CULTURAL AND FERTILIZER PRACTICES FOR BAHIAGRASS SEED PRODUCTION

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INTRODUCTION

It was estimated in 1985 (Ruelke) that bahiagrass occupied over 70% of the 3.4 million acres sown to improved permanent pastures in Florida. In order to increase revenue, many ranchers have been harvesting seed from the same bahiagrass pastures used in their cattle operation. However, seed yields of bahiagrass are seriously reduced the third year after establishment because of dense sod development. This condition leads to economic losses to both seed growers in Florida and other semi tropical regions of the world. The purpose of this research was to determine the effect of various cultural and fertilization treatments in spring on seed production and quality of bahiagrass.

EXPERIMENT PROCEDURE

In April of 1985 and June of 1986, plots of Pensacola and Argentine bahiagrass pastures that were over 7 years old, at C. M. Payne and Sons Ranch near Sebring, FL, were subjected to four pre-treatments -- chopping (roller chopper), burning, spraying of gibberellic acid (GA) and a control of closely grazed sward. Superimposed on each pre-treatment were 13 fertilizer treatments. These consisted of factorial combinations of 0, 67 and 134 lb/A nitrogen (N); 0 and 150 lb/A phosphate (P_2O_5) and 0 and 80 lb/A potash (K_2O) and an additional fertilizer treatment to satisfy soil test recommendations (67-115-75 lb/A N-P_2O_5-K_2O). Seed heads were hand clipped in July for Pensacola, and in August for Argentine. After drying, seed was cleaned and weighed. Samples of seed were sent to Florida Department of Agriculture and Consumer Services in Tallahassee for germination analysis.

RESULTS AND DISCUSSION

Pensacola

The two year data on Pensacola seed production is summarized in Table 1. The key to improved Pensacola bahiagrass seed production was burning plus nitrogen application. The results indicate that the 2 year average seed production without fertilizer ranged between 72 and 83 lb/A depending on pre-treatment. Pensacola seed yield did not show any positive response to fertilizer application unless the sward was burned. Pensacola seed yield increased to 110 and 140 lb/A when plots were burned and fertilized with 67 and 134 lb/A N, respectively. It was observed from seed head count analysis that burning not only stimulated seed head production, but also induced uniform development to reduce shattering losses. This enabled a more efficient utilization of applied nitrogen towards seed production on burned plots. Seed yield of pensacola also showed some positive response to phosphate application on burned plots, but was not affected by potassium addition. Soil at the experimental site contained on the average 40 lbs P_2O_5 and 140 lb K_2O/A which might explain the lack of response to potassium application. Germination of Pensacola seed produced was 49, 38, 45 and 49% for chopped, burned, GA and control plots, respectively. Total viable seed averaged 80%, regardless of pre-treatment and 31 to 42% of Pensacola seed was dormant.

Table 1. Two year summary of Pensacola bahiagrass seed production under cultural and fertilizer treatments.

No.	Fertilizer N-P_2O_5-K_2O	Pretreatment: Chop	Urn	GA	Control
		yield lb/A			
1	0-0-0	72	80	79	83
2	67-0-0	63	108	81	100
3	134-0-0	54	137	79	113
4	0-150-0	52	128	67	77
5	67-150-0	85	107	61	62
6	134-150-0	64	133	74	90
7	0-0-80	55	70	42	73
8	67-0-80	63	145	71	90
9	134-0-80	102	134	67	57
10	0-150-80	58	108	65	55
11	67-150-80	76	130	83	107
12	134-150-80	75	138	103	105
13	67-115-75 (soil test)	58	121	58	120
Mean		67	118	71	87

Argentine

Nitrogen and phosphate fertilizer applications were the most important factors that influenced Argentine seed production (Table 2). Seed produced without fertilization was always less than 20 lb/A. The application of either 67 lb/A N or 150 lb/A P_2O_5, separately, increased seed yield to 136 and 109 lb/A, respectively. Seed yield was not affected by potassium fertilizer probably because of an existing high potassium soil status (140 lb/A K_2O). A linear increase from 10 to 250 lb/A clean seed was obtained when N application rate was raised from 0 to 134 lb/A without addition of

phosphorus or potassium. Mean seed yield from 67 lb/A N and 150 lb/A P_2O_5 applied together was 270 lb/A compared with 290 lb/A obtained with a combination of 134 lb/A N and 150 lb/A P_2O_5. The highest N rate when applied together with phosphorus promoted excessive vegetative growth and induced seed head lodging. Unlike Pensacola, the effect of burning on Argentine seed yield was not consistent from year to year. More seed was obtained from burned plots than the other pre-treatments only in the initial year (1985). Yield from all four pre-treatments were similar in 1986. The two year Argentine seed production averaged over fertilizer treatments were 185, 217, 154 and 204 for chopped, burned, GA and control pre-treatments, respectively. Argentine seed germination ranged between 85 and 90%.

Table 2. Two year summary of Argentine bahiagrass seed production under cultural and fertilizer treatments.

	Fertilizer	Pretreatment				
No.	N-P_2O_5-K_2O	Chop	Burn	GA	Control	Mean
		--------yield, lb/A----------				
1	0-0-0	13	17	11	4	11
2	67-0-0	105	154	161	123	136
3	134-0-0	185	322	203	276	247
4	0-150-0	62	125	122	128	109
5	67-150-80	333	251	255	296	284
6	134-150-0	273	285	302	340	300
7	0-0-0	19	63	10	8	25
8	67-0-80	166	162	140	192	165
9	134-0-80	322	307	193	326	287
10	0-150-80	105	163	66	104	110
11	67-150-80	250	330	195	314	257
12	134-150-80	305	333	179	269	272
13	67-115-75 (soil test)	273	309	164	278	256
Mean		185	217	154	204	

SUMMARY

The purpose of this study was to obtain preliminary information on factors that might influence seed yield of Pensacola and Argentine bahiagrass pastures. In two separate trials, attempts were made at improving seed production by imposing four pre-treatments -- chopping (roller chopper), burning, spraying gibberellic acid (GA) and a control (grazed) - on 7 to 8 year old swards of Argentine and Pensacola bahiagrasses. Superimposed on each pre-treatment were 13 fertilizer treatments consisting of factorial combinations of 0, 67 and 134 lb/A N; 0 and 150 lb/A P_2O_5 and 80 lb/A K_2O and an additional fertilizer rate to satisfy soil test recommendations (applied 67-115-75 lb/A N-P_2O_5-K_2O). The results on seed yield indicate that Pensacola and Argentine bahiagrass responded differently to the treatments imposed. Two year average Pensacola clean seed yield obtained without fertilizer application was 80 lb/A. However, the response of Pensacola bahiagrass in seed production to applied nitrogen was much greater on burned plots. Pensacola clean seed yield of 110 to 135 lb/A was obtained with 67 to 134 lb N/A on burned sward.

Argentine bahiagrass clean seed yields without any fertilizer application was generally low (4 to 17 lb/A) regardless of pretreatment. Both nitrogen and phosphorus fertilizer applications substantially influenced Argentine seed yield. Seed production of Argentine increased linearly from 10 to 250 lbs/A as nitrogen application rate was increased from 0 to 134 lbs/A (without any phosphorus or potassium). The application of 150 lb P_2O_5/A also increased seed yield from 10 to 120 lb/A. It was concluded that the combination of burning Pensacola bahiagrass pasture in spring followed by nitrogen fertilization produced highest clean seed yield of about 135 lb/A. High levels of nitrogen (134 lb/A) without phosphorus, or moderate levels of nitrogen and phosphorus (70 lb/A N and 150 lb/A P_2O_5) applied in spring following close grazing or burning, resulted in highest Argentine bahiagrass seed yields of 250-300 lb/A.

Germination of Pensacola seed averaged 45% (80% viable seed) compared with 85 to 90% germination for Argentine. These values should be of interest when determining seeding rate of bahiagrass.