

# Effects of Single vs Twin Rearing on Cow and Calf Performance

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## Story in Brief

Forty-six Hereford x Holstein cows were employed in an experiment in which performance of cows and their calves reared as single vs. simulated twins was compared. Simulated twins were produced by grafting a second newborn calf onto cows at the time of birth of their natural calf.

Cows rearing twins produced 39% more milk, weaned 60% more calf and were slower to start cycling after calving. Twin-rearing cows required 74% more supplement to maintain weight loss patterns similar to cows rearing single calves.

Cows rearing twin calves were nursed more frequently (4.7 vs 3.4 times daily) and 25% longer each day than cows with single calves.

Grafted calves nursed less frequently and were 94 lb lighter at weaning than their natural born contemporaries.

## Introduction

The possibility of inducing the conception of twin calves in beef cows has generated a large amount of interest in the past several years. At O.S.U. a substantial research effort has been exerted in an attempt to gain an understanding of the physiological mechanisms involved in twin conception.

Efforts to induce twinning in beef cows have met with limited success; however, progress is being made and many feel that the solution of technical problems in this area is close at hand.

As the feasibility of twinning on a commercial scale draws nearer, the producer is faced with a variety of new problems. What impact will a high incidence of free martins have on selection programs and calf performance? How much milk will a cow rearing twins need to produce? What effect will twinning have on calf performance both pre-weaning and in the feedlot? How will twinning affect supplemental feed requirements of cows during winter lactation periods? How will twinning affect reproductive performance of cows? These are a few of the questions

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which will need attention as we consider twinning as a viable production alternative.

## Materials and Methods

The research reported here was conducted in an effort to gain preliminary data relating to (1) winter supplemental feed requirements of cows rearing twins, (2) the effect of rearing twins on milk yield in cows, (3) the effect of rearing twins on reproductive performance of cows, and (4) the performance of calves reared as singles vs. twins.

Forty-six 6-year-old Hereford x Holstein females were employed. Eighteen of the cows raised their natural single calves. An additional 14 cows raised their natural calf plus an additional calf which was grafted to her at the time of birth of her natural calf. Parturition was induced with a 40 mg dose of dexamethazone (Azium) within 10 days of the projected calving date to facilitate the crossgrafting scheme. All calves were sired by Angus bulls.

Supplemental winter feed requirements of cows rearing twins were estimated by determining the amount of supplemental feed which was required to achieve winter weight patterns similar to those of cows rearing single calves. Cow weight measurements were taken bi-weekly and appropriate adjustments in supplement feeding levels were made. A body weight loss target of 20% (including calving weight loss) was estimated as desirable for these cows based on earlier research at this station.

Estimates of 24-hour milk consumption by calves were made at seven monthly intervals using the calf-suckle technique. Calves were weaned at  $240 \pm 7$  days. Heifer weaning weights were adjusted to a steer equivalent using a factor of 1.05.

Nursing patterns of cows rearing single or twin calves were evaluated by two 24-hour pasture observations.

Reproductive performance of cows in both treatment groups was evaluated by heat dates and blood hormone levels.

## Results and Discussion

Simulation of twin rearing was only partially successful as indicated by the fact that natural born calves of the twin sets weaned 94 pounds heavier than their grafted mates (Table 5). However, some interesting observations were made and will be reported here.

Performance of the cows is summarized in Table 1. Post-calving supplemental feed required by cows rearing singles and twins was 3.9 and 6.8 lb/day, respectively. These supplement levels resulted in similar

weight loss patterns for cows rearing singles and twins (19.0 and 18.6%, respectively) and suggest a rather dramatic increase (74%) in supplemental feed requirements of cows rearing twins.

Average daily milk yield for the lactation period was 14.5 and 20.2 lb/day for cows rearing singles and twins, respectively. This represents a 39% increase in milk yield for cows nursing twins.

There were no differences in forage intake (Table 2) between cows rearing singles or twins during the winter (March) or spring (May) forage intake trials. Keep in mind, however, that cows rearing twins received 74% more supplement during the March intake trial.

Cows rearing twin calves were slower to re-cycle (Table 3) than those rearing singles. Only 14% of the twin-rearing cows were cycling by 60 days post-partum compared to 36% of the cows rearing singles. By 90 days post-partum, 71% of the cows rearing single calves were cycling contrasted to 43% of the twin rearing cows. Since winter body weight losses for the two cow groups were similar, this would not appear to be a problem associated with the nutritional regime. The slow re-cycling response is probably due to the greater suckling intensity experienced by twin rearing cows. During two pasture observation trials (Table 4) it was noted that cows rearing twin calves were nursed more frequently

**Table 1. Performance of Cows Rearing Single or Simulated Twin Calves**

Item	Single calves	Twin calves
Daily winter supplement <sup>1</sup> post-calving, lb	3.9	6.8
Fall weight, lb	1092	1119
Spring weight, lb	885	911
Winter weight loss, %	19.0	18.6
Daily milk yield, lb	14.5	20.2
Calving date	12-29-74	12-27-74

<sup>1</sup> 30% all-natural crude protein supplement.

**Table 2. Relative Dry Matter Intake By Cows Rearing Single or Twin Calves**

Item	Single calves	Twin calves
Trial 1 (March)		
Forage intake, lb <sup>1</sup>	30.8	32.8
% of singles	100	107
Trial 2 (May)		
Forage intake, lb <sup>1</sup>	49.9	50.6
% of singles	100	101

<sup>1</sup> This value does not represent actual forage intake, but serves as an index of relative intake.

and were nursed for a longer total interval each day. This was particularly apparent in April when cows would have been starting to cycle. During this trial, cows rearing singles and twins were nursed 3.4 and 5.1 times/day, respectively. Total interval nursed was 42% (32.4 vs. 46.1 min) greater for cows nursing twin calves.

The 240-day adjusted weaning weight of calves reared as singles was 555 lb, 111 lb heavier than the average of calves reared as twins. Cows rearing twins weaned 60% more calf (888 vs 555 lb) than cows rearing singles. As indicated previously, grafted calves of the simulated twin pairs weaned 94 lb lighter than their natural born contemporaries. The performance of simulated twin calves cannot be considered equivalent to that of natural twins due to differences in prenatal and apparent differences in postnatal environment. Grafted calves of simulated twin pairs did not nurse as frequently (Table 6) as their natural born mates and their total time spent nursing each day was substantially shorter than that of natural born calves during both pasture observation trials.

**Table 3. Reproductive Performance of Cows Rearing Single or Simulated Twin Calves**

Twin	Single	Twin
Cows cycling by 60 days post-partum, %	36	14
Cows cycling by 80 days post-partum, %	71	43

**Table 4. Nursing Behavior of Cows Rearing Single or Simulated Twin Calves**

Item	Single calves	Twin calves
Trial 1 (April)		
Times nursed/day	3.4	5.1
Total interval nursed, min	32.4	46.1
Interval nursed/nursing, min	9.9	9.3
Number of calves nursing	1.0	1.4
Trial 2 (August)		
Times nursed/day	3.4	4.4
Total interval nursed, min	34.4	37.6
Interval nursed/nursing, min	9.9	8.8
Number of calves nursing	1.0	1.5

Forage intake by calves reared as singles and twins was quite variable, however, there was a trend toward higher forage intake by calves reared as twins (Table 7). Higher forage intake levels would be anticipated in view of the lower milk intakes of calves reared as twins.

**Table 5. Performance of Calves Reared as Singles or Simulated Twins**

Item	Single	Simulated twins	
		Natural	Grafted
Birth wt. lb	72.9	72.0	68.9
Daily milk intake, lb	14.5	10.5	9.7
Weaning wt., lb <sup>1</sup>	555	491	397
Condition score <sup>2</sup>	6.1	5.3	4.3
Conformation score <sup>3</sup>	12.3	11.9	10.6

<sup>1</sup> Adjusted 240-day, sex corrected weaning weight.

<sup>2</sup> 1=very thin, 9=very fat.

<sup>3</sup> 12=low choice.

**Table 6. Suckling Behavior of Natural vs Grafted Calves or Simulated Twin Pairs**

Item	Natural	Grafted
Trial 1 (April)		
Times nursed/day	4.1	3.3
Total interval nursing, min	36.9	26.5
Interval nursed/nursing	9.1	8.4
Trial 2 (August)		
Times nursed/day	3.9	2.4
Total interval nursing, min	29.8	18.3
Interval nursed/nursing	7.8	7.7

**Table 7. Relative Forage Intake By Calves Reared As Singles or Simulated Twins**

Item	Single	Simulated twins	
		Natural	Grafted
Trial 1			
Forage intake, lb <sup>1</sup>	4.7	5.2	5.1
% of single	100	110	108
Trial 2			
Forage intake, lb <sup>1</sup>	9.1	10.8	9.9
% of singles	100	119	108

<sup>1</sup> This value does not represent actual forage intake, but serves as an index of relative intakes.