FIELD DAY REPORT - 1992

Texas A&M University Agricultural Research and Extension Center at Overton

Texas Agricultural Experiment Station
Texas Agricultural Extension Service

Overton, Texas

April 30, 1992

Research Center Technical Report 92-1

INFLUENCE OF NITROGEN FERTILIZER ON OVERTON R18 ROSE CLOVER SEEDLING GROWTH

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Background. Cool-season annual clovers are planted in mixtures with annual ryegrass to aid in distributing the small-seeded clover over the pasture, provide earlier grazing than the clover alone, and reduce the potential of bloat by livestock. Ryegrass requires some nitrogen (N) fertilization for growth. However, applying N fertilizer to clover seedlings may decrease nodule formation and nitrogen fixation from the air. Planning a N fertilization program for a clover-ryegrass mixture presents a problem. Clover will be reduced, and may be lost, because of the more rapid ryegrass growth due to N fertilization. A rose clover-ryegrass mixture was fertilized with 0, 30, 60, or 90 lb N/acre at planting or delayed until the clover seedling reached the first true leaf stage to study the effects on rose clover seedling growth.

Research Findings. Clover seedlings were removed about 4 and 6 weeks after N was applied at the first true clover leaf stage in 1990 and 1991, respectively. After washing the soil from the roots, the number of leaves and nodules per seeding was recorded. Dry weight per seedling was then determined. There were no significant differences in leaves and nodules per clover seedling due to N rate and time of application in 1990 (Table 1). However, nodules per seedling did decrease slightly as N rate at planting increased. Clover seedlings had a few more nodules if 60 and 90 lb N/acre were applied later at first clover leaf than at planting. Overton R18 rose clover seedlings did respond up to 60 lb N applied at planting in terms of leaf number and weight. In 1991, leaves, nodules, and weight per rose clover seedling were not influenced by N rate or time of application (Table 2).

Table 1. Response of Overton R18 rose clover seedlings in a ryegrass mixture to nitrogen rate and time of application 1990.

Nitrogen Rate		Clover Seedling		
At planting	1st clover leaf	Leaf no.	Nodule no.	Weight
----------lb/ac----------				---g---
0	0	5.43	7.40	0.043 ab†
30	0	5.85	6.80	0.048 ab
60	0	6.60	6.35	0.056 a
90	0	6.38	5.68	0.054 ab
0	30	5.10	6.80	0.039 b
0	60	5.13	7.25	0.039 b
0	90	5.50	7.05	0.044 ab

†Values within a column followed by the same letter are not significantly different at the 0.05 level, Waller-Duncan Multiple Range Test.

Table 2. Response of Overton R18 rose clover seedlings in a ryegrass mixture to nitrogen rate and time of application 1991.

Nitrogen Rate		Clover Seedling		
At planting	1st clover leaf	Leaf no.	Nodule no.	Weight
----------lb/ac----------				---g---
0	0	6.78	5.25	0.052
30	0	6.25	5.30	0.054
60	0	6.13	5.93	0.049
90	0	5.85	5.35	0.052
0	30	6.10	5.73	0.053
0	60	5.93	5.23	0.051
0	90	6.45	6.63	0.055

Application. Nitrogen fertilizer applied at planting or when clover seedlings reached the first true leaf stage did not significantly affect leaf number, nodule number, or weight of Overton R18 rose clover seedlings from the no-N treatment on these sandy soils. Similar studies on loam and clay soils in southeast Texas resulted in reduced nodulation as N fertilizer rate increased. Clover seedling weights were also reduced at N rates greater than 50 lb/acre because of increased competition from ryegrass. We believe N fertilizer did not reduce rose clover seedling growth in this study because the sandy soils in East Texas have a very low N holding capacity and are subject to leaching with average or greater rainfall. Most N fertilizer not taken up by plants within 4 to 6 weeks is probably lost.

Based on the data from this study, we recommend the following autumn N fertilization program for rose clover-ryegrass mixtures in East Texas. Delay N fertilization until ryegrass and clover have emerged. This will reduce the risk of N leaching from the soil before ryegrass seedlings have developed a root system to take up N. Nitrogen rate should be from 30 to 50 lb N/acre. A second N application can be applied about 6 weeks later if temperatures are not too cold and ryegrass is a pale green. Maintain sufficient grazing pressure to prevent the ryegrass from exceeding a 6-in. height and shading the clover.