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

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SUMMARY

Eight fall-calving F-1 (Brahman x Hereford) cows were grazed on bermudagrass-clover-ryegrass pastures at each of three levels of available forage during each of two successive years. Animal performance, milk production, percent total solids, protein, and butterfat were measured during the 2-year trial. Low levels of available forage (high stocking rates) caused animal gains to decline. Four-hour milk production decreased with increasing stocking rates. Percent total solids, protein, and butterfat, however, were not adversely affected by increasing stocking rates.

INTRODUCTION

Milk production is affected by both quality and quantity of feed or forage intake. The primary objective of this grazing trial was to evaluate the influence of available forage on four-hour milk production and various milk constituents from fall calving F-1 (Brahman x Hereford) cows.

PROCEDURES

Both common and 'Coastal' bermudagrass were oversown with either 'Mt. Barker' subterranean clover or 'Yuchi' arrowleaf clover and 'Gulf' ryegrass and grazed at three levels of forage availability. The trial was conducted each of two successive years and data will be reported as Trials 1 and 2. The total fertilizer applied during the course of the grazing period was 150-100-100 lbs/ac of N-P₂O₅-K₂O. Pastures were sampled monthly for available forage and every two weeks for quality.

Eight head of F-1 (Brahman x Hereford) fall-calving cows with 4 heifer calves and 4 steer calves were used as "testers". Calves were sired by Simmental bulls. Forage availability was maintained with "regulator" cows and calves via put-and-take method of grazing. All animals were weighed at approximately 28-day intervals. Cows were hand-milked in the following manner for the collection of milk yield,

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total solids, protein, and butterfat: (1) injected with 20 IU of oxytocin intravenously; (2) allowed to stand for approximately 1 minute, removed all milk possible by hand, and discarded milk; (3) allowed cow to stand for 4 hours with only water available; (4) injected 20 IU oxytocin and hand-milked to measure production during the previous 4-hour period.

RESULTS AND DISCUSSION

Table 1 shows the average forage available during the test period for both trials. The desired range in levels of available forage was more nearly attained during the first trial as opposed to the second trial. This is readily apparent by the animal response at the high stocking rate, and the similarity of gains obtained at the low and medium stocking rates during the second year. The two-trial average showed cow average daily gains (ADG) of 1.38, 1.02, and -.96 for the low (L), medium (M), and high (H) stocking rates. Steer ADG were 3.03, 2.68, and 1.09; whereas, heifer ADG were 2.46, 2.27, and 0.86, respectively, for L, M, and H stocking rates. Table 2 shows the condition scores of cows by period for each of the two trials. The overall lighter grazing pressures used during Trial 2 were also reflected by the higher condition scores of cattle at all stocking rates, and especially at the high stocking rate. Because of difficulties encountered in obtaining milk from these crossbred cows, only 7 head each for the L and M stocking rates were used in Trial 2.

Table 3 shows the 4-hour milk production from the fall-calving cows at each of the three stocking rates. The relative level of forage available between the two years was obvious in noting the rate of decline in milk production as well as the total yields. Low forage availability caused a substantial decline in milk production. In addition, the amount of forage available at the low to medium stocking rate was adequate to allow for maximum milk production under the conditions of this trial.

Tables 4, 5, and 6 show the influence of stocking rates, respectively, on percent total solids, protein, and butterfat. Percent total solids averaged approximately 14% and did not appear to be affected by stocking rate. Percent protein averaged slightly more than 3% and no definite trends were apparent with respect to level of forage availability. Percent butterfat averaged about 5.5% from the fall-calving F-1 cows and once again no detectable trends occurred due to treatment. Butterfat did tend to increase, however, with stage of lactation. This increase, however, may not be significant.

TABLE 1. COW AND CALF LIVELWEIGHT GAINS AT THREE STOCKING RATES

TRIAL 1 (4-26 to 7-18)			COW			STEERS			HEIFERS		
Stocking Rate	Average Forage Avail.		Initial Weight	ADG		Initial Weight	Weaning Weight	ADG	Initial Weight	Weaning Weight	ADG
Low	2485		996	2.09		501	787	3.42	452	691	2.86
Medium	1695		1005	1.28		471	716	2.93	456	672	2.58
High	535		1042	-1.19		467	521	0.64	436	457	0.24
TRIAL 2 (3-1 to 7-8)											
Low	2430		1114	0.66		474	767	2.63	431	659	2.06
Medium	2011		1114	0.76		422	692	2.43	393	609	1.95
High	936		1102	-0.72		451	622	1.54	407	572	1.48
TRIAL AVG.											
Low	2458		1055	1.38		488	777	3.03	442	675	2.46
Medium	1853		1060	1.02		447	704	2.68	428	641	2.27
High	736		1072	-0.96		459	572	1.09	422	515	0.86

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

TRIAL 1

STOCKING RATE	n	Date of Milking			
		4-26	5-23	6-20	7-18
Low	8		6.2	6.6	6.2
Medium	8		6.6	6.9	6.7
High	8		5.0	4.5	3.9

TRIAL 2

STOCKING RATE	n	3-1	5-1	5-29	6-26	7-8
Low	7	7.1	7.6	8.2	8.3	7.5
Medium	7	7.7	7.8	8.1	8.1	7.8
High	8	7.6	7.4	7.2	7.4	6.9

TRIAL AVG.

STOCKING RATE	n	3-1	4-26	5-23	6-20	7-18
			5-1	5-29	6-26	7-8
Low	15	7.1	7.6	7.2	7.5	6.9
Medium	15	7.7	7.8	7.4	7.5	7.3
High	16	7.6	7.4	6.1	6.0	5.4

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

TRIAL 1

STOCKING		Date of Milking			
<u>RATE</u>	<u>n</u>	<u>4-26</u>	<u>5-23</u>	<u>6-20</u>	<u>7-18</u>
		-----lbs-----			
Low	8	2.552	2.622	2.376	1.665
Medium	8	2.882	3.150	2.772	1.544
High	8	2.317	1.661	.937	.405

TRIAL 2

STOCKING								
<u>RATE</u>	<u>n</u>	<u>3-1</u>	<u>5-1</u>	<u>5-29</u>	<u>6-26</u>	<u>7-8</u>		
		-----lbs-----						
Low	7	4.209	3.208	2.752	2.651	1.421		
Medium	7	3.241	2.675	2.400	1.949	1.718		
High	8	3.353	3.016	2.163	1.091	.339		

TRIAL AVG.

STOCKING			4-26	5-23	6-20	7-18
<u>RATE</u>	<u>n</u>	<u>3-1</u>	<u>5-1</u>	<u>5-29</u>	<u>6-26</u>	<u>7-8</u>
				-----lbs-----		
Low	15	4.209	2.880	2.687	2.514	1.543
Medium	15	3.241	2.779	2.775	2.361	1.631
High	16	3.353	2.667	1.912	1.014	.372

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

TRIAL 1

STOCKING		Date of Milking			
<u>RATE</u>	<u>n</u>	<u>4-26</u>	<u>5-23</u>	<u>6-20</u>	<u>7-18</u>
----- % -----					
Low	8	14.63	13.78	15.49	14.09
Medium	8	14.26	14.24	15.23	15.16
High	8	13.70	13.95	15.22	14.34

TRIAL 2

STOCKING							
<u>RATE</u>	<u>n</u>	<u>3-1</u>	<u>5-1</u>	<u>5-29</u>	<u>6-26</u>	<u>7-8</u>	
		----- % -----					
Low	7	15.15	14.80	13.91	14.29	17.03	
Medium	7	13.19	14.42	14.95	13.98	16.90	
High	8	13.64	14.10	13.67	15.32	12.27	

TRIAL AVG

STOCKING			4-26	5-23	6-20	7-18
<u>RATE</u>	<u>n</u>	<u>3-1</u>	<u>5-1</u>	<u>5-29</u>	<u>6-26</u>	<u>7-8</u>
		----- % -----				
Low	15	15.15	14.72	13.85	14.89	15.61
Medium	15	13.19	14.35	14.60	14.61	16.03
High	16	13.64	13.90	13.81	15.27	13.31

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

STOCKING RATE	n	Date of Milking			
		4-26	5-23	6-20	7-18
		-----%			
Low	8	2.99	2.59	3.00	2.86
Medium	8	2.86	2.99	2.96	3.15
High	8	2.92	3.05	3.48	3.26

TRIAL 2

STOCKING RATE	n	3-1	5-1	5-29	6-26	7-8
		-----%				
Low	7	3.42	3.05	3.10	3.33	3.4
Medium	7	3.20	2.97	3.10	3.40	3.25
High	8	3.38	2.93	2.87	3.21	3.21

TRIAL AVG

STOCKING RATE	n	3-1	4-26	5-23	6-20	7-18
		5-1	5-29	6-26	7-8	
		-----%				
Low	15	3.42	3.02	2.85	3.17	3.13
Medium	15	3.20	2.92	3.05	3.18	3.20
High	15	3.38	2.93	2.96	3.35	3.24

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

TRIAL 1

STOCKING RATE	n	Date of Milking			
		4-26	5-23	6-20	7-18
		-----%			
Low	8	5.77	5.18	5.58	5.91
Medium	8	5.84	5.49	5.52	6.87
High	8	5.37	5.74	5.11	6.34

TRIAL 2

STOCKING RATE	n	3-1	5-1	5-29	6-26	7-8
		-----%				
Low	7	5.49	5.77	5.34	4.58	6.65
Medium	7	4.58	5.89	6.14	5.65	7.41
High	8	4.81	5.75	5.20	5.63	4.17

TRIAL AVG

STOCKING RATE	n	3-1	4-26	5-23	6-20	7-18
		-----%				
Low	15	5.49	5.77	5.31	5.08	6.28
Medium	15	4.58	5.87	5.82	5.59	7.14
High	15	4.81	5.56	5.47	5.37	5.26