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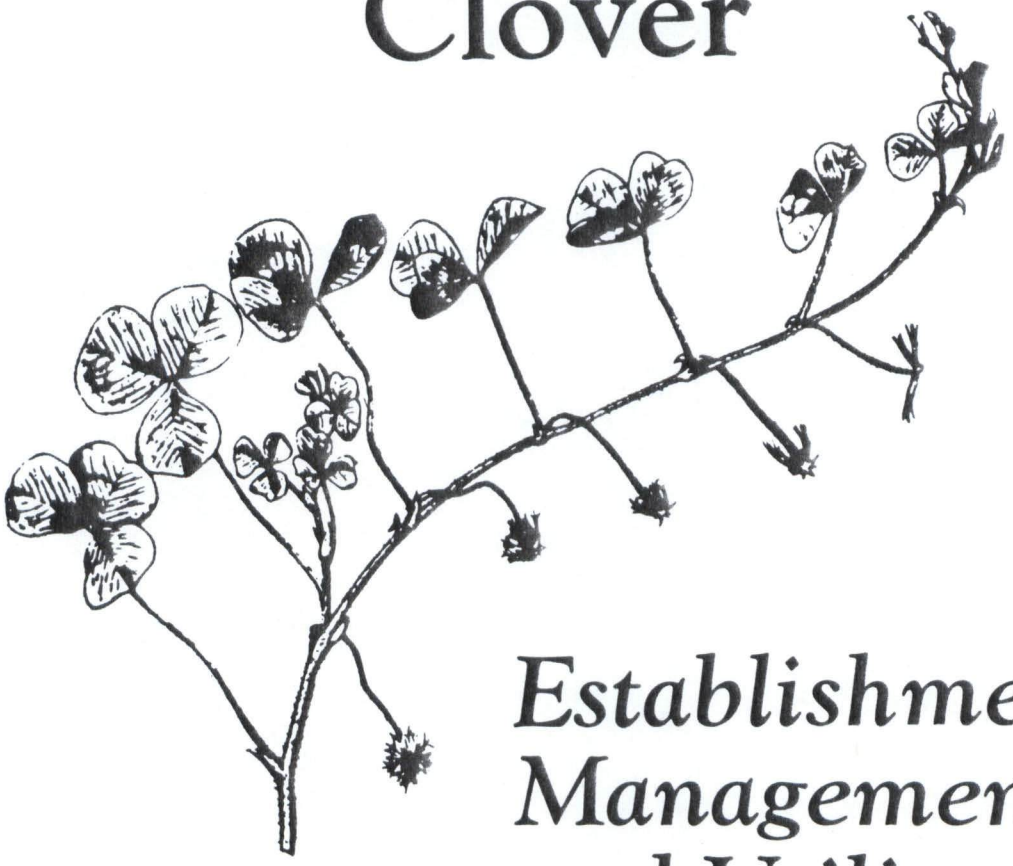

Establishment, Management, and Utilization in Texas

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CHAPTER 7

Utilization of Subterranean Clover—Bermudagrass Mixtures in East Texas

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The climatic conditions in East Texas allow for the successful overseeding of cool-season annual forages in warm-season perennial grass pastures. Bermudagrasses are the dominant permanent pastures in this area. With adequate fertilizer, they permit intensive grazing pressures or stocking rates of one to three animal-units per acre during the active growing season. Bermudagrass is normally available for grazing from late April to early November. Cool-season annual forages, therefore, may grow in the bermudagrass sod from November through April without any significant competitive effects from the bermudagrass.

The primary reasons for using legumes, with or without ryegrass, in bermudagrass pastures are threefold: (1) extend the grazing period for an otherwise dormant sod; (2) increase the quality of the available diet; and (3) allow the nitrogen-fixing capabilities of the legume to enhance the nutrient status of the pasture. There are several approaches which may be taken in the scheme of forage utilization and they range from continuous grazing to various types of rotational grazing techniques. The principal concern is that the forage which is grown be consumed and converted to a salable product. The degree of utilization, therefore, has a significant impact on forage and animal production as well as economic returns.

A 3-year trial was conducted at the Texas A&M University Agricultural Research and Extension Center at Overton in East Texas to ascertain the influence of a continuous grazing program on Coastal bermudagrass pastures which were overseeded during the previous October with Mt. Barker subterranean clover and Marshall ryegrass. Three levels of grazing pressure or stocking rates were used to maintain three levels of forage available for consumption (Tables 1 and 2). Forage production from February to mid-April consists entirely of clover and ryegrass. By late May and throughout the remainder of the summer months, the pasture consists exclusively of bermudagrass. The 3-year average forage dry matter available for consumption on the high (H), medium (M), and low (L) stocked pastures was 941, 1,867, and 2,822 lbs/A, respectively. The average liveweights required to maintain these levels of available forage were 5,192, 2,823, and 1,733 lbs/A, respectively for the H, M, and L stocked pastures. Grazing pressure is the relationship between the quantity of forage available and the amount of animal liveweight grazing the pasture. Further, grazing pressure may be calculated by expressing pounds of forage dry matter per 100 pounds of body weight. Therefore, by examining Table 2, these average grazing pressure relationships were 18, 66, and 163, respectively for H, M, and L stocked pastures. The significance or impact of these stocking rates may be more clearly shown using animal performance data. The pasture-animal data presented

Table 1. Forage Available for Consumption at Each Level of Stocking of Coastal Bermudagrass Pastures Overseeded With Mt. Barker Subterranean Clover and Marshall Ryegrass[1]

		Forage Available[2]		
	Date[3]	High SR	Medium SR	Low SR
		Pounds Per Acre		
	February	1,976	1,973	2,261
	March	531	1,419	2,017
	April	708	1,381	2,362
	May	502	1,072	2,242
	June	859	2,391	3,565
	July	1,068	2,966	4,488
Avg.	140 days	941	1,867	2,822

[1]All pastures received fertilizer rate of (100-100-100) of (N-P_2O_5-K_2O) during the grazing period.

[2]Forage harvested to ground level.

[3]Three-year average.

herein includes only that segment of time in which the lactating cow and fall-born calf had residence time on these pastures. The remaining portion of the grazing season (July-October) will not be discussed in this chapter since that time period involves the management of exclusive bermudagrass pastures.

An average of three successive years' research trials using F-1 (Brahman x Hereford) cows and their fall-born, Simmental-sired calves is presented in Table 3. Cows on the H stocked pastures were unable to maintain both body weight and condition. Calves on the H stocked pastures gained more than 2 lbs/day during the clover-ryegrass dominant period (Feb.-May). However, once bermudagrass became the primary diet, calf average daily gain (ADG) decreased dramatically. This decline was attributed in part to forage quantity and quality, and in part, to stage of lactation of the cow since the calves were approximately 8 months old during this time. Thus, under these conditions, the most economically advantageous approach for the H stocked conditions may have been to wean the fall-born calf in early to mid-June. At the other end of the stocking rate situation, the suckling steer calves on the L stocked pasture gained more than 3 lbs/day during every weigh period except the June-July period. And, the overall calf ADG of 2.72 lbs certainly encouraged retaining the calf in the suckling stage for as long as possible, especially since the cow was also gaining in excess of 1.1 lbs/day.

As stocking rates are increased, performance of both cow and suckling calf were affected. As a consequence, weaning weights were restricted on the H stocked pastures (Table 4). Pastures with stocking rates that averaged 3.46 animal-units (AU) (one AU equivalent to 1,500 lbs liveweight) per acre from mid-February to mid-July produced weaning weights of 595 lbs. Steers on the H stocked pastures weaned at 635 lbs; whereas, heifers on these same pastures weaned at 555 lbs. By essentially reducing the stocking rate by half (3.46 to 1.88 AU/A) or decreasing the grazing pressure relationship from 18 to 66 lbs DM/100 lbs BW (Table 2), the weaning weights of calves increased by 124 lbs (595 to 719 lbs). An even further reduction in stocking rate (from 1.88 to 1.15 AU/A) resulted in only an extra 36 lbs of weaning weight (719 to 755 lbs). The level or degree of risk associated with increased stocking rates, and hence, less total surplus of forage, will certainly impact management decisions. The influence of stocking rate on gain per animal (calf) and gain per acre is presented in Table 5. The gain per calf at the H, M, and L stocked pastures was 207, 333, and 362 lbs, respectively; whereas, the respective gains per acre were 709, 623, and 419 lbs. Thus, at the lowest stocking rate, there was an abundance of forage available at all times and this certainly represents a minimum risk level under improved pasture conditions of East Texas. And, the gain per calf was maximized at 362 lbs on these lightly stocked pastures. However, calf gains per acre on the L stocked pas-

Table 2. Average Forage Availability (DM) and Animal Body Weight (BW) at Each of Three Stocking Rates

	High SR			Medium SR			Low SR		
Trial	Forage DM[1]	Animal BW	DM/ 100 lbs BW	Forage DM	Animal BW	DM/ 100 lbs BW	Forage DM	Animal BW	DM/ 100 lbs BW
	lbs/A			lbs/A			lbs/A		
1	908	5,709	16	2,400	2,542	94	3,406	1,529	223
2	750	5,385	14	1,527	2,747	56	2,669	1,697	157
3	1,165	4,481	26	1,675	3,181	53	2,392	1,972	121
3-Yr Avg.	941	5,192	18	1,867	2,823	66	2,822	1,733	163

[1]Forage dry matter harvested to ground level.

Table 3. Influence of Stocking Rate (SR) on Performance of Cows and Calves Grazing Coastal Bermudagrass Pastures Overseeded With Mt. Barker Subterranean Clover and Marshall Ryegrass

	Average Daily Gain[1]											
	High SR				Medium SR				Low SR			
Period	Cow[2]	Calf[3]	STR	HFR	Cow	Calf	STR	HFR	Cow	Calf	STR	HFR
Month	Pounds Per Head Per Day											
Feb.-Mar.	−.34	2.55	2.53	2.58	1.14	3.10	3.50	2.70	1.70	3.30	3.56	3.04
Apr.-May	.33	2.14	2.35	1.92	.75	2.59	2.85	2.33	1.43	2.83	3.04	2.62
May-June	.16	1.54	1.81	1.28	.81	2.51	2.61	2.42	1.27	2.88	3.03	2.73
June-July	−.25	0.21	0.32	.09	.29	1.77	1.81	1.72	0.03	1.98	2.05	1.92
Total	−.16	1.55	1.70	1.41	.76	2.50	2.73	2.28	1.11	2.72	2.88	2.57

[1]Average Daily Gains represent 3-year averages.

[2]Cows are F-1 (Brahman x Hereford).

[3]Calves are sired by Simmental bulls and born in October-November. Data for calves is an average of steers (STR) and heifers (HFR).

tures at 419 lbs were 204 lbs/A less than the M stocked pastures and 290 lbs/A less than the H stocked pastures. Certainly under these trial conditions where pasture inputs on a per-acre basis were equal on all three stocking rates, the most economically advantageous management decision was to increase the grazing pressure or stocking rate to more completely utilize that forage which was produced. The M stocked pastures had the appearance of spot or selective grazing with an abundance of tall forage in and around the dung areas. Other areas within the pasture had been grazed to varying heights of one-half inch to 3 inches. Thus, only under the most severe drought conditions would the M stocked pastures be at a level of risk which would necessitate the removal of animals from the pasture due to lack of available forage.

Under the East Texas climatic conditions, none of the variously stocked subterranean clover pastures produced a successful reseeding stand. However, this would not prevent the use of subterranean clover as an annually planted forage. The nutritive value and the extension of the grazing season are valuable assets of clover-ryegrass pastures. The resultant animal performance is only as successful or economical as the genetic base and growth potential of the animals selected to graze these pastures. The level of stocking or degree of forage utilization employed varies among operators, but some of the primary management considerations in selecting the proper stocking rate are cow herd retention, continuous ownership of calves post-weaning, pasture vigor and stand, climatic conditions, and cash flow situations. From the management standpoint, it is important that these types of grazing programs involving clover-ryegrass and bermudagrass pastures be flexible enough to wean 800-lb steers with moderate gains per acre or 550- to 600-lb calves with gains of 700 lbs/A during a 4 to 5 month grazing period. It is imperative that the grazing management system include both biological and economical flexibility in order to optimize net returns.

Table 4. Influence of Stocking Rate (SR) on Weaning Weights of Steers (STR) and Heifers (HFR) Grazing Coastal Bermudagrass Overseeded With Mt. Barker Subterranean Clover and Marshall Ryegrass

	High SR				Medium SR				Low SR			
	STR Rate[1]	Weaning Weights			STR Rate	Weaning Weights			STR Rate	Weaning Weights		
Trial	(AU/A)	STR	HFR	Calf	(AU/A)	STR	HFR	Calf	(AU/A)	STR	HFR	Calf
		Pounds				Pounds				Pounds		
1	3.81	575	550	563	1.69	765	680	723	1.02	778	715	747
2	3.59	686	542	614	1.83	805	724	765	1.13	816	729	773
3	2.99	644	573	609	2.12	705	634	670	1.31	784	705	745
3-Yr Avg.	3.46	635	555	595	1.88	758	679	719	1.15	793	716	755

[1]Stocking rate calculated as 1,500 lbs body weight = 1 cow and 1 calf (1 pair) = 1 animal unit (AU).

Table 5. Influence of Stocking Rate (SR) on Gain Per Calf and Gain Per Acre of Coastal Bermudagrass Pastures Overseeded With Mt. Barker Subterranean Clover and Marshall Ryegrass

	High SR			Medium SR			Low SR		
Trial	STR[1] Rate (AU/A)	Gain/ Calf (lbs)	Gain/[2] Acre (lbs)	STR Rate (AU/A)	Gain/ Calf (lbs)	Gain/ Acre (lbs)	STR Rate (AU/A)	Gain/ Calf (lbs)	Gain/ Acre (lbs)
1	3.81	178	678	1.69	328	554	1.02	336	343
2	3.59	207	744	1.83	374	684	1.13	375	424
3	2.99	236	706	2.12	297	630	1.31	375	491
3-Yr Avg.	3.46	207	709	1.88	333	623	1.15	362	419

[1]Stocking rate calculated as 1,500 lbs body weight = 1 cow and 1 calf (1 pair) = 1 animal-unit (AU).

[2]Gain per acre based on calf performance (average of steers and heifers).