

Forage Research in Texas

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

F. M. Rouquette, Jr. and M. J. Florence*

SUMMARY

'Mt. Barker' subterranean clover was either drilled or broadcast on a 'Tifton 44' bermudagrass sod at seeding rates of 0, 10, 20, and 40 lbs/ac. At each seeding rate, 'Mt. Barker' was planted alone and in combination with 20 lbs/ac 'Gulf' ryegrass. Drilled plantings of clover produced 49% more forage than broadcast plantings, whereas, there was only an 11% advantage for ryegrass under similar planting conditions. Ryegrass planted alone and fertilized with nitrogen produced 3.4 times more forage than clover alone, and 1.9 times more forage than clover plus ryegrass. The seasonal dry matter production from ryegrass-bermudagrass fertilized with nitrogen was approximately 1.6 times that forage produced from clover-bermudagrass or clover-ryegrass-bermudagrass.

Introduction

Subterranean clover was introduced into East Texas pastures more than forty years ago. However, due to problems associated with rhizobia strain specificity and general grazing management, the sub clovers did not appear to offer significant contributions to the overall forage-animal enterprise. With advanced research in soil microbiology, plant breeding, and clipping-grazing management, the sub clovers appear to offer some potential for the East Texas area. In order to evaluate alternative methods of establishing a sub clover stand, this study was designed to examine the effect of clover seeding rate, method of planting in a bermudagrass sod, and inclusion of ryegrass on both clover and grass production.

Procedures

'Mt. Barker' subterranean clover was planted alone and in combination with ryegrass on a 'Tifton 44' bermudagrass sod at 0, 10, 20, and 40 lbs/ac in mid-October. Ryegrass was planted at the rate of 20 lbs/ac. At each clover seeding rate, seeds were drilled and broadcast in separate plots. All plots received 425 lbs/ac of 6-24-24 at time of planting. The ryegrass alone plots 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 with hand clippers from two one-square-foot areas within each plot. The forage species were separated into the various components in the laboratory.

* Respectively, associate professor and research associate, Texas A&M Agricultural Research & Extension Center, Overton, Texas 75684.

Results

Tables 1 and 2 show the individual and collective forage production from the various seeding rates and planting methods. Planting subterranean clover with a drill resulted in 49% more dry matter forage than a broadcast planting. Ryegrass which was drilled produced 11% more forage than that which was broadcast. Clover planted alone produced nearly double that amount of clover forage produced when planted in combination with ryegrass. Ryegrass when planted alone and fertilized with nitrogen produced 3.4 times more forage than clover alone; 2.7 times more forage than the ryegrass in the mixed planting; and 1.9 times more forage than the clover component in the mixed planting. In addition, the total seasonal yield of ryegrass-bermudagrass fertilized with nitrogen was approximately 1.6 times that of the non-nitrogen fertilized plots containing clover alone or in a mixture.

Table 3 illustrates the impact of ryegrass on clover yields when the two species are planted together. Subterranean yields were reduced by 65, 50, and 32%, respectively, on the 10, 20, and 40 lb/ac clover seeding rate plots that also contained ryegrass. Thus, the 10 lb/ac seeding rate of clover provided as much clover forage as the other seeding rates when seeded alone. With the addition of ryegrass, a higher seeding rate would be desirable to provide sufficient seed source for the succeeding year.

Table 1. Dry matter production of 'Mt. Barker' subterranean clover, 'Gulf' ryegrass, and 'Tifton 44' bermudagrass as affected by seeding rate and planting method.

Clover seeding rate (lbs/ac)	Planting method	Dry Matter Yield (lbs/ac)			
		Clover	Ryegrass	Bermuda	TOTAL
0 lbs + ryegrass	Broadcast	0	5,296	14,378	19,674
0 lbs + ryegrass	Drilled	0	5,635	13,169	18,904
10 lbs alone	Broadcast	1,298	0	9,997	11,295
10 lbs alone	Drilled	1,916	0	11,803	13,719
10 lbs + ryegrass	Broadcast	479	1,658	8,245	10,382
10 lbs + ryegrass	Drilled	655	1,776	8,626	11,057
20 lbs alone	Broadcast	1,174	0	8,425	9,599
20 lbs alone	Drilled	1,796	0	10,700	12,496
20 lbs + ryegrass	Broadcast	736	1,874	8,857	11,467
20 lbs + ryegrass	Drilled	747	2,637	10,041	13,425
40 lbs alone	Broadcast	1,289	0	11,958	13,147
40 lbs alone	Drilled	2,191	0	9,053	11,244
40 lbs + ryegrass	Broadcast	895	2,071	9,649	12,615
40 lbs + ryegrass	Drilled	1,473	2,082	9,004	12,559

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

<u>Treatment</u> ¹	<u>Dry Matter Yield (lbs/ac)</u>			<u>TOTAL</u>
	<u>Clover</u>	<u>Ryegrass</u>	<u>Bermudagrass</u>	
Broadcast ²	979	2,725		
Drilled ²	1,463	3,033		
Clover Alone	1,611	-	10,323	11,934
Ryegrass Alone	-	5,466	13,824	19,290
Clover + Ryegrass	831	2,016	9,070	11,917

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 Matter¹ (lbs/ac)</u>		
	<u>Yield</u>	<u>Yield Reduction Due to Ryegrass</u>	
10 lbs alone	1,607		
10 lbs + ryegrass	567	1,040	65%
20 lbs alone	1,485		
20 lbs + ryegrass	742	743	50%
40 lbs alone	1,740		
40 lbs + ryegrass	1,184	556	32%

¹Yields combined across method of planting.