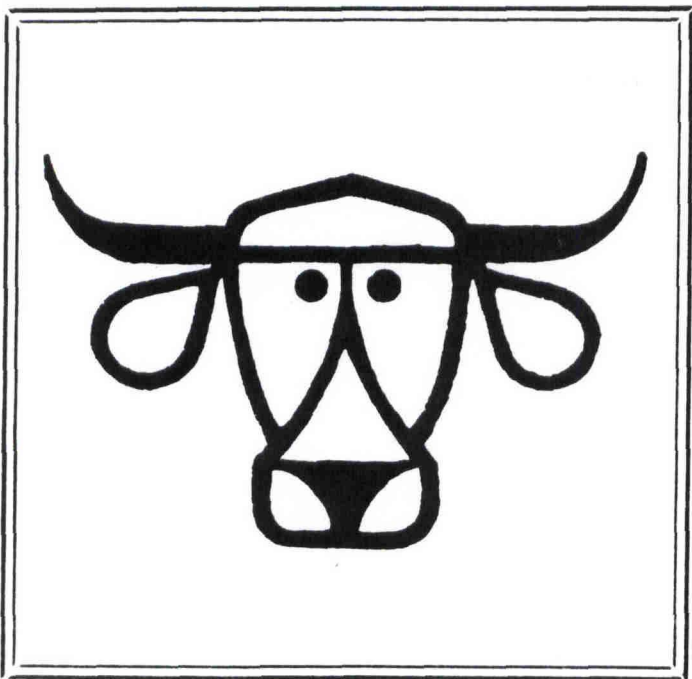
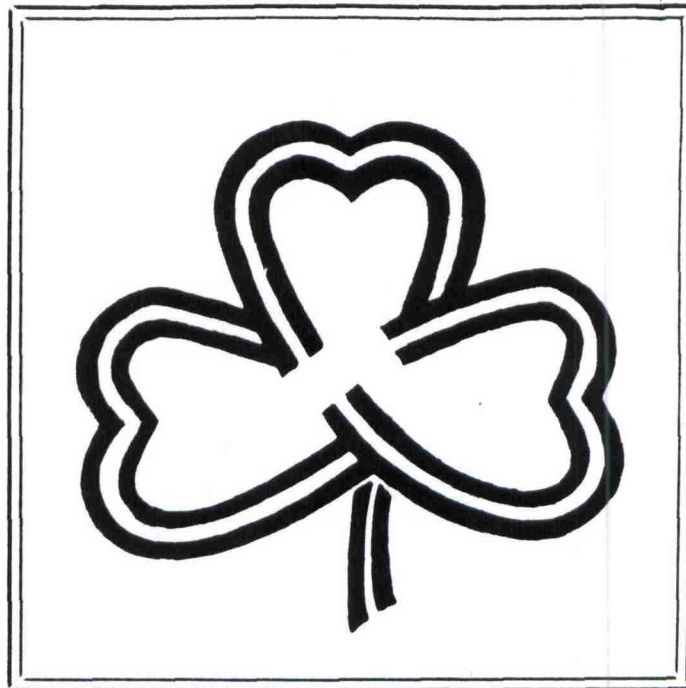


# **PUBLICATIONS**

## **1984**



# Forage Research in Texas

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# 1984

PERFORMANCE OF F-1 (BRAHMAN X HEREFORD) COWS AND  
SIMMENTAL-SIRED CALVES AT FOUR STOCKING RATES

F. M. Rouquette, Jr., L. D. Roth, M. J. Florence, and W. C. Ellis<sup>1</sup>

SUMMARY

Cows with fall-born calves were grazed at four stocking rates on 'Marshall' ryegrass and 'Mt. Barker' subterranean clover overseeded on Coastal bermudagrass and cows with spring-born calves were grazed at four stocking rates on Coastal bermudagrass. The average stocking rates for the 210-day trial were 1.57, 2.01, 2.62, and 3.92 animal-units per acre. The average daily gain of cows ranged from .59 lbs to -1.57 lbs from low to high stocking rates; whereas, calf gains ranged from 2.64, 2.23, 2.04, and 1.39, respectively, for each of the four stocking rates. Calf gains per acre at the low, medium low, medium high, and high stocking rates, respectively, were 870, 941, 1127, and 1141 pounds.

INTRODUCTION

In order to make sound biological and economical decisions related to stocking rate, one must know the performance boundaries of both the forage and the class of livestock being used. The primary objective of this trial was to determine the influence of level of available forage on the liveweight gains of cows and suckling calves.

PROCEDURE

Coastal bermudagrass was overseeded with 'Marshall' ryegrass and 'Mt. Barker' subterranean clover in mid-October 1982. In November, fertilizer was applied at the rate of 0-100-100 lbs/acre of N-P<sub>2</sub>O<sub>5</sub>-K<sub>2</sub>O. A total of 250 lbs/ac nitrogen was split-applied in 50 lb/ac increments beginning in late January and continuing through early August, 1983. Pasture size ranged from 2.3 to 5.5 acres. Forage samples for quality were taken at 14-day intervals and samples for availability were taken at 28-day intervals throughout the duration of the 210-day grazing period (February 28 to September 29).

Two sets of F-1 (Brahman x Hereford) cows and Simmental-sired calves served as "testers" during the 210-day trial. From February 28 to July 12, cows with fall-born calves were used to monitor animal responses to level of available forage. On July 12, the fall-born

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<sup>1</sup>Respectively, professor, graduate student and research associate, Texas Agricultural Experiment Station, Overton; and professor, Texas A&M University, Animal Science Dept., College Station.

KEYWORDS: Stocking rate/cows/calves/forage availability

(October-November) calves were weaned, and from July 15 to September 29, F-1 cows with spring-born (February-March) calves were used to measure animal performance. Forage availability differences between each pasture were maintained using the put-and-take method of grazing. Regulator animals consisted of other cow-calf pairs and weaned steers and heifers. Animals were weighed at approximate 28-day intervals. Stocking rates were calculated by allowing one cow and one calf equal to 1500 pounds of total animal body weight. Using a common body weight for each pasture allowed for a more uniform estimation of grazing pressure at each of the four forage availability treatments. The 1500-pound animal unit equivalent does not account for differences in intake between cows, suckling calves, and weaned calves. However, for the purpose of estimating stocking rate differences between treatments, the use of 1500-pounds is considered to represent an equal bias across all treatments. Thus, for calculating an absolute stocking rate for one class of livestock when using multiple classes of livestock in the same pasture, other techniques such as the Effective Feed Unit (Petersen and Lucas, 1968), etc., may be more appropriate.

#### RESULTS AND DISCUSSION

Table 1 shows the monthly and season average forage availabilities for each of the four treatment pastures. The original intent was to maintain a surplus of forage at all times on the low stocking rate treatment and to restrict ad libitum intake on the high stocking rate treatment. The ratio of lbs forage DM/acre to 100 pound units of live weight gives a good illustration of the grazing pressure throughout the season. As this ratio exceeded 100, forage quantity never restricted intake. However, as this ratio moved into the teens, available forage restricted ad libitum intake of the grazing animal.

The monthly, seasonal, and total gains for cows, steers, heifers, and averages for steers plus heifers when grazed at low (L), medium low (ML), medium high (MH), and high (H), stocking rates are shown in Tables 2, 3, 4, and 5, respectively. At the low stocking rate (Table 1), fall-born steers gained 2.89 and heifers gained 2.72 lbs/hd/day. The cows gained .87 lbs/hd/day during the 134-day period. Spring-born steers and heifers had average daily gains (ADG) of 2.32 and 2.36 lbs, respectively; whereas, the ADG for these cows was .06 lbs. For the 210-day period, there were 554 lbs of calf gain at the low stocking rate. The average calculated stocking rate for the trial was 1.57 animal-units per acre.

At the medium low stocking rate (Table 2), the ADG of fall-born steers and heifers was essentially the same with an average of 2.46 lbs. These cows gained slightly more than one-half pound per day during this first period of the summer. The ADG for spring-born calves was 1.81 pounds and for the cows was -.13 lbs. During the combined 210-day trial, calves gained 468 pounds at a calculated stocking rate of 2.01 animal units per acre. The medium high stocking rate (Table 4) showed a gradual decline in performance of both cows and calves. At a slightly higher stocking rate, 2.62 vs 2.01, calves gained about a quarter of a pound per day less than their

counterparts. The cows lost nearly three quarters of a pound per day more than cows at the next lighter stocking rate. Thus, forage:animal body weight ratios which are representative of these two stocking rates, 62 vs 38 (Table 1), provide for acceptable calf performance, 2.23 and 2.04 ADG, respectively, with a minimum of excess cow gain.

Animal performance from the restricted available forage treatment is shown in Table 5. The dramatic differences in ADG of fall vs spring-born calves may be accounted for during the first 29-day period (February 28 to March 29) when cattle had a higher quality (ryegrass-clover) diet, and also had less grazing pressure per acre. The 210-day trial resulted in cow ADG of -1.57 and calf ADG of 1.39. This was equivalent to 291 pounds of calf gain at a calculated stocking rate of 3.92 1500-pound animal unit equivalents per acre.

Tables 6, 7, 8, and 9 show the gains per animal and gains per acre for both fall and spring-born calves at each of the four stocking rates. Cows which calved during the fall had total period (134 days) gains of 118 pounds to -60 pounds for low to high stocking rates, respectively. Calf gains during this period were 376, 330, 298, and 237 pounds, respectively, for the L, ML, MH, and H stocking rates. Although gain per animal declined with increasing stocking rate, gain per acre increased from 496 to 711 lbs/acre as stocking rate increased from 1.32 to 3.0 animal units per acre. Spring-born calves exhibited a similar trend to the fall-born calves with respect to gain per animal with increasing stocking rate. However, gain per acre was maximized on the MH stocking rate and the performance of the H stocking rate produced the lowest gains per acre. This was due to the higher grazing pressure exerted during the last 76-day period as compared to the first 134-day period and is not exclusively due to the date of calving. Forage quality was primarily responsible for the differences in gain per animal between the fall vs spring-born calves. The data presented attempts to document cow and calf gains which are likely to occur at both optimum and maximum forage utilization. The choice of proper stocking rate is dependent upon additional factors, such as risk, finance, post-weaning ownership, market trends, reproduction, etc.

TABLE 1. FORAGE DRY MATTER AVAILABLE PER ACRE AND PER 100 POUNDS ANIMAL BODY WEIGHT AT FOUR STOCKING RATES

Date	LOW		MEDIUM LOW		MEDIUM HIGH		HIGH	
	<u>lb DM/ac<sup>1</sup></u>	<u>lb DM<sup>2</sup></u> <u>100 lb BW</u>	<u>lb DM/ac</u>	<u>lb DM</u> <u>100 lb BW</u>	<u>lb DM/ac</u>	<u>lb DM</u> <u>100 lb BW</u>	<u>lb DM/ac</u>	<u>lb DM</u> <u>100 lb BW</u>
Feb. 24	3206	-	3331	-	2755	-	2880	-
March 14	2381	147	1603	59	1978	73	1037	28
April 13	2119	116	1185	68	1625	54	780	20
June 1	1046	49	1267	38	547	16	317	7
June 30	2899	114	1526	37	1488	37	922	14
July 27	2698	82	2304	57	1661	29	1046	11
August 31	7085	247	3235	95	1978	38	298	4
Sept. 26	6739	229	2448	76	912	19	86	1.3
AVG	3522	142	2112	62	1618	38	921	12

<sup>1</sup>Pounds of forage dry matter per acre harvested to ground level.

<sup>2</sup>Pounds of forage dry matter per 100 pounds of animal body weight.

TABLE 2. LIVELWEIGHT GAINS OF COWS WITH FALL- AND SPRING-BORN CALVES AT A HIGH LEVEL OF AVAILABLE FORAGE OR LOW STOCKING RATE

Period	No. Days	Average Daily Gain			Period Gain/Calf (lbs)	Grazing <sup>1</sup> Pressure Per Acre (lbs/ac)	Stocking <sup>2</sup> Rate (AU/ac)
		Cow	Steer	Heifer			
<u>Fall-Born Calves</u>							
2-28 to 3-29	29	0.81	3.25	3.34	3.30	1600	1.07
3-29 to 5-23	55	1.18	2.84	2.74	2.79	1831	1.22
5-23 to 6-16	24	1.60	3.35	3.02	3.18	2123	1.42
6-16 to 7-12	26	-0.37	2.19	1.69	1.94	2549	1.70
TOTALS/AVG	134	0.87	2.89	2.72	2.80	1980	1.32
<u>Spring-Born Calves</u>							
7-15 to 8-10	26	1.74	3.21	3.00	3.11	3272	2.18
8-10 to 9-7	28	-2.29	2.25	2.59	2.42	2879	1.92
9-7 to 9-29	22	1.09	1.38	1.32	1.35	2940	1.96
TOTALS/AVG	76	0.06	2.32	2.36	2.34	3030	2.02
SEASON TOTALS	210	0.59	2.70	2.59	2.64	2355	1.57

<sup>1</sup>Grazing pressure per acre represents total liveweight of cow-calf pairs and weaned calves which were occupying this particular pasture.

<sup>2</sup>Stocking rate based on 1500 lbs grazing pressure equivalent to one cow and one calf.

TABLE 3. LIVELWEIGHT GAINS OF COWS WITH FALL- AND SPRING-BORN CALVES AT A MEDIUM HIGH LEVEL OF AVAILABLE FORAGE OR MEDIUM LOW STOCKING RATE

Period	No. Days	Average Daily Gain			Period Gain/Calf (lbs)	Grazing <sup>1</sup> Pressure Per Acre (lbs/ac)	Stocking <sup>2</sup> Rate (AU/ac)
		Cow	Steer	Heifer			
<u>Fall-Born Calves</u>							
2-28 to 3-29	29	0.27	3.41	3.03	93	2687	1.79
3-29 to 5-23	55	0.80	2.33	2.45	132	1753	1.17
5-23 to 6-16	24	1.53	3.02	3.00	72	3365	2.24
6-16 to 7-12	26	-0.17	1.07	1.44	33	4096	2.73
TOTALS/AVG	134	.63	2.44	2.48	330	2700	1.80
<u>Spring-Born Calves</u>							
7-15 to 8-10	26	1.45	2.28	2.46	61	4008	2.67
8-10 to 9-7	28	-1.05	2.18	2.14	59	3406	2.27
9-7 to 9-29	22	-0.82	0.91	0.84	18	3215	2.14
TOTALS/AVG	76	-0.13	1.75	1.87	138	3555	2.37
SEASON TOTALS	210	0.35	2.20	2.26	468	3015	2.01

<sup>1</sup>Grazing pressure per acre represents total liveweight of cow-calf pairs and weaned calves which were occupying this particular pasture.

<sup>2</sup>Stocking rate based on 1500 lbs grazing pressure equivalent to one cow and one calf.



TABLE 4. LIVELWEIGHT GAINS OF COWS WITH FALL- AND SPRING-BORN CALVES AT A MEDIUM LOW LEVEL OF AVAILABLE FORAGE OR MEDIUM HIGH STOCKING RATE

Period	No. Days	Average Daily Gain			Period Gain/Calf (lbs)	Grazing <sup>1</sup> Pressure Per Acre (lbs/ac)	Stocking <sup>2</sup> Rate (AU/ac)
		Cow	Steer	Heifer			
<u>Fall-Born Calves</u>							
2-28 to 3-29	29	-.37	3.74	2.93	97	2705	1.80
3-29 to 5-23	55	.69	2.71	2.05	131	2982	1.99
5-23 to 6-16	24	-.05	1.52	1.64	38	3349	2.23
6-16 to 7-12	26	-.13	0.92	1.51	32	4013	2.68
TOTALS/AVG	134	.16	2.37	2.06	298	3195	2.13
<u>Spring-Born Calves</u>							
7-15 to 8-10	26	.71	2.17	2.57	62	5631	3.75
8-10 to 9-7	28	-2.13	1.78	1.78	50	5142	3.43
9-7 to 9-29	22	-2.46	1.06	.77	20	4857	3.24
TOTALS/AVG	76	-1.25	1.71	1.76	132	5220	3.48
SEASON TOTALS	210	-0.34	2.13	1.96	430	3930	2.62

<sup>1</sup>Grazing pressure per acre represents total liveweight of cow-calf pairs and weaned calves which were occupying this particular pasture.

<sup>2</sup>Stocking rate based on 1500 lbs grazing pressure equivalent to one cow and one calf.

TABLE 5. LIVELWEIGHT GAINS OF COWS WITH FALL- AND SPRING-BORN CALVES AT A LOW LEVEL OF AVAILABLE FORAGE OR HIGH STOCKING RATE

Period	No. Days	Average Daily Gain			Period Gain/Calf (lbs)	Grazing <sup>1</sup> Pressure Per Acre (lbs/ac)	Stocking <sup>2</sup> Rate (AU/ac)
		Cow	Steer	Heifer			
<u>Fall-Born Calves</u>							
2-28- to 3-29	29	-.09	3.34	3.53	100	3656	2.44
3-29 to 5-23	55	-1.24	1.86	1.54	94	3890	2.59
5-23 to 6-16	24	1.31	1.47	1.04	30	4547	3.03
6-16 to 7-12	26	-0.81	0.76	0.23	13	6590	4.39
TOTALS/AVG	134	-0.45	1.90	1.63	237	4500	3.00
<u>Spring-Born Calves</u>							
7-15 to 8-10	26	-3.70	1.42	1.30	35	9558	6.37
8-10 to 9-7	28	-3.72	0.26	0.92	17	8270	5.51
9-7 to 9-29	22	-3.09	0.22	-.02	2	6875	4.58
TOTALS/AVG	76	-3.53	0.65	0.78	54	8310	5.54
SEASON TOTALS	210	-1.57	1.45	1.32	291	5880	3.92

<sup>1</sup>Grazing pressure per acre represents total liveweight of cow-calf pairs and weaned calves which were occupying this particular pasture.

<sup>2</sup>Stocking rate based on 1500 lbs grazing pressure equivalent to one cow and one calf.

TABLE 6. GAINS PER ANIMAL AND GAINS PER ACRE FROM COWS AND CALVES  
GRAZING CLOVER-RYEGRASS-BERMUDAGRASS AT LOW STOCKING RATE

ITEM	FALL CALVERS			
	LOW STOCKING			
	Cow	Steer	Heifer	Calf
Initiation			2-28-83	
Termination			7-12-83	
No. Days			134	
Initial Wt (lbs)	1112	395	340	368
Termination Wt (lbs)	1230	784	705	744
Trial Gain (lbs)	118	389	365	376
Trial ADG (lbs)	0.87	2.89	2.72	2.80
Stocking Rate (AU/ac)	1.32	1.32	1.32	1.32
Gain/Acre (lbs)		513	482	496
	SPRING CALVERS			
Initiation			7-15-83	
Termination			9-29-83	
No. Days			76	
Initial Wt (lbs)	1139	403	428	416
Termination Wt (lbs)	1144	580	607	594
Trial Gain (lbs)	5	177	179	178
Trial ADG (lbs)	.06	2.32	2.36	2.34
Stocking Rate (AU/ac)	2.02	2.02	2.02	2.02
Gain/Acre (lbs)		358	362	360
	FALL + SPRING CALVERS			
No. Days	210			
Total Gain (lbs)	123	566	544	554
Total ADG (lbs)	.59	2.70	2.59	2.64
Stocking Rate (AU/ac)	1.57	1.57	1.57	1.57
Gain/Acre (lbs)		889	854	870

TABLE 7. GAINS PER ANIMAL AND GAINS PER ACRE FROM COWS AND CALVES  
GRAZING CLOVER-RYEGRASS-BERMUDAGRASS AT MEDIUM LOW STOCKING RATE

FALL CALVERS

ITEM	MEDIUM LOW STOCKED			
	<u>Cow</u>	<u>Steer</u>	<u>Heifer</u>	<u>Calf</u>
Initiation		2-28-83		
Termination		7-12-83		
No. Days		134		
Initial Wt (lbs)	1086	382	338	360
Termination Wt (lbs)	1170	710	670	690
Trial Gain (lbs)	84	328	332	330
Trial ADG (lbs)	0.63	2.44	2.48	2.46
Stocking Rate (AU/ac)	1.80	1.80	1.80	1.80
Gain/Acre (lbs)		590	598	594

SPRING CALVERS

Initiation		7-15-83		
Termination		9-29-83		
No. Days		76		
Initial Wt (lbs)	1082	394	424	409
Termination Wt (lbs)	1072	527	567	547
Trial Gain (lbs)	-10	133	143	138
Trial ADG (lbs)	-.13	1.75	1.87	1.81
Stocking Rate (AU/ac)	2.37	2.37	2.37	2.37
Gain/Acre (lbs)		315	339	327

FALL + SPRING CALVERS

No. Days	210			
Total Gain	74	461	475	468
Total ADG	.35	2.20	2.26	2.23
Stocking Rate (AU/ac)	2.01	2.01	2.01	2.01
Gain/Acre (lbs)		927	955	941

TABLE 8. GAINS PER ANIMAL AND GAINS PER ACRE FROM COWS AND CALVES  
GRAZING CLOVER RYEGRASS-BERMUDAGRASS AT MEDIUM HIGH STOCKING RATE

ITEM	MEDIUM HIGH STOCKED			
	Cow	Steer	Heifer	Calf
Initiation			2-28-83	
Termination			7-12-83	
No. Days			134	
Initial Wt (lbs)	1150	387	357	372
Termination Wt (lbs)	1173	705	634	669
Trial Gain (lbs)	23	318	277	298
Trial ADG (lbs)	0.16	2.37	2.06	2.22
Stocking Rate (AU/ac)	2.13	2.13	2.13	2.13
Gain/Acre (lbs)		677	590	635

<u>SPRING CALVERS</u>				
Initiation			7-15-83	
Termination			9-29-83	
No. Days			76	
Initial Wt (lbs)	1102	412	434	423
Termination Wt (lbs)	1007	542	568	555
Trial Gain (lbs)	-95	130	134	132
Trial ADG (lbs)	-1.25	1.71	1.76	1.74
Stocking Rate (AU/ac)	3.48	3.48	3.48	3.48
Gain/Acre (lbs)		452	466	459

<u>FALL + SPRING CALVERS</u>				
No. Days	210			
Total Gain (lbs)	-72	448	411	430
Total ADG (lbs)	-.34	2.13	1.96	2.04
Stocking Rate (AU/ac)	2.62	2.62	2.62	2.62
Gain/Acre (lbs)		1174	1077	1127

TABLE 9. GAINS PER ANIMAL AND GAINS PER ACRE FROM COWS AND CALVES  
GRAZING CLOVER-RYEGRASS-BERMUDAGRASS AT HIGH STOCKING RATE

ITEM	FALL CALVERS			
	HIGH STOCKED			
	Cow	Steer	Heifer	Calf
Initiation			2-28-83	
Termination			7-12-83	
No. Days			134	
Initial Wt (lbs)	1112	389	355	372
Termination Wt (lbs)	1052	644	573	609
Trial Gain (lbs)	-60	255	218	237
Trial ADG (lbs)	-.45	1.90	1.63	1.77
Stocking Rate (AU/ac)	3.00	3.00	3.00	3.00
Gain/Acre (lbs)		765	654	711
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	SPRING CALVERS			
Initiation			7-15-83	
Termination			9-29-83	
No. Days			76	
Initial Wt (lbs)	1157	422	423	423
Termination Wt (lbs)	888	471	483	477
Trial Gain (lbs)	-269	49	60	54
Trial ADG (lbs)	-3.53	.65	.78	.72
Stocking Rate (AU/ac)	5.54	5.54	5.54	5.54
Gain/Acre (lbs)		271	332	299
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	FALL + SPRING CALVERS			
No. Days	210			
Total Gain (lbs)	-329	304	278	291
Total ADG (lbs)	-1.57	1.45	1.32	1.39
Stocking Rate (AU/ac)	3.92	3.92	3.92	3.92
Gain/Acre (lbs)		1192	1090	1141