FORAGE-LIVESTOCK FIELD DAY REPORT - 1998

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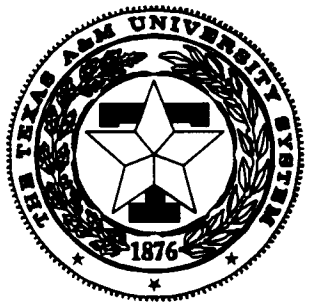

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INFLUENCE OF TIME OF BROILER LITTER APPLICATION ON PRODUCTION OF RYEGRASS-BERMUDAGRASS PASTURE

G. W. Evers, A. D. Davidson, and D. S. Doctorian

Background. The broiler industry in east Texas generates large quantities of broiler litter which is a mixture of litter (sawdust, wood chips, etc.), excreta, wasted feed, and feathers. In the southeastern US over 90% of the broiler litter is applied to agricultural land as fertilizer. It is an excellent fertilizer because it contains N, P and K and other nutrients; is a source of organic matter to improve the nutrient and water holding capacity of the soil; contains calcium which maintains or slightly increases soil pH; and the release of nutrients from organic matter is slow so leaching of soluble nutrients such as N, K, and boron is reduced. Broiler litter can also be less expensive than commercial fertilizer if the broiler farm is nearby so transportation costs are not prohibitive. The optimum time to apply broiler litter to a year-round pasture (annual ryegrass-bermudagrass) needs to be known to obtain the greatest economic benefit.

A TAM 90 annual ryegrass-Coastal bermudagrass hay meadow was fertilized with 6 tons/acre of broiler litter in the spring, autumn, or split between spring and autumn. Two additional treatments included a spring or autumn application with crimson clover added to the annual ryegrass. The study began in October 1993 and continued for 2 years until September 1995. Monthly harvesting began when ryegrass reached about 8 in. tall which resulted in 7 harvests in 1994 and 8 harvests in 1995. Experimental design was a randomized complete block with four replications.

Research Findings. Time of broiler litter application had no effect on total forage produced each year. Treatment yields ranged from 10,277 to 11,660 lb/acre in 1994 and from 9,228 to 9,936 lb/acre in 1995 (Table 1 and 2). Production of the individual forages was the major effect of broiler litter application time. Annual ryegrass yields were about doubled if broiler litter was applied in the autumn. Splitting the 6 ton rate into a spring and autumn application resulted in intermediate yields. When crimson clover was included, clover yields were opposite of annual ryegrass. Autumn litter applications increased annual ryegrass production and competition to the clover. Coastal bermudagrass production following only ryegrass was similar in the 1994 growing season. However, in the 1995 growing season bermudagrass production was suppressed by the higher annual ryegrass yields from the autumn and split broiler litter applications. Annual ryegrass yields were twice as high in 1995 because of a mild, moist autumn and winter. The addition of crimson clover to the mixture significantly reduced bermudagrass production both years. Clovers have flat leaves that are parallel to the ground which shades the ground more than a grass that has upright leaves. Allowing less sunlight to reach the soil surface may have

suppressed bermudagrass growth in late spring. Bermudagrass growth may not be as restricted under grazing where the pasture is maintained at a shorter height than under a hay type system.

Application. In a year-round growing season such as a warm-season perennial grass overseeded with a cool-season annual, time of applying broiler litter had no effect on annual forage production. However, applying broiler litter in autumn substantially increased the amount of cool-season forage production which is higher quality than warm-season grass production. This cool-season forage production is usually more economical than hay and purchased supplements for stocker calves, replacement heifers, or fall calving cows.

Table 1. Dry matter yield by forage species in 1994 from 6 tons/acre of broiler poultry litter at different times of the year.

Treatment	Ryegrass	Clover	Bermuda	Total Forage
	----------lb DM/acre----------			
Spring (S)	1307 d[1]	--	9410 a	10718 a
Autumn (A)	2955 a-c	--	8704 ab	11660 a
Split (SA)	1858 cd	--	8669 ab	10527 a
S + clover	2369 b-d	1109 a	6799 b	10277 a
A + clover	3739 a	815 b	6551 b	11105 a

[1]Values within a column followed by the same letter are not significantly different at .05 level Waller-Duncan Multiple Range Test.

Table 2. Dry matter yield by forage species in 1995 from the application of 6 tons/acre broiler litter at different times of the year.

Treatment	Ryegrass	Clover	Bermuda	Total Forage
	----------lb DM/acre----------			
Spring (S)	2926 b[1]	--	6358 a	9284 a
Autumn (A)	5241 a	--	4309 b	9550 a
Split (SA)	4492 a	--	4736 b	9228 a
S + clover	2455 b	2959 a	4522 b	9936 a
A + clover	4638 a	1235 b	3542 b	9415 a

[1]Yields in a column followed by the same letter are not significantly different at .05 level, Waller-Duncan Multiple Range Test.