CLOVER-BERMUDAGRASS PRODUCTION FERTILIZED WITH BROILER LITTER AND COMMERCIAL NITROGEN FERTILIZER

G. W. Evers, M. J. Parsons, and N. B. Melson

Background. Broiler litter is a good plant nutrient source for pastures and may be more economical than commercial fertilizer. Broiler litter contains other nutrients besides nitrogen, phosphorus, and potassium and adds organic matter to the soil. Broiler litter usually contains as much or more P than N. Because grasses like bermudagrass and annual ryegrass take up only 1 lb of phosphorus as P_2O_5 for every 4 lb N, only about 25% of the P in broiler litter is taken up. With continued annual broiler litter applications, the excess P builds up in the soil over time and could move into creeks, rivers, and lakes and cause environmental problems. Other studies reported in this field day handout have shown that applying commercial N fertilizer in combination with broiler litter increased forage production and P uptake by an annual ryegrass-Coastal bermudagrass pasture. A similar study was conducted substituting Dixie crimson clover for annual ryegrass. Because legumes like crimson clover can utilize N from the air, we wanted to determine if the clover could fix sufficient N from the air to eliminate the need for applying commercial N fertilizer. Broiler litter was applied in late April after the last clover harvest at 4 tons/acre in 1999 and 2000 and at 2 tons/acre in 2001 and 2002. Fifty pounds of N/acre were applied from 1 to 3 times during the year in April, June, and/or July to the Coastal bermudagrass. Bermudagrass yield plus clover from the following spring were combined to calculate the total annual yield. Results from 2001 and 2002 will be reported here. The 1999 and 2000 results were reported in the 2002 Overton Field Day Report.

Research Findings. Applying broiler litter the previous three years increased the 2001 bermudagrass and clover yields four fold over the no broiler litter or nitrogen fertilizer treatment (Table 1). Adding N fertilizer with the broiler litter did not increase bermudagrass yields. Therefore the clover appears to have been providing sufficient nitrogen to meet the bermudagrass needs. In 2002, applying 2 tons/acre of broiler litter increased bermudagrass and total yields about 50% over the no broiler litter or N treatment (Table 2). In the second year, the only nitrogen fertilizer treatment that increased bermudagrass yields was the April-July treatment and the clover yields were increased by April and April-June-July treatments. Total yield was increased about 2000 lb/acre by applying nitrogen in April-June or April-June-July treatments. There was no response to N fertilizer in 2001. In the second year, applying 100 to 150 lb N/acre was required to increase yield about 2000 lb/acre which is probably not economical.

Application. Because of the limited response to N fertilizer during this 2-year study, it is recommended that N fertilizer not be applied to bermudagrass that was fertilized with 2 to 4 tons/acre of broiler liter and overseeded with clover.

Table 1. Annual yields of Dixie crimson clover and Coastal bermudagrass fertilized with 2 tons/acre of broiler litter in April 2001 and 50 lb N/acre one to three times during the year.

50 lb N/acre/month	2001 Bermuda	2002 Crimson	Total
	yield (lb DM/acre)		
No BL† or N	2655 b‡	919 b	3574 b
BL, no N	9503 a	3045 a	12548 a
BL, Apr.	10085 a	3014 a	13098 a
BL, June	9835 a	2904 a	12739 a
BL, July	9672 a	2856 a	12527 a
BL, Apr., June	10178 a	3180 a	13358 a
BL, Apr., July	10551 a	3283 a	13834 a
BL, June, July	10611 a	2961 a	13572 a
BL, Apr., June, July	10471 a	3344 a	13815 a

†Broiler litter.
‡Values in a column followed by the same letter are not significantly different at 0.05 level, Fisher's Protected LSD.

Table 2. Annual yields of Dixie crimson clover and Coastal bermudagrass fertilized with 2 tons/acre of broiler litter in April 2002 and 50 lb N/acre one to three times during the year.

50 lb N/acre/month	2002 Bermuda	2003 Crimson	Total
	yield (lb DM/acre)		
No BL† or N	6733 d‡	2115 c	8847 d
BL, no N	10068 bc	2522 b	12590 c
BL, Apr.	9936 c	2876 a	12812 bc
BL, June	9919 c	2589 ab	12508 c
BL, July	10253 bc	2691 ab	12943 bc
BL, Apr., June	11056 a-c	2512 b	13568 a-c
BL, Apr., July	11756 a	2737 ab	14502 a
BL, June, July	11305 a-c	2617 ab	13922 a-c
BL, Apr., June, July	11394 ab	2863 a	14256 ab

†Broiler litter.
‡Values in a column followed by the same letter are not significantly different at the 0.05 level, Fisher's Protected LSD.