

UNITED STATES DEPARTMENT OF AGRICULTURE
NATURAL RESOURCES CONSERVATION SERVICE
BOONEVILLE, ARKANSAS

and

UNITED STATES DEPARTMENT OF AGRICULTURE
AGRICULTURAL RESEARCH SERVICE
BOONEVILLE, ARKANSAS

and

ARKANSAS AGRICULTURE EXPERIMENT STATION
FAYETTEVILLE, ARKANSAS

NOTICE OF RELEASE OF 'BUMPERS' EASTERN GAMAGRASS

The Natural Resources Conservation Service (NRCS), U.S. Department of Agriculture (USDA), USDA Agricultural Research Service and the Arkansas Agriculture Experiment Station announce the naming and release of 'Bumpers' eastern gamagrass [*Tripsacum dactyloides* (L.) L.]. Bumpers was tested under the accession number 9058495.

Collection Site Information: Bumpers was collected in 1989 by the Yell County Field Office staff, Arkansas, (MLRA 118). Seeds were collected from plants on the east side of Chickalah Mountain at 93°17' latitude and 35°09' longitude. It was growing on an eastern exposure on a Barling silt loam with a 1 % slope. Collection site elevation was 109 meters (360 feet) and average annual precipitation for this location is 1219 millimeters (48 inches).

Description: Eastern gamagrass is a native grass that can be found from Massachusetts, west to Illinois and Nebraska, and south to the West Indies, Central America, and Brazil. Bumpers eastern gamagrass forms large clumps, with thick, knotty, rhizomes. Mature foliage height ranges from 0.6 to 2 meters (1.5 to 5 feet) tall. Foliage is a bluish-green color and the blades are usually 1 to 2 centimeters wide and scabrous on the margins. Flowers are produced from June to August, with maximum seed production generally occurring in mid-July. Flowering culms are from 2 to 3.5 meters (5 to 9 feet) tall and may lodge somewhat when seeds mature. Racemes are 15 to 25 centimeters (6 to 10 inches), with the separate staminate flowers held distally. Pistillate spikelets are 7 to 10 millimeters (0.25 to 0.4 inches) long (Hitchcock, 1951). Seeds are produced apomically. The caryopses are contained in a fruitcase composed of hardened segments of the rachis and lignified outer glumes. Bumpers is a tetraploid ($2n = 72$) (Chet Dewald, personal communication).

Potential Uses: Bumpers is recommended primarily for livestock and forage production. It is best used as a seasonal hay crop; however, it can be utilized in grazing situations if appropriate grazing management techniques are applied (i.e. rotational grazing) to

prevent damage to the plant community and stand population. It also has potential as a perennial silage crop and for many types of conservation plantings, such as plant buffers and vegetative barriers. The extensive root system makes it ideal for holding soil particles and the prevention of erosion.

Method of Breeding and Selection:

Initial evaluation: Bumpers was initially evaluated at the USDA-NRCS Booneville Plant Materials Center (PMC), Booneville, Arkansas, 1994 through 1998.. Initially, 9058495 was one of a total of 252 accessions collected from eastern Oklahoma, southern Missouri, and western Arkansas that were included in the study. From these initial evaluations, Bumpers was determined to have superior vigor, growth form and development, and disease resistance (Snider, 1995).

Regional Genotype Trial: Bumpers was selected by the PMC for inclusion in a regional trial comparing 13 eastern gamagrass accessions from southern and western sources (Snider, 1995). This trial was conducted from 1996 through 1998 at nine PMCs, including the Booneville PMC. Yield data was collected at of these six sites (Table 1) (Douglas et al., 2000).

Table 1. Average dry matter yield from 1996-1998 at six locations.

Accession	Booneville, AR	Knox City, TX	Nacogdoches, TX	Coffeerville, MS	Americus, GA	Brooksville, FL
-----kg ha ⁻¹ -----						
Bumpers	13 665	12 553	10 261	18 436 [†]	14 508	*
Highlander	14 383	11 155	12 722	18 065	19 133	7522
Jackson	7930	*	14 492	12 427 [†]	19 049	3201
434493	12 830	13 682	8172	14 041 [†]	18 616	12 898
9043629	9032	8120	14 448	12 121 [†]	12 858	7398
9043762	13 324	16 423	11 724	†	16 812	9967
9055975	*	*	2715	*	7455	10 957
9059213	*	2820	9179	*	14 791	13 306
9059215	*	3533	6799	*	16 579	15 131
9058465	11 436	11 269	11 823	15 653 [†]	16 158	9405
9058569	9214	8013	4742	10 626 [†]	7204	*
9062708	11 625	8588	10 691	15 359 [†]	18 040	8158
9066165	13 707	13 083	11 042	14 723 [†]	18 810	5942
Mean	11 714	9631	9909	14 606	15 385	8644
LSD (0.05)	2903	3586	7132	----- [‡]	2940	5969

* Indicates that plants died after the first winter.

† Plants were not harvested in 1998 because they succumbed to disease.

‡ Because this column contains both two-year and three-year yield averages, no LSD was determined.

Accessions 9055975, 9059213, and 9059215 were Florida accessions that did not survive the first winter at Booneville, Arkansas or Coffeerville, Mississippi. (Do we want to remove this next sentence????) All accessions except Highlander died in the winter of 1997 or the early spring of 1998 at the Coffeerville location due to a disease problem. Plant and soil samples collected at Coffeerville determined that *Pythium* spp. and

Rhizoctonia spp. were present, but inoculations would be required to confirm whether either or both of the organisms were the cause of the mortality. Bumpers did not persist at Brooksville, FL.

Forage Quality Estimates: Typically, crude protein (CP) values for Bumpers indicated a seasonal decline. Initial first cutting CP averaged over three years (1996-1998) was 138 gm/kg. Seasonal crude protein averages for the three years ranged from 119-140 gm/kg. Means for annual acid detergent fiber and neutral detergent fiber ranged from 332-363 and 613-628 gm/kg, respectively. Total digestible nutrients (expressed as a %) ranged from 63.8 to 74.1 during the study and were 66.8, 67.7, and 70.3 % for 1996, 1997, and 1998, respectively.

Seed Production: Average seed yields of Bumpers at Booneville range from 105 to 160 kg/ha. These are similar to those reported for Pete grown in Kansas (USDA-SCS, 1988). Timing of harvest is critical for optimum seed yield, as seed heads are vulnerable to shattering.

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 Bumpers was suitable for release based on the criterion contained in this document. This conclusion is mainly due to the fact that eastern gamagrass is a naturally occurring species in the southeastern United States and planting Bumpers would therefore not constitute an introduction of a foreign species into local ecosystems. Any negative impacts on other native plant species would likely be minimal to non-existent. Also, in addition to the substantial evidence that Bumpers provides excellent forage for livestock, critical wildlife habitat, and it also may provide plant material for critical area remediation.

Conservation Use: Highlander can be used for forage and biofuel production, erosion control, wildlife habitat, and water quality improvement. It has a high degree of tolerance to environmental stresses and will tolerate wet, heavy soils.

Area of Adaptation: Bumpers is well adapted for use in the mid-south portions of USDA Hardiness Zones 6a to 8a, using Oklahoma Interstate 35 as its western limit. Current testing has not completely substantiated Zone 6a as the northern limit of its range of adaptation, so it may be adapted in more northern zones.

Availability of Plant Materials: Breeder seed will be maintained by the USDA-NRCS Booneville Plant Materials Center.

'Bumpers' eastern gamagrass was named after Senator Dale Bumpers who was born on a farm in Charleston, Arkansas 15 miles north of Booneville and served as governor of Arkansas for 5 years and as a U.S. Senator for 24 years. . Senator Bumpers was an ardent supporter of agriculture, conservation issues and responsible for the establishment of the Bumpers Small Farm Research Center.

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References:

- Douglas, J. L., Houck, M. J., Brakie, M. R., Tharel, L. M., Owsley, C. M., Pfaff, S. L. 2000. Yield, Quality and Persistence of 13 Accessions of Eastern Gamagrass in the Southern U.S. In Eastern Gamagrass Technology Update. Jamie L. Whitten Plant Materials Center, Coffeerville, MS. 45-55.
- Hitchcock, A. S. 1951. Manual of the grasses of the United States. Miscellaneous Publication 200. United States Department of Agriculture. Washington, DC.
- Snider, J. 1995. Initial Evaluations of Eastern Gamagrass Ecotypes for the Mid-South. Technical Note 6. Jamie L. Whitten Plant Materials Center, Coffeerville, MS.
- USDA-Soil Conservation Service. 1988. Seed Production Record. In Proceedings of Eastern Gamagrass Workshop, Manhattan, KS, May 17-18, 1988.
- USDA-Natural Resources Conservation Service. 2000. National Plant Materials Manual, Title 190 (Washington, D.C., U.S. Government Printing Office, June, 2000).

Signatures for release of:

'Bumpers' Eastern gamagrass [*Tripsacum dactyloides* (L.) L.]

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