SEED PRODUCTION OF EASTERN GAMAGRASS AS INFLUENCED BY NITROGEN FERTILIZATION

Joel L. Douglas[1], Janet M. Grabowski[1], David J. Lang[2], Robert L. Elmore[2] Paul D. Meints[2], Roscoe L. Ivy[3], Jimmy L. Howell[3]

[1] USDA-Natural Resources Conservation Service, Jamie L. Whitten Plant Materials Center Coffeeville, MS 38922

[2] Dept. of Plant and Soil Sciences, Mississippi State University, Mississippi State, MS 39762

[3] Prairie Branch Experiment Station, North Mississippi Research and Extension Center, Mississippi State University, Prairie, MS 39756

ABSTRACT: Single and split applications of N fertilizer at 0, 100 and 200 lb/ac were applied to eastern gamagrass (accession 9062680) at the Prairie Experiment Station on a Houston clay soil. The single and first split application were made on 18 April 2002 and the second split application was made on 12 May 2002 at the boot stage of growth. Nitrogen increased the number of fertile and total tillers and the number of primary and axillary inflorescences as well as seed yields in 2002. Nitrogen increased seed yields from 20 to over 50 percent depending on rate and application method.

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KEY WORDS: Eastern gamagrass, nitrogen, total tillers, percent fertile tillers, primary inflorescence, axillary inflorescence, seed yield.

MATERIALS AND METHODS: Vegetative propagules of eastern gamagrass (accession 9062680) were established in 6 by 9 ft plots in April 2000 at the Prairie Experiment Station on a Houston clay (very fine, montmorillonitic, thermic, Typic, Chromuderts). Nitrogen fertilizer was broadcast applied as ammonium nitrate in single applications of 0, 100 and 200 lb/ac and equal split applications of 100 (50) and 200 (100) lb/ac. Single application rates of 0, 100 and 200 lb/ac N and the first split application rates of 100 and 200 lb/ac N was applied 18 April 2002. The second split application rate was applied 12 May 2002 when 50 percent of the reproductive stems were in the boot stage of growth. Experimental design was a randomized complete block with three replications. Phosphorus and K were maintained at a medium to high level according to soil tests. Total number of tillers, percent fertile tillers and primary and axillary inflorescences were determined on 12 June 2002 from two randomly selected plants in each plot. Seed was harvested on 22 July 2002 when 75 percent of the upper 2/3 of the axillary inflorescences began casting the staminate portion of the flower. The inflorescences were bundled and cut from each plot with gas powered hedge trimmers. Seed units were separated from the inflorescence by hand and partitioned into heavy and light seed components using an air fractionating aspirator (Carter-Day Model No. CF 21, Minneapolis, MN). The first fraction was used to calculate seed

yield. Differences in tiller numbers, inflorescence types and yield were determined using analysis of variance and significant means were separated using the least significant difference (LSD) at $P<0.05$.

RESULTS AND DISCUSSION: Average number of total tillers, inflorescences and seed yield of eastern gamagrass by N rate is presented in Table 1. Nitrogen increased the number of total tillers. Nitrogen rates of 100 and 200 lb/ac applied in a single application significantly increased the total number of tillers compared to the 0 lb/ac rate. Percentage of fertile tillers is defined as the percent of the total number of tillers that produced inflorescences with the potential for producing viable seed. Nitrogen fertilizer had limited effect on the production of fertile tillers in 2002. Average percentage of fertile tillers per plant ranged from 18-27. Consequently, vegetative tillers comprised over 70 percent of the total number of tillers per plant. Dewald and Louthan (1979) reported that the percentage of fertile shoots in eastern gamagrass at Woodward, OK ranged from 15 to 25 percent and the ratio of reproductive to vegetative shoots was 1:3.

Average number of primary inflorescences increased as N rates increased. Applying N in single or split applications did not affect the production of primary inflorescences. Number of axillary inflorescences increased as N rates increased. Increase in the number of axillary inflorescences from applied N was over 60 percent. Nitrogen fertilizer increased seed yield 20 to over 50 percent compared to 0 lb/ac (Table 1). A single application of N at 200 lb/ac significantly increased seed yields over all other N treatments.

REFERENCES

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Table 1. Average number of tillers, percent fertile tillers and inflorescences per plant and seed yield of eastern gamagrass by N rate at Prairie, MS, 2001.

N Rate (lb/ac)	FT [1]	TT[2]	PI[3]	AI[4]	Yield[5]
	--%/plant--	--------Avg/plant---------			lb/ac
0	20	71	8	30	131
100[6]	24	134	12	44	159
100 (50)[7]	18	109	12	45	157
200[8]	24	125	13	51	227
200 (100)[9]	27	112	13	48	163
Mean	23	110	12	44	167
LSD (0.05)[10]	NS[11]	43	NS	NS	61

[1] Percent fertile tillers.
[2] Average number of total tillers (both vegetative and fertile).
[3] Primary inflorescence.
[4] Axillary inflorescence.
[5] Seed yield (lb/ac). Yield was calculated from the heaviest seed fraction harvested from a 6 x 9 ft plot.
[6] Single application of 100 applied April 18.
[7] 100 lb split. First 50 lb/ac applied April 18; second 50 lb/ac applied 12 May 2002.
[8] Single application of 200 applied April 18.
[9] 200 lb split. First 100 lb/ac applied April 18; second 100 lb/ac applied 12 May 2002.
[10] Least significant difference at $P<0.05$.
[11] Not significantly different.