TEXAS A&M UNIVERSITY-KINGSVILLE
CAESAR KLEBERG WILDLIFE RESEARCH INSTITUTE
SOUTH TEXAS NATIVES
KINGSVILLE, TEXAS

And

UNITED STATES DEPARTMENT OF AGRICULTURE
NATURAL RESOURCES CONSERVATION SERVICE
E. "KIKA" DE LA GARZA PLANT MATERIALS CENTER
KINGSVILLE, TEXAS

NOTICE OF RELEASE OF DUVAL GERMPLASM RED LOVEGRASS SELECTED PLANT MATERIAL

Texas A&M University-Kingsville (TAMUK), Caesar Kleberg Wildlife Research Institute (CKWRI), *South Texas Natives* (STN), and the United States Department of Agriculture (USDA), Natural Resources Conservation Service (NRCS), E. "Kika" de la Garza Plant Materials Center (PMC) announce the release of a selected plant material of red lovegrass [*Eragrostis secundiflora* J. Presl ssp. *oxylepis* (Torr.) S.D. Koch] (USDA, NRCS 2013).

This release will be referred to as Duval Germplasm red lovegrass, and is released as a selected plant material class of certified seed (natural track). Duval Germplasm was tested under the accession numbers 9093481, 9093480, 9076884, and 9064457. Seed of Duval Germplasm red lovegrass release will be identified by USDA NRCS accession number 9112620.

This alternative release procedure is justified because there are no existing commercial sources of red lovegrass that have been tested or have known adaptation in the Rio Grande Plains, Gulf Coast Prairies and Marshes, or Coastal Sand Plain.

A. Proposed Variety Name and Temporary Designation:

DUVAL GERMPLASM RED LOVEGRASS

B. Family, kind, genus and species:

Family: Poaceae

Kind: red lovegrass

Genus and species: *Eragrostis secundiflora* J. Presl ssp. *oxylepis* (Torr.) S.D. Koch

C. Origin and breeding history of the variety:

Collection Site Information:

Red lovegrass accession 9064457 was collected on November 11, 1993 in Zavala County, TX by Vivian Garcia. Red lovegrass accession 9076884 was collected on November 6, 1995 by Dan Yanta in Calhoun County, TX near 28° 15' 0" Latitude and 96° 36' 30" Longitude. The soil at this collection site was a Galveston sandy soil which is characteristic of the Gulf Coast saline prairies (MLRA 150B). Accession 9093480 was collected on October 28, 2008 by Forrest Smith from Nueces deep sand in Jim Hogg County, TX near 27° 0' 59" Latitude and 98° 34' 10" Longitude. This area is part of the sand sheets prairie region of south Texas (MLRA 83E). Accession 9093481 was collected on October 28, 2008 by Forrest Smith. This accession originated from a Duval fine sandy loam in Webb County, TX near 28° 6' 2" Latitude and 99° 31' 47" Longitude. This region is part of the central Rio Grande Plain (MLRA 083C) (Figure 1).

Breeding History: Plants evaluated in initial evaluation plantings were grown from the original wild seed collections. Advanced evaluations and seed increases were also started using the original seed collections. Later increases were made using seed harvested from seed production fields established by transplants grown from seed produced in isolation from other red lovegrass accessions. Multiple harvests of the accession in the seed increase portion of the germplasm development were made in an effort to maintain the full spectrum of genetic diversity of the natural population. No intentional selection of any kind was conducted within the accessions in the development of this release.

D. Objective description of the variety

Description: Red lovegrass is a tufted perennial with culms ranging from 30-75 cm tall. Accessions 9093481, 9093480, and 9064457 are shorter-statured populations ranging from 15-25 cm tall, while accession 9076884 is taller ranging from 50-75 cm tall. Blades are flat with long hairs above the ligule. Blades are usually 10-15 cm long and 2-2.25 mm wide with green to blue green coloration (Gould 1975). Leaf color and size are similar in accessions 9093481, 9093480, and 9064457 and are similar to published size ranges. Accession 9076884 also has green to blue green leaves, however leaves of this accession are typically twice as long as the other accessions.

Red lovegrass panicles are usually contracted, but sometimes open ranging from 5-30 cm long and 1-45 cm wide. The spikelets are in dense clusters on branches and branchlets. Spikelets are pedicellate, linear-oblong to ovate, strongly compressed with 10-26 florets, laterally flattened, pale green or violate to reddish in color (Gould 1975; Hatch et al. 2003). Caryopses are dark red to brown with 3,759,533 seeds per pound.

Potential Uses: Duval Germplasm red lovegrass is recommended for use in range seeding mixtures, upland wildlife plantings, roadside plantings, and conservation plantings on sand, loamy sand, and sandy loam soils in the Rio Grande Plain (MLRA 083B), Gulf Coast Prairies and Marshes (MLRA 150B), Coastal Sand Plain (MLRA 083E), and Blackland Prairie (MLRA 086B) ecoregions of Texas. Red lovegrass is an early successional plant well adapted to colonizing openings. Hatch and Pluhar (1993) states red lovegrass is poor forage for cattle.

E. Evidence

Method of Breeding and Selection:

Initial Evaluation

As part of an effort to collect, evaluate, and release adapted germplasms of a variety of plants native to south Texas for use in habitat restoration activities, seed collections from native populations of red lovegrass were obtained from across the region from 2001-2010. Red lovegrass collections from the South Texas region available in the USDA NRCS Plant Materials Program seed collections were also evaluated. In total, 19 populations of red lovegrass originating from Texas were evaluated. Initial evaluations were conducted from 2010-2011 by personnel from the *South Texas Natives* Project of the Caesar Kleberg Wildlife Research Institute (STN). Three sites were used for initial evaluation, including the South Texas Natives Farms at Caesar Kleberg Wildlife Center in Kingsville, Texas (WLC); Rio Farms near Monte Alto, Texas; and Rancho Blanco near Laredo, Texas. These sites are representative of the variations in soils and climate along a north to south and east to west gradients encompassing the natural distribution of red lovegrass in the area of intended benefit from our work.

Based on evaluations at the WLC, Rio Farms, and Rancho Blanco of 19 red lovegrass accessions from 2010-2011, we chose 4 accessions for advanced evaluation and seed increase. Field evaluations were based on a minimum of 2 replications of ten plants of each accession per location. Because we wanted to maintain a minimum population for evaluations, accessions 9064481 and 9064476 were not included in field evaluations due to a low number of plants establishing in the greenhouse. Field characteristics were scored throughout the evaluation years and averaged by accession/site/year for selection purposes. Criteria visually evaluated and scored included disease resistance, foliage density and production, stage of development, and seed production. Measurements were also recorded for plant height and survival. Whenever possible, seed was collected from the accessions planted at each evaluation site for tests of active seed germination and comparative seed quality.

Initial selections were based primarily on field performance data collected from multiple sites, and collection origin. Seed quality was not used for selection purposes due to uniformly high seed quality by all accessions.

We attempted to select populations from each of the geographic areas in the programs area of focus where red lovegrass naturally occurs and would potentially be used in seeding activities. Selection decisions for advanced evaluation were based on the following initial evaluation observations:

- Accession 9064457-Zavala County was selected based on being the 5th best performer when data from all sites were combined (Table 1). It had the 2nd highest seed production score compared to all other accessions at all 3 sites, as well as being 2nd best accession at Rancho Blanco (Table 2 & 3). This accession is representative of red lovegrass accessions that grow in in the western Rio Grande.

- Accession 9076884-Calhoun County was selected for being the 4th best accession overall when data from all sites were combined (Table 1). It was the top performer in evaluations conducted at the WLC, and scored the highest for forge production compared to all other accessions at all 3 sites (Table 4 & 5). This accession was also selected due to the fact that it originated from an eastern county that is part of the Coastal Prairies and Marshes ecoregion (MLRA 150B).

- Accession 9093481-Webb County was the 3rd best performer when all data from all 3 evaluation sites were combined (Table 1). 9093481 was the top accession at the Rancho Blanco evaluation site (Table 3). It was the 2nd best accession at Rio Farms (Table 6). This accession also originates from a Duval fine sandy loam which is a soil type that has a large distribution throughout the intended area of use.

- Accession 9093480-Jim Hogg County was the top performing accession at all evaluation sites when data were pooled across sites (Table 1). It was also the best accession at Rio Farms (Table 6). Accession 9093480 also scored the highest for seed production compared to all other accessions at all 3 sites. Besides good performance overall, we also chose this accession because it was the best accession of those that originated from the Coastal Sand Plain ecoregion (MLRA 083E).

Table 1. Overall ranking of *Eragrostis secundiflora* accessions combined across 3 evaluation sites and 2 sampling years.

Accession	Ranking
9093480	4.1
9076883	4.2
9093481	4.3
9076884	4.3
9064457	4.7
9090369	5.0
9076891	5.2
9076893	5.3
9076887	5.3
9076879	5.4
9076878	5.5
9064485	5.5
9076877	5.6
9076880	5.8
9064479	6.0
9064489	6.2

Table 2. Seed production ranking of *Eragrostis secundiflora* accessions combined across 3 evaluation sites and 2 sampling years.

Accession	Seed Production Score
9076893	3.3
9093480	3.9
9064457	4.4
9093481	4.4
9076883	5.0
9090369	5.0
9076877	5.4
9076879	5.4
9076891	5.4
9076878	5.5
9076887	5.5
9064479	5.6
9076884	5.6
9064485	5.7
9076880	5.8
9064489	6.1

Table 3. Overall ranking of *Eragrostis secundiflora* accessions at the Rancho Blanco evaluation site near Laredo, TX. Data presented are combined over 2 sampling years.

Accession	Mean Evaluation Score
9093481	4.3
9064457	4.3
9093480	4.3
9076884	4.4
9076883	4.4
9064485	5.3
9090369	5.3
9076879	5.4
9076887	5.4
9076891	5.6
9076878	5.7
9076877	5.9
9076880	6.1
9064489	6.3
9064479	6.4
9076893	N/D

Table 4. Forage production ranking of *Eragrostis secundiflora* accessions combined across 3 evaluation sites and 2 sampling years.

Accession	Forage Production
9076884	3.9
9076883	4.0
9093480	4.3
9093481	4.4
9064457	5.0
9090369	5.2
9076891	5.2
9076879	5.3
9076893	5.4
9076887	5.4
9076878	5.7
9064485	5.7
9076877	5.8
9076880	6.0
9064479	6.2
9064489	6.4

Table 5. Overall ranking of *Eragrostis secundiflora* accessions at the WLC evaluation site near Kingsville, TX. Data presented are combined over 2 sampling years.

Accession	Mean Evaluation Score
9076884	4.2
9076883	4.3
9093480	4.3
9090369	4.4
9093481	4.8
9076887	4.9
9076893	5.0
9064479	5.3
9076891	5.4
9076877	5.5
9076878	5.7
9064457	5.8
9064485	5.9
9076879	6.1
9064489	6.3
9076880	6.6

Table 6. Overall ranking of *Eragrostis secundiflora* accessions at the Rio Farms evaluation site near Monte Alto, TX. Data presented are combined over 2 sampling years.

Accession	Mean Evaluation Score
9093480	3.6
9076883	4.0
9093481	4.0
9064457	4.0
9076884	4.4
9076891	4.6
9076880	4.6
9076879	4.6
9076878	5.1
9090369	5.4
9064485	5.4
9076877	5.5
9076887	5.6
9076893	5.6
9064489	6.1
9064479	6.4

Seed Increase

Seed increase plots were established at Rio Farms, near Monte Alto, Texas and the South Texas Natives Farm in Kingsville, Texas. Seed of each of the accessions comprising the Duval Germplasm were grown in isolation from the other selected accession, wild, or other cultivated materials of red lovegrass. Seed quality of Duval Germplasm averaged 93% PLS in seed increase fields. Potential seed yields per acre have been calculated at 10 PLS lbs per acre on 36" bedded rows with a plant population of 14,000 plants per acre (plants established using transplants spaced 1').

Seed Production, Harvest, and Cleaning

Seed production of Duval Germplasm red lovegrass is best started using greenhouse grown transplants, planted on bedded rows. Seedlings grow and mature quickly and will produce a marketable crop in the year of planting. When cleaned to caryopses, seed quality and active germination are very high (≥ 90%). Because of this, only small amounts of seed are needed to produce a sufficient number of transplants to establish production fields.

Seed harvest is possible using a variety of methods and implements. Seed of all accessions ripens indeterminately. A Woodward Flail-Vac Seed Stripper (Ag-renewal, Inc., Weatherford, Oklahoma) can collect the ripe seed crop without damaging or eliminating the ability to make subsequent harvests of the stand as later flowering florets mature. However, we have also found that a majority of the seed crop will hold well on the plants after completing maturity, allowing

for a combine to be used to harvest the seed. An additional benefit of combining is the removal of unfilled florets which increases seed harvest purity. We have found that in well managed irrigated fields, 2-3 harvests can be expected per year. The first harvest has typically taken place as early as May with the last harvest occurring in October.

Seed is best cleaned by combinations of brushing, and screening. Caryopses can be easily dislodged from hulls using a brush machine and then cleaned using screens. Cleaning by this method can result in high PLS percentages averaging ≥ 90% PLS.

G. Area of Adaptation

Based on origin

Duval Germplasm is likely to perform best on sand, sandy loam, and loamy sand soils in the Rio Grande Plain (MLRA 083B), Gulf Coast Prairies and Marshes (MLRA 150B), Coastal Sand Plain (MLRA 083E), and southern portion of the Blackland Prairies (MLRA 086B) ecoregions of Texas. Use of Duval Germplasm in adjacent ecoregions has not been tested.

G. Procedure for maintaining stock classes of seed

G0 seed of Duval Germplasm red lovegrass will be maintained by *South Texas Natives.*

H. Description of how variety is to be constituted, etc.

Duval Germplasm is a blend of 4 accessions of red lovegrass, 9093481, 9093480, 9076884, and 9064457. For each accession in the release, G0 seed will be made up of the individual accessions, grown in isolation from one another, and maintained by the breeder. G1 seed is harvested from isolated plantings of G0 seed by commercial seedsmen and G2 seed is harvested from plantings of G1 seed. Increase from G2 seed is prohibited. G0 seed of Duval Germplasm is defined as a mixture of equal amounts of Texas Department of Agriculture Certified, G1 or G2 pure live seed (PLS) of accessions 9093481, 9093480, 9076884, and 9064457. Variance of +/- 5%, such that no accession makes up more than 30%, or less than 20%, of the blend is acceptable in G0 seed designated for production of Duval Germplasm.

I. Additional restrictions, etc.

All commercial seed fields of Duval Germplasm must be located in Texas and isolated from other cultivated varieties and wild populations of *Eragrostis secundiflora* by a minimum of 300 feet. Release of this variety will be limited to a single grower, with preference given to those who can provide production locations meeting isolation requirements. G1 and G2 seed fields have a 7 year production limit, after which time, fields must be replanted using the appropriate seed generation (G0 or G1).

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 the 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 Duval Germplasm red lovegrass was suitable for release based on the criterion contained in this document. This conclusion is mainly based on the fact that red lovegrass is a naturally occurring species in Texas and planting it would 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.

Conservation Use: Duval Germplasm red lovegrass will provide a native plant species for rangeland plantings and wildlife habitat improvement on sandy and sandy loam soils which are prone to wind erosion and are often dominated by annual forb species that provide minimal erosion control.

Availability of Plant Materials: G0 seed will be maintained by the *South Texas Natives* Project of the Caesar Kleberg Wildlife Research Institute. G0 seed will be released to qualified growers under license agreement stipulating production requirements.

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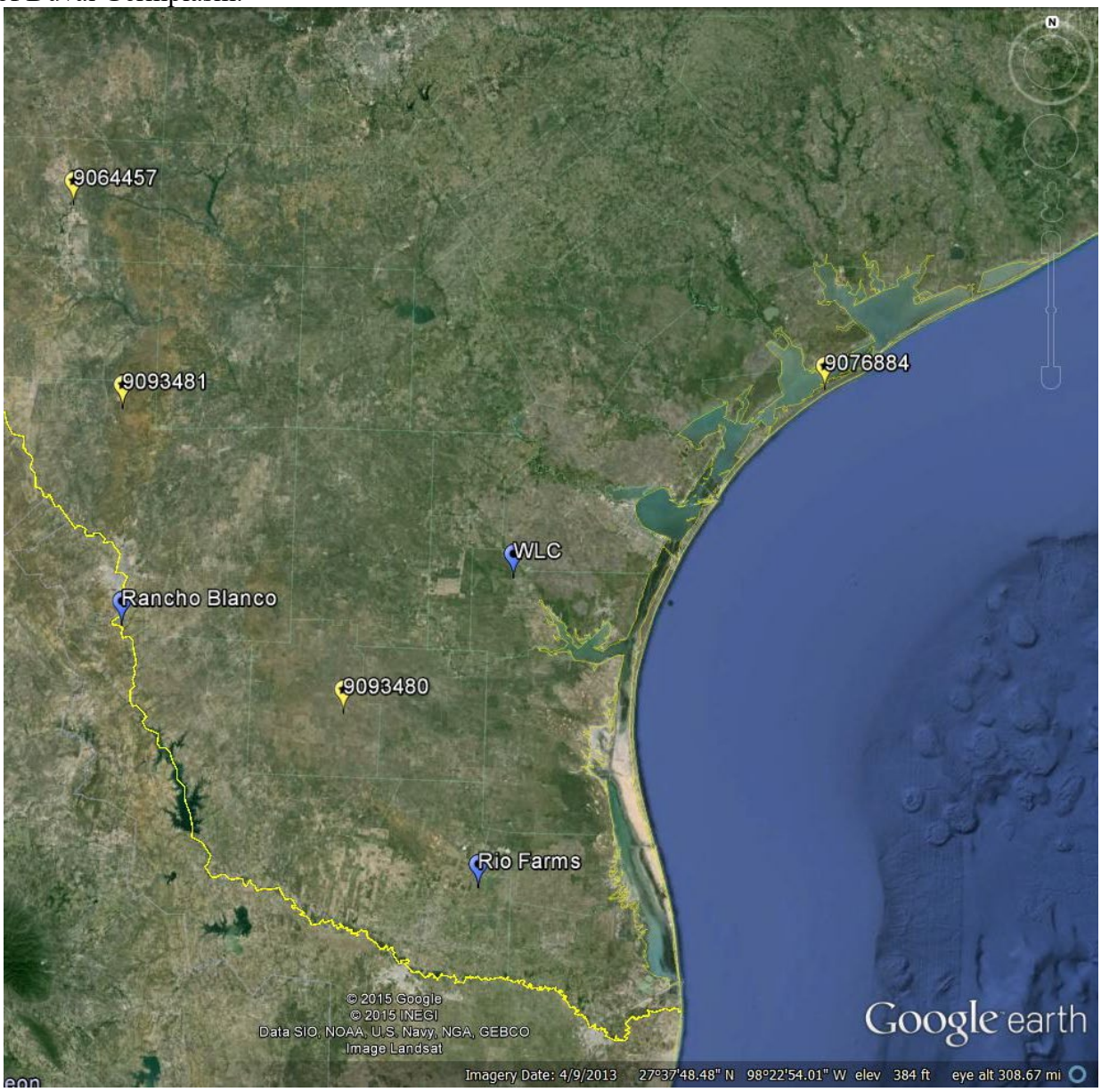
Figure 1. Collection sites (yellow pins) and evaluation sites (blue pins) used in the development of Duval Germplasm.



Signatures for release of:

DUVAL GERMPLASM RED LOVEGRASS

***Eragrostis secundiflora* J. Presl**

_____ _____

Fred C. Bryant — Date
Leroy Denman, Jr. Executive Director
Caesar Kleberg Wildlife Research Institute
Texas A&M University-Kingsville
Kingsville, TX

_____ _____

George Allen Rasmussen — Date
Dean
Dick and Mary Lewis Kleberg College of
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Salvador Salinas — Date
Texas State Conservationist
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