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NITROGEN FERTILIZATION OF ARROWLEAF-RYEGRASS MIXTURES

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Background. Cool-season annual clovers overseeded into warm-season perennial grass sod (bermudagrass, bahiagrass, etc.) produce 80 to 90% of their annual forage yield after March 1. Annual ryegrass is mixed with clovers to provide earlier grazing, increase total forage production, and prevent bloat. Ryegrass requires nitrogen (N) to be productive on the infertile, sandy soils in East Texas. When clover begins to grow in the spring and is consumed by livestock, its N is recycled back to the pasture. Nitrogen in the ungrazed clover plant is not released for use by grass until the plant dies and begins to decay. Therefore, some N fertilization of the ryegrass in a clover-ryegrass mixture is necessary for early ryegrass growth. Too much N will make the ryegrass so competitive that the clover component of the mixture will be significantly reduced. A Yuchi arrowleaf-TAM 90 ryegrass mixture was overseeded on a Coastal bermudagrass sod and fertilized with 80 lb/acre of P and K, and 1 lb boron/acre. Nitrogen fertilizer at 0, 30, 60, and 90 lb/acre was applied at planting (Oct. 12) or when clover seedlings reached the first true leaf stage (Nov. 2). These initial N treatments were usually followed by 60 lb N/acre on Dec. 13 and Mar. 27. Ryegrass alone, with, and without 180 lb N/acre in 3 applications, was included in the study for comparison. All treatments were harvested on Mar. 26, Apr. 16, and May 29, 1991.

Research Findings. Nitrogen applied at planting or when the clover seedlings reached the first true leaf stage increased forage production of the arrowleaf-ryegrass mixture (Fig. 1). Yields were higher when N was applied at planting compared to the same treatment at first clover leaf. Arrowleaf-ryegrass production was significantly higher than ryegrass at the zero and the 60-0-60-60 N treatments. Arrowleaf clover production was significantly reduced when N was applied at any time.

Yield and forage production per lb N applied was lowest when no N was applied at planting or first clover leaf (Table 1). The poor response to N in the 0-90-60-60 treatment was due to suppressed arrowleaf clover production without a corresponding increase in ryegrass production. Ryegrass alone, fertilized with 180 lb N/acre (60-0-60-60), produced less forage per pound of N applied than arrowleaf-ryegrass receiving some N at planting or first clover leaf.

Application. Results from this study indicate that 50 to 60 lb N/acre should be applied to an arrowleaf-ryegrass mixture from planting up to the first true clover leaf. Additional N applications in December and late February will increase forage production. Allowing ryegrass to exceed a 6 in. height will decrease clover production.

Table 1. Increased forage production due to nitrogen fertilization of an arrowleaf-ryegrass mixture.

At planting	1st clover leaf	13th Dec.	27th Mar.	Total	Yield	Yield above 0-0-0-0 trt.	lb forage lb N applied
lb N/acre					lb dry matter/acre		
Arrowleaf-Ryegrass mixture							
0	0	0	0	0	3078	--	--
0	0	60	60	120	3495	417	3.5
30	0	60	60	150	4253	1175	7.8
60	0	60	60	180	4547	1469	8.2
90	0	60	60	210	4905	1827	8.7
0	30	60	60	150	4042	964	6.4
0	60	60	60	180	4452	1374	7.6
0	90	60	60	210	3950	872	4.2
0	60	0	0	60	3620	542	9.0
0	60	60	0	120	3932	854	7.1
Ryegrass alone							
60	0	60	60	180	3778	700	3.9

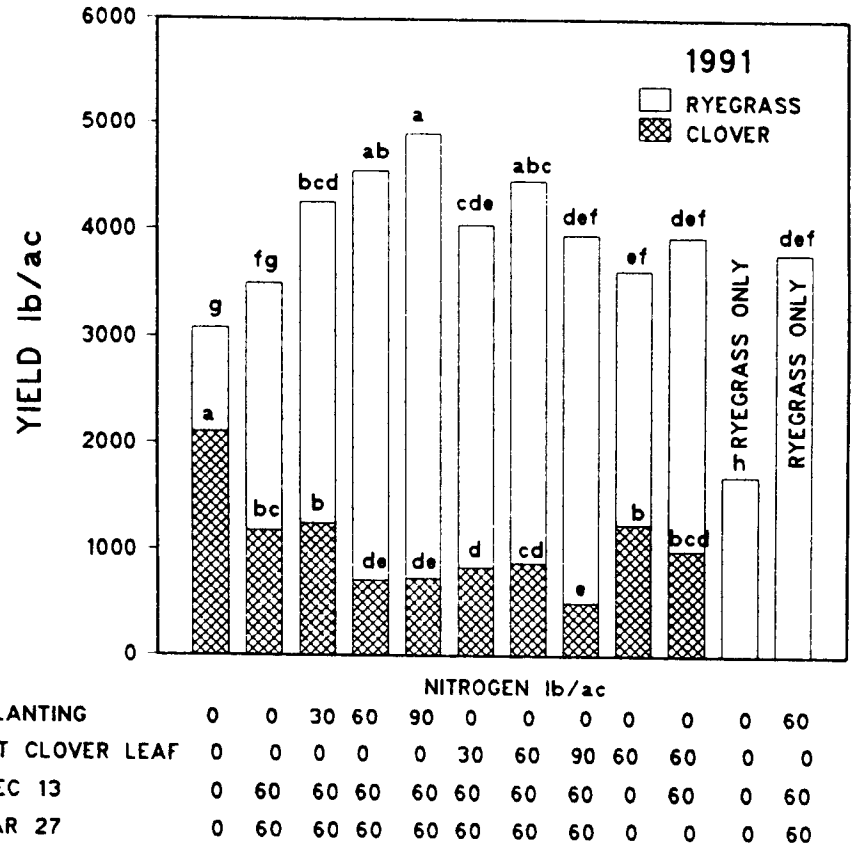

Fig. 1. Yield response of arrowleaf-ryegrass and ryegrass alone to nitrogen rate and time of application. Clover and total yields followed by the same letter are not significantly different at the 0.05 level Waller-Duncan Multiple Range Test.