



Forage Research in Texas

1984

YIELD AND COMPOSITION OF MILK FROM SPRING-CALVING BRAHMAN VS
F-1 (BRAHMAN X HEREFORD) COWS AT THREE LEVELS OF FORAGE AVAILABILITY

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SUMMARY

Brahman and F-1 (Brahman x Hereford) cows with spring-born calves were grazed at three levels of forage availability during each of two years. Four-hour milk production, percent total solids, protein, and butterfat were compared for both breeds of cattle from mid-July to early October. Milk production decreased with stage of lactation and level of available forage. There were no apparent differences between Brahman and F-1 cows with respect to any of the milk parameters monitored. In addition, stocking rate did not adversely affect percent total solids, protein, or butterfat.

INTRODUCTION

It has been previously suggested that milk production, etc., was partly responsible for gain differences between weaned vs suckling calves. This trial was initiated to ascertain the influence of forage availability or stocking rate on production and composition of milk from spring-calving F-1 (Brahman x Hereford) cows vs purebred Brahman cows.

PROCEDURE

Common and Coastal bermudagrass pastures were grazed to three different levels of available forage from mid-July to late September-early October during each of two successive years (Trials 1 and 2). Prior to initiation of this grazing trial, pastures had received 150-100-100 lbs/ac of $N-P_2O_5-K_2O$. After grazing was initiated in mid-July, an additional 50 lbs/ac N was applied to each of the pastures. Pastures were sampled monthly to monitor forage availability and biweekly for quality.

F-1 (Brahman x Hereford) cows had Simmental-sired calves in February-March; whereas, the Brahman cows had Brahman calves in April-May. Both F-1 and Brahman cows occupied the same forage availability pastures in Trial 1, but grazed separate pastures during Trial 2. Four F-1 pair were used per treatment during both trials; whereas only 2 Brahman pair were used on each treatment in Trial 1 and

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KEYWORDS: Forage availability/milk yield/milk composition/Brahman cow/spring calves

4 Brahman pair were used in Trial 2. All cows were weighed at approximate 28-day intervals. All cows were hand-milked in the following manner for the collection of milk yield, total solids, protein, and butterfat: (1) injected with 20 IU of oxytocin intravenously; (2) allowed cow to stand approximately 1 minute, removed all milk possible by hand, and discarded milk; (3) allowed cow to stand for 4 hours with access only to water; (4) injected 20 IU oxytocin and hand-milked to measure production during the previous 4-hour period.

At each milking-weighing period, cows were conditioned scored by at least two individuals. The scoring system was based on a 1 to 10 scale with a 10 being representative of maximum fat and condition obtainable and a 1 representative of a very unthrifty condition and minimum thinness to sustain life functions.

RESULTS AND DISCUSSION

The levels of forage available during each month of Trials 1 and 2 are shown in Table 1. During Trial 2, the Brahman group appeared to have slightly more forage available at the high stocking rate when expressed as lbs forage DM/100 lbs animal body weight. Additionally, the high stocking rate treatment in Trial 1 appeared to have more restricted forage available than in Trial 2. Table 2 shows condition scores for both F-1 and Brahman cows at each milking for both trials. The condition scores might also indicate the more severe grazing pressure at the high stocking rate in Trial 1 as compared to Trial 2. In general, as forage became limiting, animals lost weight and their condition scores declined. At the same general weight and frame size, Brahman cattle did not score as high as did the F-1 cattle. This may be due to differences in priority of fat deposit site, etc. between the two breeds of cattle.

Table 3 shows the monthly 4-hour milk production from both F-1 and Brahman cows during both trials. Milk production declined with stage of lactation and with increased stocking rate for both F-1 and Brahman cows. Although there was some erratic behavior in milk production with advancing season, there appeared to be very little difference between the 4-hour milk production of F-1 (Brahman x Hereford) cows and purebred Brahman cows. The most obvious difference was during the last milk collection period on the high stocking rate in which the Brahman cattle had considerably more milk than the F-1 cows. This may be due to differences in stage of lactation, differences in forage availability in Trial 2, efficiency of the Brahman cow to continue to milk at relatively high stocking rates, or a combination of several factors.

Tables 4, 5, and 6 show the influence of forage availability on percent total solids, protein, and butterfat, respectively. Percent total solids averaged about 14% regardless of the stocking rate or breed of cow. There were no identifiable trends associated with either level of forage available or breed. However, there did appear to be a slight increase in percent total solids with season or stage of lactation, but the degree of significance has not yet been

ascertained. Percent protein was also apparently unaffected by stocking rate or breed of cow. However, the two trial average indicated a decline in percent protein from more than 4% in mid-July to less than 3.5 in early October. The relative stability in protein composition may be responsible in part for the level of calf performance at high stocking rates. Also, the efficiency of protein use, rumen bypass, etc. may be largely responsible for the adequate calf gains at restricted levels of available forage. Percent butterfat followed the same trend as total solids and protein with respect to increased stocking rates and breed of cow. Within certain stocking rates and breed of cows, butterfat appeared to increase with stage of lactation. However, this trend was not identifiable with specific treatment combinations.

TABLE 1. FORAGE AVAILABLE FOR CONSUMPTION BY BRAHMAN AND F-1 (BRAHMAN X HEREFORD) COWS AND CALVES AT THREE STOCKING RATES

Date	TRIAL 1	F-1 (BxH) and Brahman	LOW STOCKED			MEDIUM STOCKED			HIGH STOCKED		
			lb DM/ac ¹	lb DM ²		lb DM/ac	lb DM		lb DM/ac	lb DM	
				100	lb BW		100	lb BW		100	lb BW
7-24- to 8-22			5,400	310		4,824	180		1,560	21	
8-22 to 9-21			11,200	400		6,528	150		672	10	
9-21 to 10-10			6,819	240		3,672	85		312	4	
	TRIAL 2	F-1 (BxH)									
7-15 to 8-13			3,768	355		3,732	200		1,368	48	
8-13 to 9-3			3,156	175		1,776	85		685	19	
9-3 to 9-26			3,072	295		2,220	130		1,008	44	
	TRIAL 2	Brahman									
7-15 to 8-13			2,088	200		4,104	230		1,632	84	
8-13 to 9-3			4,848	410		3,120	170		1,512	79	
9-3 to 9-26			2,784	230		3,216	180		840	45	

¹Pounds dry matter forage per acre

²Pounds dry matter forage per pound of body weight of animal

TABLE 2. CONDITION SCORES OF SPRING-CALVING BRAHMAN AND F-1
(BRAHMAN X HEREFORD) COWS AT THREE STOCKING RATES

TRIAL 1

<u>STOCKING RATE</u>	<u>Breed</u>	<u>n</u>	<u>Date of Milking</u>			
			<u>7-18</u>	<u>8-22</u>	<u>9-21</u>	<u>10-10</u>
Low	F-1	4		7.0	6.4	5.8
	Brah	2	6.3	6.5	5.3	5.5
Medium	F-1	4		6.4	5.0	4.5
	Brah	2	6.0	6.0	5.8	5.3
High	F-1	4		5.1	4.8	4.5
	Brah	2	5.5	3.8	4.8	3.8

TRIAL 2

<u>STOCKING RATE</u>	<u>Breed</u>	<u>n</u>	<u>7-17</u>	<u>8-13</u>	<u>9-3</u>	<u>9-26</u>
Low	F-1	4	6.3	7.3	6.2	7.1
	Brah	4	8.0	7.8	7.6	8.1
Medium	F-1	4	6.5	6.9	5.6	6.1
	Brah	4	7.6	7.5	7.3	8.1
High	F-1	4	6.4	6.6	5.8	6.3
	Brah	4	7.1	6.4	5.1	5.3

TRIAL AVG

<u>STOCKING RATE</u>	<u>Breed</u>	<u>n</u>	<u>7-18</u> <u>7-17</u>	<u>8-22</u> <u>8-13</u>	<u>9-21</u> <u>9-3</u>	<u>10-10</u> <u>9-26</u>
Low	F-1	8	6.3	7.2	6.3	6.5
	Brah	6	7.2	7.2	6.5	6.8
Medium	F-1	8	6.5	6.7	5.3	5.3
	Brah	6	6.8	6.8	6.6	6.7
High	F-1	8	6.4	5.9	5.3	5.4
	Brah	6	6.3	5.1	5.0	4.6

TABLE 3. FOUR-HOUR MILK PRODUCTION FROM SPRING-CALVING BRAHMAN AND F-1 (BRAHMAN X HEREFORD) COWS AT THREE STOCKING RATES

TRIAL 1			Date of Milking			
STOCKING RATE	Breed	n	7-18	8-22	9-21	10-10
			-----lbs-----			
Low	F-1	4		2.882	1.450	1.124
	Brah	2	2.75	2.891	.997	1.261
Medium	F-1	4		3.078	1.417	1.430
	Brah	2	2.924	3.091	1.659	1.525
High	F-1	4		2.928	1.338	.642
	Brah	2	2.444	1.650	.887	1.100
TRIAL 2						
STOCKING RATE	Breed	n	7-17	8-13	9-3	9-26
			-----lbs-----			
Low	F-1	4	3.320	2.715	2.638	1.756
	Brah	4	2.851	2.440	2.512	2.248
Medium	F-1	4	3.318	3.078	2.193	2.418
	Brah	4	2.776	2.204	2.026	1.951
High	F-1	4	2.596	2.950	1.265	.440
	Brah	4	2.402	1.817	1.712	1.764
TRIAL AVG						
STOCKING RATE	Breed	n	7-18	8-22	9-21	10-10
			7-17	8-13	9-3	9-26
			-----lbs-----			
Low	F-1	8	3.320	2.799	2.044	1.440
	Brah	6	2.801	2.666	1.755	1.755
Medium	F-1	8	3.318	3.078	1.805	1.924
	Brah	6	2.850	2.648	1.843	1.738
High	F-1	8	2.596	2.939	1.302	.541
	Brah	6	2.423	1.734	1.300	1.432

TABLE 4. PERCENT TOTAL SOLIDS OF MILK FROM SPRING-CALVING BRAHMAN AND F-1 (BRAHMAN X HEREFORD) COWS AT THREE STOCKING RATES

TRIAL 1				Date of Milking				
STOCKING RATE	Breed	n		7-18	8-22	9-21	10-10	
Low	F-1	4			12.20	14.7	16.1	
	Brah	2		14.3	13.0	14.0	13.1	
Medium	F-1	4			13.6	15.1	18.4	
	Brah	2		15.3	10.1	13.6	15.5	
High	F-1	4			13.4	13.5	14.5	
	Brah	2		14.6	13.5	15.3	14.4	
TRIAL 2				Date of Milking				
STOCKING RATE	Breed	n		7-17	8-13	9-3	9-26	
Low	F-1	4		12.1	14.3	10.3	12.8	
	Brah	4		13.6	14.8	13.9	15.5	
Medium	F-1	4		12.9	14.8	11.0	14.2	
	Brah	4		13.9	15.2	11.6	15.8	
High	F-1	4		11.8	14.4	10.1	14.5	
	Brah	4		13.8	15.3	12.5	14.9	
TRIAL AVG				Date of Milking				
STOCKING RATE	Breed	n		7-18 7-17	8-22 8-13	9-21 9-3	10-10 9-26	
Low	F-1	8		12.1	13.3	12.5	14.5	
	Brah	6		14.0	13.9	14.0	14.3	
Medium	F-1	8		12.9	14.2	13.1	16.3	
	Brah	6		14.6	12.7	12.6	15.7	
High	F-1	8		11.8	13.9	11.8	14.5	
	Brah	6		14.2	14.4	13.9	14.7	

TABLE 5. PERCENT PROTEIN OF MILK FROM SPRING-CALVING BRAHMAN AND F-1 (BRAHMAN X HEREFORD) COWS AT THREE STOCKING RATES

TRIAL 1				Date of Milking			
STOCKING RATE	Breed	n	7-18	8-22	9-21	10-10	
Low	F-1	4		2.50	2.77	2.93	
	Brah	2	2.73	2.40	2.36	2.92	
Medium	F-1	4		2.64	2.43	3.64	
	Brah	2	2.83	1.99	2.40	2.95	
High	F-1	4		2.86	2.37	3.00	
	Brah	2	3.30	3.11	3.07	3.26	
TRIAL 2							
STOCKING RATE	Breed	n	7-17	8-13	9-3	9-26	
Low	F-1	4	4.90	4.08	4.20	3.73	
	Brah	4	4.83	4.10	4.03	3.80	
Medium	F-1	4	4.60	4.30	3.75	2.88	
	Brah	4	5.70	4.00	3.60	3.90	
High	F-1	4	4.28	3.83	4.03	4.40	
	Brah	4	4.90	4.05	3.43	4.05	
TRIAL AVG							
STOCKING RATE	Breed	n	7-18 7-17	8-22 8-13	9-21 9-3	10-10 9-26	
Low	F-1	8	4.90	3.29	3.49	3.33	
	Brah	6	3.78	3.25	3.20	3.36	
Medium	F-1	8	4.60	3.47	3.09	3.26	
	Brah	6	4.27	3.00	3.00	3.43	
High	F-1	8	4.28	3.35	3.20	3.70	
	Brah	6	4.10	3.58	3.25	3.67	

TABLE 6. PERCENT BUTTERFAT OF MILK FROM SPRING-CALVING BRAHMAN AND F-1 (BRAHMAN X HEREFORD) COWS AT THREE STOCKING RATES

TRIAL 1			Date of Milking			
STOCKING RATE	Breed	n	7-18	8-22	9-21	10-10
Low	F-1	4		4.40	4.34	6.62
	Brah	2	5.58	4.55	4.91	5.22
Medium	F-1	4		4.98	6.39	7.59
	Brah	2	6.07	4.03	5.39	6.26
High	F-1	4		5.73	5.18	5.69
	Brah	2	5.78	4.77	5.52	4.77
TRIAL 2						
STOCKING RATE	Breed	n	7-17	8-13	9-3	9-26
Low	F-1	4	4.98	4.44	4.64	4.43
	Brah	4	3.95	5.24	5.66	5.70
Medium	F-1	4	4.94	4.86	4.84	5.45
	Brah	4	5.64	5.54	5.94	6.34
High	F-1	4	5.40	4.40	5.54	5.40
	Brah	4	4.36	5.64	4.70	5.65
TRIAL AVG						
STOCKING RATE	Breed	n	7-18 7-17	8-22 8-13	9-21 9-3	10-10 9-26
Low	F-1	8	4.98	4.42	4.49	5.53
	Brah	6	4.77	4.90	5.29	5.46
Medium	F-1	8	4.94	4.92	5.62	6.52
	Brah	6	5.86	4.79	5.67	6.30
High	F-1	8	5.40	5.07	5.36	5.55
	Brah	6	5.07	5.21	5.11	5.21