



Kika de la Garza Plant Materials Center

Kingsville, TX

Vol. 1 No. 7

Technical Note

November 1998

A GERMINATION STUDY OF NINETY-SIX ACCESSIONS OF PLAINS BRISTLEGRASS

INTRODUCTION

Plains bristlegrass is a warm-season, perennial grass that is native from South Texas to New Mexico, Colorado and Arizona, and down into central Mexico (Gould, 1975; Hitchcock, 1971). Its current scientific name is *Setaria machrostachya* (Correl & Johnston, 1996), although in the past *Setaria leucopila* and *Setaria texana* have also been included under this common name (Correl & Johnston, 1996; Gould, 1975). Plains bristlegrass is found on open dry ground and in dry woods (Hitchcock, 1971) and "on well drained soils along gullies, stream courses, and other areas occasionally with abundant moisture" (Gould, 1975, p.557). It provides moderate to high quality forage for all types of grazing livestock (Gay, Dwyer, Allison, Hatch, and Schickendanz, 1980), and makes up "an appreciable part of the forage on southwestern ranges" (Hitchcock, 1971, p.718). This species shows promise as a plant for range and wildlife use. The objective of this study was to seek out accessions of plains bristlegrass with good germination for further evaluation as a warm-season forage for south Texas. Future studies will examine factors such as plant hardiness, forage production, seed production, and other characteristics that would make plains bristlegrass desirable to include in South Texas range mixes.

MATERIALS AND METHODS

All of the accessions of plains bristlegrass used for this study were from Texas. They came from as far north as Dumas, as far west as El Paso, as far south as Raymondville, and as far east as Rosenberg. The majority of the ninety-six accessions studied were collected in 1982 and 1983, with three exceptions: accession #17041 which was collected in 1963, accession # 2615 which was collected in 1970, and accession #441267 which was collected in 1978.

The accessions were tested in four groups of twenty-four. Each germination test consisted of 50 untreated seeds of one accession evenly distributed on two sheets of blotter paper stacked one on top of the other, and placed in plastic boxes, with tight fitting lids. The blotter paper was moistened with de-ionized

water, and remoistened with de-ionized water when necessary. Each test was conducted once. Twenty-four plastic boxes, each containing one of the twenty-four accessions assigned to a test group, were placed in a randomized design on one of four shelves in a controlled environment chamber. The chamber temperature was set to provide sixteen hours at 10°C and eight hours at 30°C in each twenty-four hour period. The chamber was kept in total darkness throughout the tests. Samples were checked on a daily basis for 21 days starting on June 26, 1998, for test group one, July 17, 1998, for test group two, August 7, 1998, for test group three, and August 28, 1998, for test group four. Daily germination percentages were recorded and shelf position was rotated daily. Seeds were considered germinated when the coleoptile and radicle extended the length of the seed or more. Percent of germination was the number of seeds germinated per box multiplied by two. Once seeds were considered germinated, they were removed from the plastic boxes and discarded, unless germination for an accession exceeded forty percent. When this occurred, germinated seeds were planted in potting soil in plastic cones and grown outdoors in a shaded area for observation purposes.

RESULTS

Germination for plains bristlegrass occurred as early as four days into the test, and as late as twenty days, with the predominance of germination occurring between seven to sixteen days. A majority of the plains bristlegrass accessions tested showed no germination. Only one accession from Laredo, #29587, exceeded forty percent germination with a germination rate of 70%. Accession #38835 from Zavala County showed the second highest germination rate in the study with 34% germination. These were followed by two accessions that showed 20% germination: #29648 from Laredo and #29677 from Kenedy. Several accessions showed 10% germination or better, but poorer than 20% germination. These accessions include: #29582 from Crosbyton and #31331 from Hutchinson County (both 18%), #29602 from Clarendon and #29679 from Tilden (both 16%), #29636 from George West (14%), and #29592 from Wellington and #38715 from Duval County (both 10%). Additionally, there were several accessions with less than 10% germination. Accessions #29605 from Val Verde County and #29635 from Hockley County both showed 6% germination. Four percent germination was shown by #29610 from Snyder, #29619 from Muleshoe, #38689 from Brownfield, and #38708 from Goliad County. Accessions #29591 from Spur, #29597 from Nolan County, #29611 from Hereford, #29613 from Amarillo, #29626 from Hutchinson County, #29667 from Cotulla, #31365 from Alpine, #31500 from Cottle County, #35730 from Collingsworth County, #38741 from Pecos, and #38755 from Throckmorton all showed 2% germination. For a complete list of accessions, see Table 1.

DISCUSSION AND CONCLUSIONS

A majority of the accessions studied showed poor or no germination. Since the criteria for further study was a germination rate of forty percent or better, only one accession from this study, #29587 from Laredo, will be evaluated further. This accession showed superior germination (70%), and it is hoped that this accession will exhibit other positive qualities such as good survival, hardiness, forage

production and seed production that will render it a good accession of plains
bristlegrass for inclusion in South Texas range mixes.

It should be noted that this study did have some limitations. First, all seed used in this study was more than 15 years old, which may have had an impact on seed viability. Second, only one replication of this study was done due to space, time, and seed amount limitations. Finally, much of the seed used in this study had been treated with an unknown fungicidal or insecticidal powder, which may have had some impact on germination as well.

List of Plains Bristlegrass Accessions with Seed as of 6/30/98

#	Accession Number	Year Collected	Location Collected	Germination %
1	17041	63	<u>S. TEXAS</u>	0
2	29581	82	MORTON	0
3	29582	82	CROSBYTON	18
4	29587	82	LAREDO	70
5	29589	82	ROSENBERG	0
6	29591	82	SPUR	2
7	29592	82	WELLINGTON	10
8	29597	82	NOLAN CO.	2
9	29602	82	CLARENDON	16
10	29607	82	HASKELL	0
11	29608	82	JAYTON	0
12	29609	82	MARTIN CO.	0
13	29610	82	SNYDER	4
14	29611	82	HEREFORD	2
15	29612	82	POST	0
16	29613	82	AMARILLO	2
17	29615	82	CLAUDE	0
18	29616	82	CANYON	0
19	29619	82	MULESHOE	4
20	29625	82	HARTLEY CO.	0
21	29626	82	HUTCHINSON CO.	2
22	29627	82	MATADOR	0
23	29630	82	DUMAS	0
24	29635	82	HOCKLEY CO.	6
25	29636	82	GEORGE WEST	14
26	29643	82	BIG LAKE	0
27	29644	82	CUERO	0
28	29646	82	LITTLEFIELD	0
29	29647	82	SILVERTON	0
30	29648	82	LAREDO	20
31	29654	82	SANDERSON	0
32	29655	82	MARFA	0

33	29656	82	VAN HORN	0
34	29657	82	FORT STOCKTON	0
35	29658	82	PECOS	0
36	29659	82	EL PASO	0
37	29660	82	EL PASO	0
38	29661	82	EL PASO	0
39	29663	82	VEGA	0
40	29664	82	RAYMONDVILLE	0
41	29667	82	COTULLA	2
42	29669	82	HEBBRONVILLE	0
43	29672	82	ZAPATA	0
44	29673	82	GOLIAD	0
45	29677	82	KENEDY	20
46	29678	82	TILDEN	0
47	29679	82	TILDEN	16
48	29934	82	CHILDRESS CO.	0
49	31318	82	QUANAH	0
50	31321	82	COLORADO CITY	2
51	31322	82	ABILENE	0
52	31331	82	HUTCHINSON CO.	18
53	31349	82	KNOX CO.	0
54	31365	82	ALPINE	2
55	31369	82	VERNON	0
56	31443	82	ECTOR CO.	0
57	31493	82	WILBARGER CO.	0
58	31496	82	FOARD CO.	0
59	31500	82	COTTLE CO.	2
60	2615	70	GEORGE WEST	0
61	35730	83	COLINGSWORTH CO.	2
62	38689	83	BROWNFIELD	4
63	38693	83	GOLDTHWAITE	0
64	38697	83	SPUR	0
65	38708	83	GOLIAD CO.	4
66	38711	83	KNOX CITY	0
67	38713	83	DUVAL CO.	0
68	38715	83	DUVAL CO.	10
69	38737	83	MULESHOE	0
70	38739	83	MARFA	0
71	38741	83	PECOS	2
72	38755	83	THROCKMORTON	2
73	38761	83	JAYTON	0
74	38762	83	ABILENE	0
75	38778	83	ASPERMONT	0
76	38788	83	WILBARGER	0
77	38789	83	HARDERMAN	0
78	38792	83	MATADOR	0

79	38793	83	PARMER CO.	0
80	38802	83	ALPINE	0
81	38815	83	POST	0
82	38818	83	MEMPHIS	0
83	38819	83	SAN ANTONIO	0
84	38820	83	WILLACY CO.	0
85	38827	83	JIM HOGG CO.	0
86	38829	83	DONLEY CO.	0
87	38830	83	HUTCHINSON CO.	0
88	38833	83	FRIO CO.	0
89	38835	83	ZAVALA CO.	34
90	43205	83	DEWITT CO.	0
91	43208	83	CHILDRESS CO.	0
92	441267	78	FORT STOCKTON	0
93	29586	82	LAREDO	0
94	29605	82	VALVERDE CO.	6
95	29622	82	ASPERMONT	0
96	38787	83	BAYLOR CO.	0

References

Correll, D. S., and Johnston, M.C., (1996). Manual of the Vascular Plants of Texas. Richardson, TX: The University of Texas at Dallas.

Gay, C.W. Jr., Dwyer, D. D., Allison, C., Hatch, S. and Schickendanz, J., (1980). New Mexico Range Plants. Las Cruces, N. M.: New Mexico State University Cooperative Extension.

Gould, F.W., (1975). The Grasses of Texas. College Station, Texas: Texas A&M University Press.

Hitchcock, A.S., (1971). Manual of the Grasses of the United States, 2nd Edition. New York: Dover Publications, Inc.

The United States Department of Agriculture (USDA) prohibits discrimination in all its programs on the basis of race, color, national origin, gender, religion, age, disability, political beliefs, sexual orientation, and marital or family status. (Not all prohibited bases apply to all programs.) Persons with disabilities who require alternative means for communication of program information (Braille, large print, audiotape, etc.) should contact USDA's TARGET Center at (202) 720-2600 (voice and TDD).

To file a complaint of discrimination, write the USDA, Director, Office of Civil Rights, Room 326W, Whitten Building, 14th and Independence Avenue, SW. Washington, D.C., 20250-9410 or call (202) 720-5964 (voice or TDD). USDA is an equal opportunity provider and employer.