0	5.7	5.0
9029587	Webb	96	50	5.0	5.0	5.0	5.3	5.0
9029678	McMullen	92	50	6.3	6.3	5.0	5.3	5.0
9086153	Zavala	94	-	5.0	5.0	5.0	5.0	5.0
9086163	Zavala	90	-	6.3	6.3	5.0	6.5	5.0
9088606	Zavala	92	-	5.3	5.7	5.0	6.5	5.0
9088574	Zavala	87	-	6.7	6.7	6.0	6.5	5.0
9089041	Live Oak	92	-	6.7	6.7	5.0	7.0	5.0
9089116	Medina	80	-	7.0	7.0	5.0	7.0	5.0
9089207	Uvalde	68	-	7.0	7.0	5.3	6.0	5.0
9089209	Uvalde	93	-	6.0	5.7	6.7	6.5	5.0
9086280	Atascosa	90	-	5.3	5.0	6.7	6.0	5.0
9086980	Frio	95	-	5.7	5.3	6.7	5.5	5.0
9088959	Atascosa	98	-	6.0	5.7	5.7	6.5	5.0
9088928	Dimmit	94	-	5.7	5.3	5.0	5.5	5.0
9088932	Duval	100	-	4.3	4.3	5.0	4.5	5.0
9089059	La Salle	100	-	5.7	5.3	5.7	5.0	5.0
9088958	Atascosa	98	-	5.3	5.0	5.7	5.5	5.0
9086210	Kenedy	100	-	4.7	5.0	5.0	5.0	5.0

*Ocular estimate (1 = Best)

A germination experiment was also conducted on seed harvested at the PMC in 2003 and stored only in the office (Table 3). There was an indication that cold storage (50% humidity and 50°F) was causing the seed to go into greater dormancy. Accession 9029648 had a germination rate of 33%.

Table 3. Bristlegrass Germination Test – 2003 PMC Harvest, Office-Stored Seed

Accession Number	Germination (3-Day)	Total Germination	Seed-Fill	Viability Test
9029677	5%	24%	49%	42%
9029648	9%	33%	37%	21%
9038819	0%	17%	68%	48%
9038820	0%	5%	32%	31%
9038715	0%	7%	34%	27%

Seed Dormancy: In 2003 and early 2004, numerous attempts ranging from moist heat to acid scarification were made to increase the germination or break the seed dormancy of bristlegrass. None of the attempts were very successful (Kika de la Garza PMC, 2003).

In 2004, efforts continued to be focused on evaluating seed production and quality at different locations and at different months of the year. Seed fill and germination was good from accession 9029648 at Knox City in 2004 (Table 4). Seed harvested in June 2004 at Beeville had germination rates of 44% (Table 5) and germination rates of 48% from seed harvested in September 2004 (Table 6).

Table 4. Bristlegrass Germination Test – Knox City Seed, 2004

Accession Number	Storage Type	Harvest Date	Germination 3-day	Germination 9-day	Total Germination	Seed-Fill
648	Greenhouse	8-16-04	8%	56%	76%	78%
648	Office	8-16-04	2%	52%	66%	63%
648	Greenhouse	9-08-04	6%	74%	86%	52%
648	Office	9-08-04	4%	60%	88%	66%

Table 5. Bristlegrass Germination Test – Beeville Seed, 2004

Accession Number	Harvest Type	Harvest Date	Germination	Seeds/Pound
9029648	Tarp	6-03-04	44%	567,500

Table 6. Bristlegrass Seed Harvest Yield and Germination – Beeville Seed, 2004

Accession Number	Harvest Date	Seed Harvest (grams)	Germination	Total Viable
9029648	9-30-04	1113	48%	60%
9029648	6-03-04	1040	-	-

Seed Production: Seed yield of Kika648 Germplasm plains bristlegrass at Beeville have been 108 lb/ac (121 kg ha⁻¹) with 41% pure live seed (Table 7). This was the year of establishment, and the seed production off of the same land area was nearly that much for the first harvest in 2006 (data not shown).

Table 7. Bristlegrass Seed Harvest Yield – Beeville Seed, 2005

Accession Number	Harvest Date	Seed Harvest (lbs.)	Harvest (lbs./ac)	% PLS	PLS Pounds
9029648	2005	48.8	108	41	27.8

Indeterminate seed maturity, seed shattering and lodging are factors that may influence economical seed yields of plains bristlegrass. A typical combine-run harvest consists of complete seed units or filled seed, incomplete seed units or unfilled seed and other non-viable inert matter. Filled seed at Beeville, Texas ranged from 21% in 2003 to 60% in 2004. However, seed fill may be influenced by environmental conditions such as temperature and soil moisture. Data from Knox City (Table 4) for both month of harvest as well as storage location shows variability in percentage of seed fill. Therefore, location and ability to irrigate may dictate where bristlegrass can be most economically grown for seed production.

Seed shattering is a problem with bristlegrass species. However, one attribute to an indeterminate seed development is that all the seed is not lost at maturity if a storm or high winds occur. Furthermore, with the use of a Shelborne header it is possible to get multiple harvests when the seed reaches maturity without cutting off the inflorescence.

Lodging, while seen at the PMC in Kingsville, never occurred at Beeville. We are unsure of the cause of this. It may be a result of growing the bristlegrass on the heavy textured soils at Kingsville versus the coarse textured soils at Beeville. Though more likely, it is a result of growing it on raised beds spaced 36 inches apart at Kingsville whereas at Beeville it was on flat ground. Even in our first year's evaluation at Beeville, with the plants grown in wide rows with weed mat rolled out between the rows, no lodging was observed. An experiment starting in 2005 at Beeville is evaluating 5 rates of N fertilizer application on bristlegrass. The first year's results show no indication that any of the bristlegrasses are going to lodge, even with high rates of N fertilizer.

Rice stinkbugs and ergot have been observed on our bristlegrasses. Appropriate use and timeliness of applications of insecticides or fungicides can control these infestations. However, inattention to these outbreaks can affect both the quantity and the quality of the seed harvest. Rice stinkbugs are known to destroy the endosperm of developing grass seeds (Drees and Jackman, 1999). Fields treated with Sevin XLR at 3 quarts/acre have effectively controlled rice stinkbugs.

Seed quality of harvested seed can be easily manipulated. Seed harvested by a forage harvester (clipping the heads, and air drying on tarps) then keeping only the seed that shattered onto the tarp at Beeville in 2005 and then run through a *Clipper* seed cleaner has produced 59% pure seed.

Ecological Considerations and Evaluation: An Environmental Evaluation of Plant Materials Releases was completed using guidelines established by NRCS (USDA-NRCS, 2000), and the best available information for this species. Results of this evaluation determined that Kika648 Germplasm plains bristlegrass was suitable for release based on the criterion contained in this document. This conclusion is mainly due to the fact that plains bristlegrass 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 seed source for quail and other birds and may provide unknown benefits by maintaining and contributing habitat that harbors beneficial insects and butterflies. Bob White Quail are frequently observed in our bristlegrass plots at Beeville.

Conservation Use: Kika648 Germplasm plains bristlegrass will provide a native species for rangeland planting, erosion control, wildlife habitat, and water quality improvement. It has good germination, while retaining some dormant seed to deal with unpredictable weather conditions. Its bunch growth habit and good seed size make it particularly suitable for upland-bird habitat.

Area of Adaptation: Kika648 Germplasm plains bristlegrass is well adapted for use in the southern portions of Texas, coinciding with MLRA 83 (Rio Grande Plain) and MLRA 150 (Gulf Coast Prairies). Current testing has not completely substantiated the northern limit of its range of adaptation. A test site has been established at Stephenville and Knox City, TX, and additional sites are currently being planted in Ardmore, Oklahoma, Louisiana, and New Mexico.

Availability of Plant Materials: Breeder seed will be maintained by the USDA-NRCS E. "Kika" de la Garza Plant Materials Center, Kingsville, Texas.

References:

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Signatures for release of:


Kika648 Germplasm Plains bristlegrass (*Setaria vulpiseta* (Lam.) Roemer & J.A. Schultes)



Dr. Larry Butler
State Conservationist
United States Department of Agriculture
Natural Resources Conservation Service
Temple, TX

Acting


SEP 01 2006
Date



Texas Agricultural Experiment Station
College Station, Texas

8-23-2006


Date



Dr. Fred Bryant, Director
Caesar Kleberg Wildlife Research Institute
Texas A&M
Kingsville, Texas

9/8/06

Date



Robert Escherman
National Plant Materials Program Leader
United States Department of Agriculture
Natural Resources Conservation Service
Washington, D.C.

9-18-06

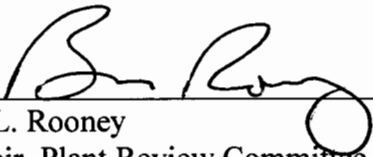
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TEXAS AGRICULTURE EXPERIMENT STATION
PLANT MATERIAL RELEASE NOTIFICATION
REPORT OF TECHNICAL COMMITTEE ON SEED RELEASE AND INCREASE

The attached proposal for plant release has been examined and reviewed by members of the TAES plant release committee. Based on this review, the following recommendations regarding release are made. Release procedures followed those given in the TAES Policy on the Management & Release of Plant Materials – 1995.

1. Species: **Plains bristlegrass (*Setaria valpiseta*)**
2. Breeders: **William R. Ocumpaugh (TAES contact) et al.**
3. Type of Release: **Selected Native Germplasm**
4. Recommended for Release: **Yes**
5. Designation to be applied upon release: **Kika648 plains bristlegrass**
6. Distribution of Breeder's Seed: **Breeder**
7. Increase and maintenance of Foundation Seed Stocks: **n/a**
8. Responsibility for providing seed to state and federal seed laboratories: **Breeder**
9. Publicity (including Station Seed Leaflet):
10. Other Recommendations:
11. Members of plant review committee considering release: **J. Betran, D. Byrne, J. Starr, G. Peterson, K. Crosby, W. Smith, L. Nelson, and J. Rudd.**

Forwarded by:

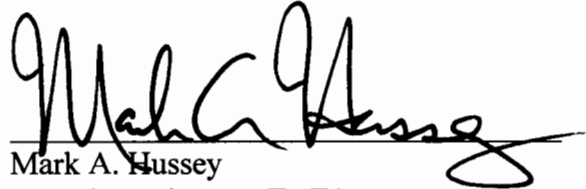


W.L. Rooney
Chair, Plant Review Committee

Date: August 21, 2006

Changes in Release: none

Approved as Recommended:



Mark A. Hussey
Associate Director, TAES

Date: **8-21-2006**

PLANT MATERIALS RELEASE PROPOSAL

Date: 18 May 2006

1. Crop: **Plains bristlegrass (*Setaria vulpiseta* (Lam.) Roemer & J.A. Schultes)**
Type of Release: **Selected Plant Material**

2. Proposed name or identification: **Kika648 plains bristlegrass**

3. Designation or name in development stages: **9029648 or 648**

4. Primary features or advantages:

- ◆ **Native to and adapted to southern Texas**
- ◆ **Selected for harvestable seed production**
- ◆ **Excellent seed germination and good 3-day germination**
- ◆ **Good long-term survival**

5. Plant Variety Protection: **No**

6. Seed amount available and date: **48 lbs by November 2005, 100 lbs more by November 2006**

7. Proposed seed distribution: Foundation seed will be produced and maintained by E. "Kika" de la Garza Plant Materials Center in conjunction with *South Texas Natives* and Texas Foundation Seed Service. Foundation seed will be released to commercial growers to be grown as monocultures for seed production.

All seed shall be produced in Texas. Foundation and certified seed fields will be limited to 7 production years.

8. Royalty: **Yes**

9. Suggested fees:

10. Supportive documents attached: **Release Proposal: Yes**

11. Submitted:

Breeders and Scientists – Date

W.R. Anger 5-26-06

Unit Heads – Date

Bobby R. Eddleman 5-30-06