

Forage Research in Texas

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Establishment of Arrowleaf Clover and Annual Ryegrass in a 'Tifton 44' Bermudagrass Sod

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SUMMARY

'Yuchi' arrowleaf clover was either drilled or broadcast on a 'Tifton 44' bermudagrass sod at seeding rates of 0, 5, 10, and 20 lbs/ac. At each seeding rate, arrowleaf was planted alone and in combination with 20 lbs/ac 'Gulf' ryegrass. Drilled clover produced 32% more forage than broadcast clover. Ryegrass planted alone and fertilized with nitrogen produced 2.5 times more dry matter forage than ryegrass planted in combination with arrowleaf. Clover yields were reduced by approximately 65% when ryegrass was included in the mixture. If planted alone, 5 lbs/ac arrowleaf seed would provide a reasonable stand and seed source for the succeeding year. If ryegrass was included in the mixture, 10 lbs/ac arrowleaf seed were necessary to provide an adequate stand for grazing and seed. Bermudagrass production from the various plots was surprisingly similar with a yield advantage of less than one ton per acre from the nitrogen fertilized plots vs clover-bermudagrass plots.

Introduction

Ryegrass and clovers are used in pasture systems to provide a high nutritive value forage for improved animal performance. In addition, clovers are added to the forage system to allow for nitrogen fixation. Arrowleaf clover is well-adapted to the East Texas area, but it often produces partial or total crop failures under certain combinations of climatic conditions and cultural practices. The objective of this trial was to determine the effect of clover seeding rate, method of planting in a bermudagrass sod, and the inclusion of ryegrass on individual and cumulative forage yields.

Procedures

'Yuchi' arrowleaf clover was planted alone and in combination with ryegrass on a 'Tifton 44' bermudagrass sod at 0, 5, 10, and 20 lbs/ac in mid-October. Ryegrass was planted at the rate of 20 lbs/ac. At each clover seeding rate, the seeds were drilled and broadcast in separate plots. All plots received 425 lbs/ac of 6-24-24 at time of planting. The ryegrass planted alone (0 lbs/ac clover) received 150 lbs/ac 33.5-0-0 at 30-45 day intervals beginning February 1 and terminating August 1 for a total seasonal nitrogen application of 325 lbs/ac. The fourteen treatment combinations were replicated three times. Forage samples were harvested

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with hand clippers from two one-square-foot areas within each plot. The forage species were separated into the various components in the laboratory.

Results

Dry matter production from the individual and collective forage components is presented in Tables 1-2. On the average, clover yields were increased 32% and ryegrass yields increased 24% by planting with a drill vs broadcasting the seed on the sod surface. The frequency and duration of rainfall after planting are the most critical factors which affect seedling vigor of broadcast planted clovers. The primary advantage of drilling seed is that the seed are placed in contact with the soil where the moisture relationships are superior to that of the sod surface. Arrowleaf planted alone produced 65% more clover forage than when planted with ryegrass. Ryegrass, on the other hand, when planted alone and fertilized with nitrogen, produced 2.5 times more forage than when planted with clover. Bermudagrass production on the nitrogen fertilized plots was only one ton greater than that from the clover-bermudagrass plots. Nitrogen fixation from the previous clover crop was partially responsible for this increased bermudagrass yield. The quantity and distribution of rainfall during the summer months was probably of equal importance in accounting for the total forage production.

Table 3 shows the effect of planting ryegrass on clover yields. The clover yield was reduced most (61%) when ryegrass was included at the low clover seeding rates. This was probably due to the area available for ryegrass germination and growth, and the degree of plant competition from the lower seeding rates of clover. If arrowleaf is planted alone, the 5-lb/ac seeding rate would provide a stand and seed source for succeeding crops. If ryegrass is included in the planting mixture, the seeding rate should be increased to 10 lbs/ac.

Table 1. Dry matter production of 'Yuchi' arrowleaf clover, 'Gulf' ryegrass, and 'Tifton 44' bermudagrass as influenced by seeding rate and planting method.

Clover Seeding rate (lbs/ac)	Planting Method	Dry Matter Yield (lbs/ac)			TOTAL
		Clover	Ryegrass	Bermudagrass	
0 lbs + ryegrass	Broadcast	0	3,773	16,948	20,721
0 lbs + ryegrass	Drilled	0	4,792	15,013	19,805
5 lbs alone	Broadcast	736	0	13,669	14,405
5 lbs alone	Drilled	1,449	0	14,169	15,618
5 lbs + ryegrass	Broadcast	297	1,487	12,174	13,958
5 lbs + ryegrass	Drilled	553	1,650	15,143	17,346
10 lbs alone	Broadcast	1,662	0	13,208	14,870
10 lbs alone	Drilled	1,855	0	15,231	17,086
10 lbs + ryegrass	Broadcast	1,248	1,340	13,256	15,844
10 lbs + ryegrass	Drilled	1,175	1,792	13,866	16,833
20 lbs alone	Broadcast	915	0	14,604	15,519
20 lbs alone	Drilled	1,465	0	13,481	14,946
20 lbs + ryegrass	Broadcast	741	1,766	13,096	15,603
20 lbs + ryegrass	Drilled	884	2,151	12,422	15,457

Table 2. Component forage production as affected by planting method and specie mixtures.

<u>Treatment</u> ¹	<u>Dry Matter Yield (lbs/ac)</u>			
	<u>Clover</u>	<u>Ryegrass</u>	<u>Bermudagrass</u>	<u>TOTAL</u>
Broadcast ²	933	2,092		
Drilled ²	1,230	2,596		
Clover Alone	1,347	-	14,060	15,407
Ryegrass Alone	-	4,283	15,981	20,264
Clover + Ryegrass	816	1,698	13,316	15,840

¹Yields combined across all seeding rates.

²Bermudagrass yields not additive across seeding rates and planting method.

Table 3. Clover production as affected by seeding rate and ryegrass.

<u>Seeding Rate</u>	<u>Clover Dry Matter (lbs/ac)</u>	
	<u>Yield</u>	<u>Yield Reduction Due to Ryegrass</u>
5 lbs alone	1,093	
5 lbs + ryegrass	425	668 61%
10 lbs alone	1,759	
10 lbs + ryegrass	1,212	547 31%
20 lbs alone	1,190	
20 lbs + ryegrass	813	377 32%

¹Yields combined across method of planting.