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CAESAR KLEBERG WILDLIFE RESEARCH INSTITUTE
SOUTH TEXAS NATIVES
KINGSVILLE, TEXAS

and

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

NOTICE OF RELEASE OF ZAPATA GERMPLASM RIO GRANDE
CLAMMYWEED SELECTED CLASS OF NATURAL GERMPLASM

Texas A&M University-Kingsville, South Texas Natives and U.S. Department of Agriculture (USDA), Natural Resources Conservation Service (NRCS), announce the release of a selected ecotype of Rio Grande clammyweed (*Polanisia dodecandra* (L.) DC. ssp. *riograndensis*) for the south Texas ecoregion. Zapata Germplasm was tested under the accession numbers 9089005 and 9091926. The release has been assigned the NRCS accession number 9093442.

This plant will be referred to as Zapata Germplasm Rio Grande clammyweed and is released as a selected class of certified seed (natural track).

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

A. Proposed Variety Name and Temporary Designation:

ZAPATA GERMPLASM RIO GRANDE CLAMMYWEED

B. Family, kind, genus and species:

Family: Capperaceae

Kind: Rio Grande clammyweed

Genus and species: *Polanisia dodecandra* (L.) DC. ssp. *riograndensis*

C. Origin and breeding history of the variety:

Collection Site Information: Accession 9089005 was collected by Forrest Smith and Cody Lawson in 2002 from a native population located at the Piloncillo Ranch in Dimmitt County, Texas at 28° 15' 32" N. latitude and 99° 33' 13" W. longitude (MLRA 83). Soil type was a Brundage fine sandy loam. Accession 901926 was collected by Cody Lawson, Keith Pawelek, and Forrest Smith in 2004 from a native population located at the Rafael Flores Ranch in Zapata County, Texas, GPS coordinates were not recorded (MLRA 83). Soil type was recorded as loamy sand.

Breeding history: Plants evaluated in all trials were grown from the original seed collections. Breeder seed was also grown from the original seed collections. All seed increase plots were grown in isolation from other accessions of Rio Grande clammyweed. No intentional breeding or genetic manipulation was conducted on the accessions.

D. Objective description of the variety:

Description: Zapata Germplasm Rio Grande clammyweed (clammyweed) is a native annual forb, endemic to southern Texas. It is found in sandy, gravelly (sometimes limestone) or alluvial silty soil, near riverbanks, coastal dunes, open areas in coastal live oak forests, bottoms of washouts, in semi-desert Opuntia-Mesquite scrub and shrub thickets, roadsides, chaparral pastures, fallow fields, or other disturbed areas on both sides of the lower Rio Grande River and adjacent areas of south Texas. Clammyweed flowers from March through November. The botanical description of clammyweed is: sparsely branched or unbranched annual (rarely perennial) 2-6 dm. tall, glandular-viscid; leaflets 3, leaves rounded or oblanceolate, 2-4 cm long, 5-20 mm wide, petals 5-16 mm long. Petals pink to rose 6-17 mm long longest stamens 12-17 mm long, style 3-5 (-8) mm long; bracts ovate to often nearly orbicular; raceme often dense and flat-topped; capsules narrow (3-) 4-7.5 cm long (3-) 4-5 (-7) mm wide, sparsely glandular; seeds prominently roughly tuberculate-rugose (Correll & Johnston, 1996). Cleaned seed of Rio Grande clammyweed has an average of 154,500 seeds per pound. Seed of Zapata Germplasm Rio Grande clammyweed is easily identified by the pronouncedly rugose-verruose (covered with blisters and ridges) nature. Flower structure and observations indicate that clammyweed is largely an insect pollinated species. Insect abundance and diversity is exceptionally high in clammyweed stands in comparison to many other native herbaceous plants.

Potential Uses: Zapata Germplasm is recommended for upland wildlife plantings and in range seeding mixes. Clammyweed seed is eaten by game birds such as bobwhite quail, scaled quail, mourning doves, white-wing doves, and Rio Grande wild turkeys, as well as many non-game species of birds and mammals. Rio Grande clammyweed is an important nectar plant for many species of butterflies and provides habitat to many other insects. Clammyweed has no grazing value for livestock or wildlife. Rio Grande clammyweed is an early successional plant. It is quick to establish on disturbed soils, grows quickly, and provides a favorable environment for other slow to germinate native species. In mixed species native plantings in south Texas, clammyweed is often the first planted species to emerge and flower. Rio Grande clammyweed readily re-seeds itself with moderate soil

disturbance. Clammyweed is often found in dense stands of non-native grasses, and may be useful in efforts to diversify these stands for wildlife.

E. Evidence

Evaluation

In February 2005, 6 accessions of clammyweed were grown for evaluation at 2 locations in the Rio Grande Plains. Transplants were grown from original seed and planted at the USDA-NRCS E. "Kika" de la Garza Plant Materials Center in Kingsville, Texas (PMC) (soil type Victoria clay) and Rio Farms Inc. near Monte Alto, Texas (soil type Delfina fine sandy loam). In March 2006 transplants were also planted for evaluation at Rancho Blanco, near Laredo, Texas (soil type Lagloria silt loam). All plots were planted in a split plot, spaced plant design with 1 ft. spacing between plants.. All plots were irrigated to ensure establishment and weeded as needed. Plots were evaluated monthly during the growing season for important traits, and seed was collected when ripe. Seed was tested for germination characteristics in controlled climate growth chambers for 30 days (12 hrs. light at 86 F, 12 hrs. dark at 68 F). Germination tests consisted of 4 replications of 100 seeds per accession. Field evaluations were used to define and rank the performance of each accession according to commercially important traits. Accessions were compared to one another by visual estimation, and scored on a scale of 1 to 9. Tables 1 and 2 present the field evaluation data, Table 3 presents germination data collected.

Table 1. Field Evaluation of six accessions of Rio Grande clammyweed planted at Rio Farms (Monte Alto, Texas) in 2005. Scores given are on a 1-9 scale, with 1 representing superior performance. Survival is given as a percent.

| Accession | Survival | Vigor | Foliage density | Uniformity | Development stage | Seed production | Biomass production | Plant height |
|-----------|----------|-------|-----------------|------------|-------------------|-----------------|--------------------|--------------|
| 9089004 | 55.00 | 4.17 | 3.67 | 4.67 | 1.00 | 3.00 | 3.67 | 3.33 |
| 9089005 | 48.75 | 3.00 | 2.75 | 4.13 | 1.00 | 2.75 | 3.13 | 2.63 |
| 9090738 | 82.50 | 3.50 | 5.00 | 4.00 | 1.00 | 3.25 | 4.00 | 3.50 |
| 9091926 | 58.88 | 2.25 | 2.25 | 3.63 | 1.00 | 3.00 | 2.13 | 2.38 |
| 9091944 | 55.00 | 3.38 | 2.88 | 3.88 | 1.00 | 2.50 | 3.25 | 3.00 |
| 9093169 | 43.80 | 2.83 | 2.83 | 4.33 | 1.00 | 2.67 | 2.83 | 2.67 |
| Mean | 57.30 | 3.19 | 3.23 | 4.10 | 1.00 | 2.86 | 3.17 | 2.92 |

Table 2. Field Evaluation of six accessions of Rio Grande clammyweed planted at Rancho Blanco (Laredo, Texas) in 2006. Scores given are on a 1-9 scale, with 1 representing superior performance. Survival is given as a percent. An "x" is used if no data was collected for those criteria. Means given include only data collected. Survival is given as a percent.

| Accession | Survival | Vigor | Foliage density | Uniformity | Development stage | Seed production | Biomass production | Plant height |
|-----------|----------|-------|-----------------|------------|-------------------|-----------------|--------------------|--------------|
| 9089004 | 5.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| 9089005 | 0.00 | x | x | x | x | x | x | x |
| 9090738 | x | x | x | x | x | x | x | x |
| 9091926 | 15.00 | 1.00 | 1.50 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| 9091944 | 20.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| 9093169 | 0.00 | x | x | x | x | x | x | x |
| Mean | 8.00 | 1.00 | 1.16 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |

Table 3. Percent active seed germination of six accessions of Rio Grande clammyweed from 2005 harvest at Rio Farms, and monthly harvests from the E. "Kika" de la Garza Plant Materials Center (PMC) from 2005. An "x" is given when no data was available.

| Accession | 2005 Rio Farms harvest germ 5/2005 harvest | 2005 PMC Annex germ 5/4/2005 harvest | 2005 PMC Annex germ 6/16/05 harvest | 2005 PMC Annex germ 7/28/05 harvest | 2005 PMC Annex germ 9/28/05 harvest |
|-----------|--|--------------------------------------|-------------------------------------|-------------------------------------|-------------------------------------|
| 9089004 | 12.67 | 66.00 | 2.00 | 1.33 | 1.33 |
| 9089005 | 12.67 | 54.00 | 0.00 | 0.00 | 0.67 |
| 9090738 | x | 12.67 | x | x | x |
| 9091926 | 23.33 | 72.67 | 0.67 | 2.67 | 1.33 |
| 9091944 | 5.33 | 66.67 | 0.00 | 0.00 | 0.67 |
| 9093169 | 6.67 | 52.00 | 0.00 | 0.00 | 0.67 |
| Mean | 12.13 | 54.00 | 0.53 | 0.80 | 0.93 |

Selection

Accessions 9089004, 9089005, and 9091926 were selected for advanced evaluation and seed increase because they showed superior active seed germination and good performance in most evaluation categories. Rio Grande clammyweed was selected for release in part because of its broad distribution in south Texas, the need for fast establishing native herbaceous plant material, and its value for wildlife habitat enhancement.

Advanced Evaluation and Seed Increase

In April 2007, 200 transplants of each of the three selected accessions were planted for advanced evaluation and seed increase at Rio Farms, near Monte Alto, Texas. Accession 9089004 showed early plant mortality, lower plant vigor, flower density and seed set than accessions 9089005 and 9091926. By August 29, accession 9089004 had experienced

100% mortality. Both 9089005 and 9091926 were both thriving and re-flowering, producing 2 more seed crops. After the advanced evaluation, accession 9089004 was dropped from the seed increase.

Testing of the seed harvests from the Rio Farms increase in the winter of 2007-2008 showed excellent seed fill and % active germination of both 9089005 and 9091926. Seed harvested in June at Rio Farms had the greatest seed weight and % PLS. Spring seed harvests from Rio Farms have had an average of 67% pure live seed, with 15% seed dormancy. Harvests from later in the growing season typically have poor seed fill, and higher dormancy. Seed yields from June hand harvests (first crop produced) at Rio Farms were 168 lbs. PLS seed/acre. Initial evaluation data collected by the Plant Materials Center (Table 3) also showed highest % active seed germination from spring harvests, with declining % active germination through summer and fall. Commercial seed production of Zapata Germplasm should focus on production of the first seed crop following planting. Plants commonly flower and produce seed beyond the first seed crop, and will set seed until frost; however subsequent seed crops have poor seed fill, lower active germination, and significantly lower seed yields.

Seed increase harvests in June 2008 at Kingsville, Texas (first crop produced) showed hand harvest seed yields averaging 144 lbs. pure live seed/acre under irrigated conditions. Pure live seed of these harvests averaged 83%.

All seed yield data was collected on rowed plantings to facilitate weed free fields; we suspect that seed yields will be much higher in flat plantings with higher plant densities.

Table 4. Seed increase data collected on two accessions of Rio Grande clammyweed 2007-2008.

| Accession | 6/2007 Harvest Rio Farms, % active germ | 8/2007 Harvest Rio Farms, % active germ | 10/2007 Harvest Rio Farms, % active germ | 6/2008 Harvest, Kingsville, % active germ | 6/2008 Harvest, Kingsville, % dormancy | 6/2008 Harvest, Kingsville, % PLS |
|-----------|---|---|--|---|--|-----------------------------------|
| 9091926 | 29.00 | 29.50 | 0.00 | 45.00 | 40.00 | 84.23 |
| 9089005 | 24.50 | 4.00 | x | 22.00 | 62.00 | 83.37 |

x denotes no data collected for category

Seeding Trials

Seeding trials at Kingsville, Texas have shown good establishment from seed in fall (October) and spring (April) plantings. Fall plantings should be made at least 2 months prior to danger of frost so that seed is produced before freezing. Clammyweed should be planted at a rate of 8 lbs. pure live seed per acre for solid stands. Zapata Germplasm Rio Grande clammyweed has also been planted in rowed, irrigated plantings for seed production. Excellent stands have also been established seeding at a rate of 10 active germinating seeds/row ft for seed production. Clammyweed typically requires 45-60 days from emergence to seed maturity.

In plantings of a mixture of 20 native species in the Lower Rio Grande Valley and near Kingsville, Texas, Zapata Germplasm Rio Grande clammyweed was observed to be the first native species to emerge following planting in March 2008. Rio Grande clammyweed has performed well in these plantings despite heavy weed infestations.

A series of one acre field plantings were initiated in August 2008 at ranches in Webb (2 plantings), Jim Hogg (1 planting), and Duval Counties (2 plantings). Of the 8 native species drill seeded, Zapata Germplasm Rio Grande clammyweed was the second most abundant planted species that emerged within 30 days of planting. Clammyweed was seeded at a rate of 0.5 lbs PLS/acre (5% of the total seed mixture), resulting in mean seedling density in the 5 plantings of 0.76 plants/ft².

F. Area of adaptation

This release has been tested and shown adaptability in the Rio Grande Plains, Coastal Sand Plains, and Gulf Prairies and Marshes ecological regions of Texas. Adaptation outside of this area is unknown. Zapata Germplasm has been grown in ornamental plantings near Dallas, Uvalde, and McAllen Texas, with good performance under irrigated conditions.

G. Procedure for maintaining stock classes of seed

Breeder seed will be produced and maintained by *South Texas Natives* in conjunction with the Texas Foundation Seed Service.

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

Breeder seed will be made up of equal amounts (% PLS) (+/- 10 %) of each of the 2 accessions comprising the release. One accession cannot make up more than 60% (by % PLS), or less than 40% (by % PLS) of the mixture.

I. Additional restrictions, etc.

Foundation and certified seed fields must be isolated from native or other cultivated stands of clammyweed by 900 ft. Foundation and certified seed fields have a 7 year production limit.

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__

Royalty distribution: Distribution of royalties and percentages to be determined at a later time.

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 Zapata Germplasm Rio Grande clammyweed was suitable for release based on the criterion contained in this document. This conclusion is mainly due to the fact that Rio Grande clammyweed 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 to upland avian wildlife species and provide unknown benefits by maintaining and contributing habitat that harbors beneficial insects and butterflies.

Conservation Use: Zapata Germplasm Rio Grande Clammyweed will provide a native plant species for rangeland planting and wildlife habitat improvement.

Availability of Plant Materials: Breeder Seed will be maintained by South Texas Natives, Kingsville, Texas. Breeder seed will be available by September 2008.

References:

Correll, D.V., and M.S. Johnston. 1996. Manual of the Vascular Plants of Texas. The University of Texas at Dallas. Dallas, Texas. Fourth Printing.

Iltis, H.H. 1969. Studies in the Capparidaceae XII: *Polanisia dodecandra riograndensis* ssp. nov. The Southwestern Naturalist 14(1):115-121.

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Signatures for release of:

**Zapata Germplasm Rio Grande clammyweed
(*Polanisia dodecandra* (L.) DC. ssp. *riograndensis*)**

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