# PUBLICATIONS

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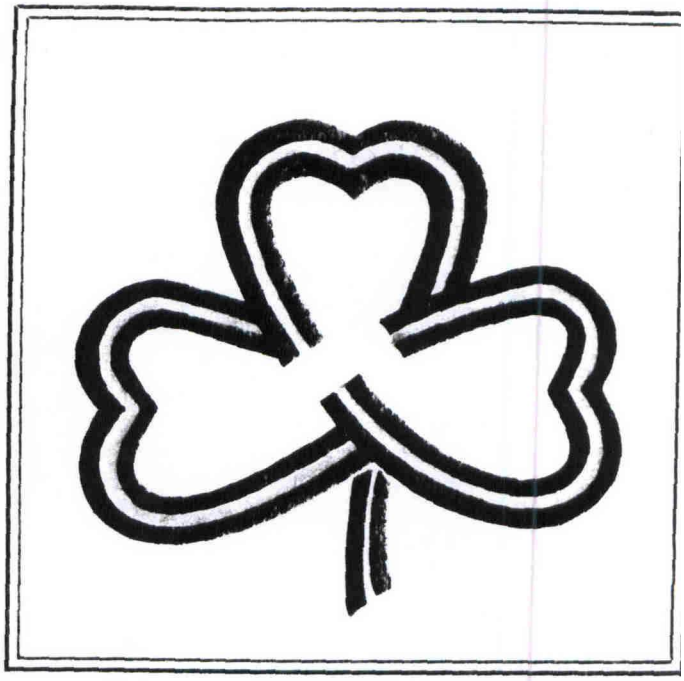
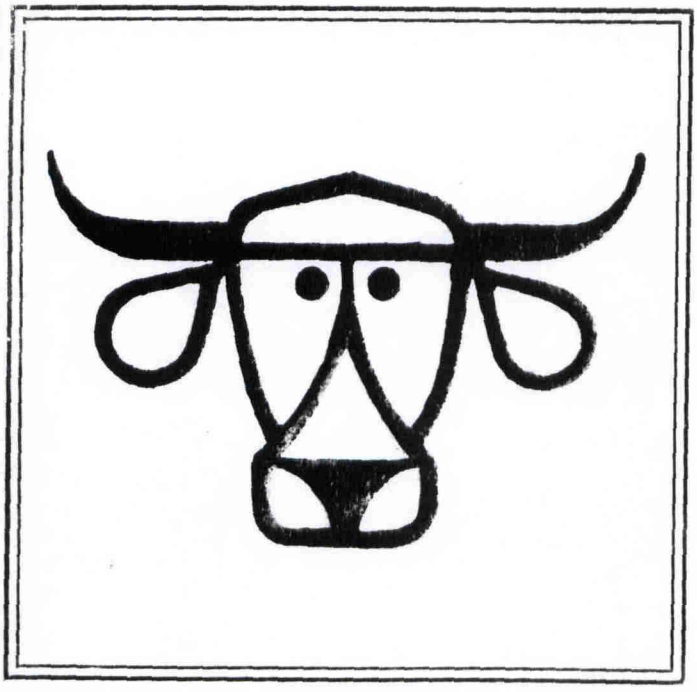
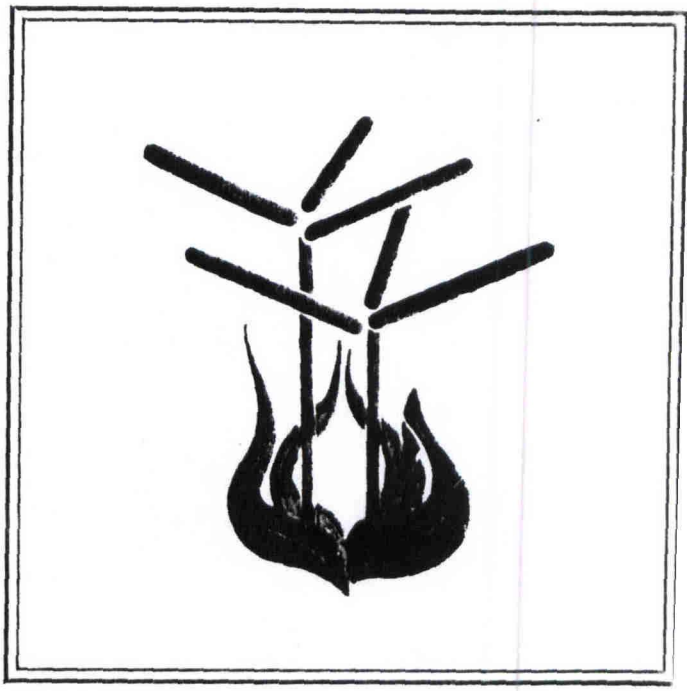
The Texas Agricultural Experiment Station, Neville P. Clarke, Director, The Texas A&M University System, College Station, Texas







# Forage Research in Texas

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SR-0006



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# COW-CALF LIVEWEIGHT GAIN AND MILK PRODUCTION FROM THREE DIFFERENTLY STOCKED PASTURES

## SUMMARY

Four F-1 (Brahman x Hereford) cows and their fall-born 1/2 Simmental calves were grazed on 2 replications each of bermudagrass-ryegrass-clover pastures at 3 levels of forage availability (stocking rate) from April 26 to July 19. Resultant stocking rates were 3.46, 1.25, and 0.75 cow-calf pairs per acre. At these stocking rates, the combined cow plus calf average daily gains (ADG) were -1.02, 4.2, and 5.1 pounds, respectively. Weaning weights ranged from a low of 457 pounds for heifers on high-stocked pastures to 787 pounds for steers on low-stocked pastures. Milk production was decreased 75% due to level of forage availability. A decrease in available forage did not adversely affect total solids, protein, or butterfat. The role of milk in calf performance was not quantitatively measured, but results from this and related trials suggest a relatively high milk:gain ratio, especially under low forage availability conditions.

## OBJECTIVES

The primary objectives of this study were to evaluate the influence of level of forage availability (stocking rate) on cow and calf average daily gains, heifer vs steer weaning weights, and milk production.

## PROCEDURES

Three levels of forage availability of bermudagrass, oversown with ryegrass and clover, were attained using different stocking rates of F-1 (Brahman x Hereford) cows and their fall-born 1/2 Simmental calves. Each forage availability level was replicated twice using 4 tester pairs per replication. Thus, a total of 8 cows, 4 heifer calves and 4 steer calves provide the animal data for each treatment. Due to unseasonably cold and dry fall, sufficient ryegrass-clover growth for grazing was delayed 60 to 80 days. The trial was initiated on April 26 and terminated July 19. The period of lactation monitored, therefore, was from approximately the 180th

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day to the 260th day. All animals were weighed at 28-day intervals. Cows were hand-milked in the following manner for collection of milk yield, total solids, protein, and butterfat: (1) injected with 20 I.U. of oxytocin intravenously; (2) allowed cow to stand for approximately 1 minute, removed all milk, and discarded; (3) allowed cow to stand for 4 hours with only water available; (4) injected 20 I.U. oxytocin and measured milk production during the previous 4-hour period. Forage availability, in terms of dry matter per acre, was measured at 28-day intervals by harvesting forage to ground level.

## RESULTS

The stocking rates required to apply sufficient grazing pressure on the bermudagrass-ryegrass-clover pastures in order to maintain desired levels of forage availability are shown in Table 1. The average weight of each cow-calf test unit may be obtained by dividing animal weight/acre by the stocking rate. Table 2 shows the influence of forage availability or stocking rate on both cow and calf average daily gain (ADG). In addition, average weaning weights for both steers and heifers are presented. The most noteworthy effect of the stocking rates was that the weaning weight differences between low and high forage availability was 51.4% for heifers and 51.1% for steers.

Table 3 illustrates the severity of restricted milk production due to stocking rate. The percent change in milk production, at the low stocking rate, is primarily an effect of stage of lactation. However, there was a 75% reduction in milk produced between the high and low stocking rates. Table 4-6 show the influence of forage availability, respectively, on percent total solids, protein, and butterfat. These milk characteristics were not adversely affected by stocking rate.

Table 1. Stocking rates required to achieve desired levels of forage availability.

| FORAGE AVAILABLE | FORAGE D.M. (lbs/ac) | STOCKING RATE (AU/ac)[1] | ANIMAL WEIGHT (lbs/ac) |
|---|---|---|---|
| LOW | 235 | 3.46 | 5058 |
| MEDIUM | 2160 | 1.25 | 2046 |
| HIGH | 3052 | 0.75 | 1268 |

[1]Animal-units/acre is equivalent to one cow plus one calf per acre.

Table 2. Average daily gain and weaning weights of animals on forage availability treatments.

| STOCKING RATE | AVERAGE DAILY GAIN | | | WEANING WEIGHTS | |
|---|---|---|---|---|---|
| | COW | CALF | COW + CALF | HEIFERS | STEERS |
| (AU/ac) | lbs | | | lbs | |
| 3.46 | -1.47 | 0.45 | -1.02 | 457 | 521 |
| 1.25 | 1.42 | 2.78 | 4.20 | 672 | 716 |
| 0.75 | 1.92 | 3.17 | 5.10 | 692 | 787 |

Table 3. Four-hour milk production at initiation and termination of trial.

| STOCKING RATE | 4-26 | 7-19 | % CHANGE |
|---|---|---|---|
| (AU/ac) | lbs | | |
| 3.46 | 2.32 ± .21 | .41 ± .24 | - 82.5 |
| 1.25 | 2.89 ± .39 | 1.55 ± .26 | - 46.4 |
| 0.75 | 2.54 ± .24 | 1.67 ± .36 | - 34.4 |

Table 4. Percent total solids of milk as influenced by forage availability.

| STOCKING RATE (AU/ac) | 4-26 | 7-19 | % CHANGE |
|---|---|---|---|
| 3.46 | 13.70 ± .25 | 14.34 ± .94 | + 4.7 |
| 1.25 | 14.28 ± .41 | 15.16 ± 1.79 | + 6.2 |
| 0.75 | 14.63 ± .50 | 14.07 ± 1.18 | - 3.8 |

Table 5. Percent milk protein as influenced by forage availability.

| STOCKING RATE (AU/ac) | 4-26 | 7-19 | % CHANGE |
|---|---|---|---|
| 3.46 | 2.92 ± .11 | 3.26 ± .28 | + 11.6 |
| 1.25 | 2.86 ± .10 | 3.15 ± .19 | + 10.1 |
| 0.75 | 2.99 ± .24 | 2.86 ± .24 | - 4.3 |

Table 6. Percent milk butterfat as influenced by forage availability.

| STOCKING RATE (AU/ac) | 4-26 | 7-19 | % CHANGE |
|---|---|---|---|
| 3.46 | 5.37 ± .25 | 6.34 ± .82 | + 18.1 |
| 1.25 | 5.84 ± .22 | 6.87 ± .44 | + 17.6 |
| 0.75 | 5.77 ± .28 | 5.91 ± .58 | + 2.4 |