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Forage Production of Selected Old World Bluestems at College Station, 1990-92

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Summary

Thirty-one Asiatic, or old world, bluestems were evaluated for forage production over a 3-year period at College Station. 'Gordo', 'PMT-587', and 'WW-Spar' old world bluestems and kleingrass 'Selection 75' were included as checks. Mean forage production over the 3-year period was 10,505 lb/acre from all accessions and cultivars compared with 8,220, 8,653, 8,913, and 9,172 lb/acre from Gordo, Selection 75, WW-Spar, and T-587, respectively. Seed for multi-location testing is currently being increased for selected high-yielding accessions for different soils and climates in Texas.

Introduction

Asiatic, or old world, bluestems were first introduced into the United States in 1917 (Celarier and Harlan 1955). This early study concluded that the old world bluestems may contribute significantly to beef production and soil conservation in the Southern Great Plains, especially when they are grown on marginal cropland to complement native rangelands. At Woodward, Oklahoma, the forage production of old world bluestems has been four times greater than that of well-managed native rangeland in good condition (Sims and Dewald 1982).

During the past 20 years, interest in the old world bluestems has increased as several cultivars have been released ('Plains', 'PMT-587', 'WW-Ironmaster', and 'WW-Spar'). Extensive plantings have been made as part of the Conservation Reserve Program. Evaluations conducted in the 1950's and 1960's suggest that although *Dichanthium annulatum* cultivars (e.g., 'Pretoria 90', etc.) were often more productive than *Bothriochloa ischaemum* cultivars ('KR bluestem'), they lacked adequate winterhardiness to be grown in regions outside south Texas. The objectives of this study were to (1) compare the forage production of PMT-587 and WW-Spar and (2) determine the forage production potential of selected old world bluestem plant introductions.

Procedure

This study was conducted over a 3-year period at the Texas A&M University Farm, 7 mi west of College

Station, Texas. On 3 Apr. 1990, seedlings of all accessions started in the greenhouse were transplanted into the field. Seedlings were transplanted on 1-ft centers into 50-sq-ft plots (5 by 10 ft) on a Norwood silty clay loam (fine silty, mixed thermic, typic udifluent). The experimental design consisted of a randomized complete block with three blocks. Accessions that suffered damage during the winter of 1990 were replanted in April 1991. The study was fertilized with 75 lb nitrogen (N)/acre on 24 Mar. 1992. Plots were harvested three times using a flail-type mower during 1990 (28 June, 31 July, and 6 Sept.), four times in 1991 (13 June, 16 July, 28 August, and 18 October), and three times in 1992 (26 June, 13 August, and 27 October). Because a direct comparison of accessions across years was not possible, a relative productivity (RP) index was calculated for each accession by dividing yearly production of each entry by the yearly production of Selection 75 kleingrass.

Results and Discussion

The total yearly production and relative productivity of each accession (Table 1) is presented in Table 2. Mean yearly forage production was highest in 1991, intermediate in 1992, and lowest during the establishment year, which corresponded to rainfall during the growing season.

In this study, Selection 75 produced more forage than did Gordo, WW-Spar, and PMT-587 during the establishment year, less than Gordo, WW-Spar, and PMT-587 in 1991, and less than WW-Spar and PMT-587 in 1992 (Table 2). Across years Gordo, Selection 75, WW-Spar, and PMT-587 had a mean yearly yield of 8,277, 8,713, 8,974, and 9,236 lb/acre, respectively. No significant differences in forage production were observed among the check cultivars throughout the study. Seed is currently being increased for the best yielding experimental cultivars from 1992 for multi-location evaluations.

Literature Cited

- Celarier, R. P., and J. R. Harlan. 1955. Studies on old world bluestems. I. Oklahoma Agri. Exp. Stn. Tech. Bull. T-58, 31 p.
- Sims, P. L., and C. L. Dewald. 1982. Old world bluestems and their forage potential for the Southern Great Plains. A review of early studies. ARS, Agri. Reviews and Manuals. Southern Series, No. 28:1-15.

Keywords: *Bothriochloa ischaemum* / *B. intermedia* / *Dichanthium annulatum* / kleingrass.

Table 1. Old world bluestem and kleingrass germplasm evaluated at College Station, Texas, 1990-92.

<i>Bothriichloa intermedia</i> (R. Br.) A. Camus. 216701, 219638, 300752, 300752, 300755, 300760, 300769, 300774, 300793, 300809, 300819, 300825, 300844, 300874, 300897
<i>Bothriichloa ischaemum</i> L. Keng var. <i>ischaemum</i> WW-Spar
<i>Panicum coloratum</i> L. Selection 75
<i>Dichanthium annulatum</i> (Forssk.) Stapf. 185504, 200330, 219976, 240149, 283249, 301880, 301894, 301902, 301919, 301931, 301935, 301936, 301938, 301947, 301949, 301951, 301952, PMT 587
<i>Dichanthium aristatum</i> (Poir) C.E. Hubb. Gordo

Table 2. Average annual yield of kleingrass and selected old world bluestems at College Station, Texas, 1990-92.

Accession	1990	RP [†]	1991	RP	1992	RP	Average
	lb/acre		lb/acre		lb/acre		RP
300825	5358	1.04	10969	1.05	4165	0.40	0.83
300819	5948	1.16	11274	1.08	4580	0.44	0.89
30079	4563	0.89	14887	1.42	4717	0.46	0.92
Gordo	2828	0.55	15005	1.43	9088	0.88	0.95
300897	3808	0.74	18333	1.75	4797	0.46	0.98
300760(45%WK [†])	4612	0.90	9341	0.89	12416	1.20	1.00
Kleingrass 75	5147	1.00	10468	1.00	10343	1.00	1.00
301952	6808	1.32	14771	1.41	3504	0.34	1.02
WW Spar	2992	0.58	13432	1.28	12697	1.23	1.03
300752(50%WK)	7134	1.39	13209	1.26	4999	0.48	1.04
301902	8072	1.57	13157	1.26	3544	0.34	1.06
PMT 587	3550	0.69	13322	1.27	12547	1.21	1.06
301919	7053	1.37	15330	1.46	5280	0.51	1.12
301931	6382	1.24	15454	1.48	7789	0.75	1.16
30074	3960	0.77	13817	1.32	14963	1.45	1.18
301894	10242	1.99	14008	1.34	2762	0.27	1.20
301880	9223	1.79	14009	1.34	6107	0.59	1.24
301936	8296	1.61	18585	1.78	3897	0.38	1.25
301949	8145	1.58	18966	1.81	3983	0.39	1.26
301938	10256	1.99	14304	1.37	6437	0.62	1.33
300755(55%WK)	3518	0.68	17467	1.67	17436	1.69	1.35
301947	8425	1.64	18475	1.76	6837	0.66	1.35
185504(30%WK)	8894	1.73	14456	1.38	9877	0.95	1.35
301935	9967	1.94	15615	1.49	6581	0.64	1.35
219638(10%WK)	9751	1.89	17089	1.63	6006	0.58	1.37
300769	6224	1.21	16083	1.54	14791	1.43	1.39
300844	8234	1.60	15017	1.43	12320	1.19	1.41
301951	10118	1.97	20191	1.93	4490	0.43	1.44
300809	7048	1.37	15434	1.47	16528	1.60	1.48
283249	6666	1.30	15403	1.47	18157	1.76	1.51
240149(10%WK)	9460	1.84	16348	1.56	12260	1.19	1.53
216701(100%WK)	6577	1.28	21129	2.02	13634	1.32	1.54
300874	6427	1.25	19460	1.86	16074	1.55	1.55
219976(85%WK)	7932	1.54	17917	1.71	14924	1.44	1.57
200330(100%WK)	12121	2.35	11645	1.11	14374	1.39	1.62
Mean	7021	1.36	15267	1.46	9226	0.89	1.24
LSD (5%)	3092		5078		5391		

†WK: winter-killed.

‡RP: relative productivity index.