

REPRODUCTIVE DEVELOPMENT AND PERFORMANCE
OF HEREFORD HEIFERS CALVING
AT 24 OR 30 MONTHS OF AGE

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Story in Brief

A three year study involving 129 weaner and yearling Hereford heifers compared calving at 24 or 30 months of age. The heifers calving at 24 months were fed at a high level (1 lb/day gain) during the winter as weaner heifers. The heifers to calve at 30 months were fed at a moderate (0.5 lb/day gain) or low (no gain) after reaching 600 lbs body weight. The results suggest that if weaner heifers are fed at a high level the winter prior to breeding, delaying calving until 30 months may not improve conception rates at either the first or second breeding or greatly reduce the postpartum interval to conception. Heifers calving at 30 months weaned heavier calves, suffered less calving difficulty and required less supplemental feed during the winter prior to the first breeding. However, calving problems were not eliminated since approximately 50 percent of the 30 months calvers required assistance compared to over 70 percent of the 24 months calvers.

(Key Words: Beef Heifers, Calving Age, Reproduction, Calving Difficulty, Rebreeding)

Introduction

Two of the most important problems associated with calving heifers at 2 years of age are increased calving difficulty and delayed rebreeding. One way to reduce these problems is to delay calving of replacement heifers. Unfortunately, since the most common system of production is to calve in a single season, the heifers will not calve first until three years of age. Although reducing problems associated with earlier calving, delaying calving of replacement heifers until three years of age results in the loss of one year of production from the cow.

An alternative that might combine advantages of both 2- and 3-year old calving would be to calve heifers first at 30 months of age. Results reported previously from this station (Lusby et al., 1979) suggest that heifers calving at 30 months of age will have improved conception rates at both first breeding and rebreeding after calving, and will wean heavier calves than heifers calving at 24 months of age. Therefore, this study was conducted to further investigate the feasibility of calving replacement heifers at 30 months of age and to compare two levels of nutrition prior to first breeding of the heifers that calve first at 30 months of age.

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Materials and Methods

This study was conducted at the Livestock and Forage Research Laboratory, (Ft Reno), El Reno utilizing a total of one hundred twenty nine Hereford heifers obtained in the fall of three consecutive years from an experimental herd at the Lake Carl Blackwell range near Stillwater. The heifers obtained each year had been born in the spring of that year or the previous fall to cows of similar breeding bred to similar bulls in both seasons of a given year. Thus, heifers of similar breeding could be bred to calve in the same season at either 24 or 30 months of age. Trial 1 begun in the fall of 1979, used 20 heifers calving at 24 months, and 20 heifers calving at 30 months. Trial 2 consisted of two replications, initiated in the falls of 1980 and 1981, and involved a total of 30 heifers calving at 24 months, and 59 heifers calving at 30 months. All fall-born heifers were bred in the spring at 21 months to calve at 30 months, and all spring-born heifers were bred at 15 months to calve at 24 months.

Before breeding, heifers were wintered on dormant native grass range supplemented with cottonseed meal and ground milo or ground corn to gain according to their respective treatments. All heifers ran together on native tall-grass pasture during the two summers they were on the experiment, with no effort made to control weight changes. During the second wintering period the bred heifers ran together and were fed at the Moderate level used in previous Fort Reno studies, which is the appropriate amount of cottonseed meal fed to heifers grazing dormant native grass range to allow them to lose 10 percent of their fall weight (approximately November 15) through and including the loss at calving.

In trial 1, the first wintering period was from November 29, 1979 to April 17, 1980. Heifers to be bred at 15 months were fed at the High level used in earlier Ft Reno studies, which was the amounts of ground milo and cottonseed meal necessary to achieve an average gain of 1.0 lb/day during the entire period. Heifers to be bred at 21 months were fed at the same level as the younger heifers until they reached a mean body weight of 600 lb, after which they were fed at the moderate level used in previous Fort Reno studies involving developing heifers to be bred to calve at 24 months of age, which was to gain .5 lb/day until the end of the wintering period. The heifers were randomly assigned to two fertility-tested Hereford bulls during the first breeding season from May 1, 1980 to July 20, 1980.

In trial 2, the first wintering periods began on November 14, 1980 and November 12, 1981 for replications 1 and 2, respectively, and ended the following May 5 for each replication. Heifers to be bred at 15 months were fed similarly to those in trial 1, with the exception of ground corn being fed instead of ground milo. Heifers to be bred at 21 months were fed similarly until each heifer reached 600 lb, after which they were fed to either maintain their weight until the end of the wintering period (30 month-maintain), or fed to gain .5 lb/day until the end of the wintering period (30 month-gain). The breeding season lasted from May 7 to July 7 each year. The heifers were randomly assigned to single-sire breeding groups with three fertility tested Angus bulls used in replication 1, and two different fertility tested Angus bulls used in replication 2. Heifers in both trials were rebred using two fertility tested Hereford bulls assigned at random to single sire breeding groups. The respective replications of each trial ended when the calves were weaned.

Data were analyzed by analysis of variance, Student's t-test, and Duncan's multiple range test.

Results and Discussion

Trial 1: At the beginning of the trial, the weaner heifers to be bred to calve at 24 months were 103 lb lighter than the yearling heifers to be bred to calve at 30 months (Table 1). The younger heifers gained .95 lb/day to weigh 550 lb by the beginning of the breeding season. The 30 mo heifers averaged .55 lb/day gain to reach an average weight of 593 lb. Weight loss during the second wintering period was near the desired level of 10% (24 mo calvers = 10.3%, and 30 mo calvers = 8.9%).

Conception rate during the first breeding season was very good and similar for both groups (100% and 95% for the 30 mo and 24 mo calvers, respectively). The average date of conception was similar for both treatments.

Calf birth weight was similar for the two groups of heifers, but the younger heifers suffered more calving difficulty than did the 30 mo heifers (calving difficulty scores of 3.21 vs 1.89) and a greater number of heifers had difficult calvings (72% vs 50%). The 24 month calvers

Table 1. Performance of heifers calved at 24 or 30 months of age.

Item	(TRIAL 1)	
	24 Month	30 Month
No. of Heifers (11/29/79)	20	20
Heifer Weights (lbs)		
Beg. 1st Winter (11/29/79)	405	508
Beg. 1st Brdg. (5/1/80)	558	593
Beg. 2nd Winter (11/13/80)	821	924
Beg. 2nd Brdg. (5/5/81)	793	843
Weaning (10/13/81)	971	1027
First Breeding Season:		
Conception Rate (%)	95	100
Date of Conception (Avg)	May 31	May 24
Calving Data:		
No. heifers calving	18	20
No. live calves	9	14
Calf Birth Wt (lbs)	79	77
Heifers Req. Assist. (%)	72	50
Calving Diff. Score (Avg)		
(Scale = 1 to 5)	3.2	1.9
Second Breeding Season:		
Conception Rate (%)	84	88
Post Partum Interval to		
Conception (days)	91	75
205 Day Adj Wn Weight (lbs)	407	425
Supplemental Winter Feed		
per Heifer 1st Winter (lbs)		
Cottonseed Meal	325	371
Milo	736	462

also lost more calves at calving (50% vs 30%) but losses were excessive in both groups. Excessive calving problems and deaths were the result of a combination of factors, with one of the most important being the necessity to change herdsman just prior to the start of the calving season. In addition, there was a large number of heavy calves. The average birth weight of calves that died was 81.9 lbs compared to 76.6 lb for the live calves.

During the second breeding season conception rates were similar (24 mo = 84%, and 30 mo = 88%), but the postpartum interval to conception was 16 days longer for the 24 mo heifers. Adjusted weaning weights were 18 lb heavier for calves from 30 mo heifers. The 30 mo heifers weaned a greater percentage of calves (65%) than did the 24 mo heifers (50%) but this was influenced by calf losses at calving. Under the conditions of this study, the 24 mo heifers required 19 lb less CSM and 274 lb more ground milo per heifer during the first wintering period (139 days) than did the 30 mo heifers.

Trial 2: This trial included 30 heifers calving at 24 months that were started on trial an average of 124 lbs lighter than the 30 mo heifers (Table 2). The 24 mo heifers gained .97 lb/day to weigh 563 lb by the beginning of the breeding season. The two groups of 30 mo heifers gained at different rates during the first wintering period (.71 lb/day and 1.0 lb/day, respectively) to reach respective weights of 639 lb and 703 lb at the beginning of the breeding season. Weight losses during the second wintering period were not influenced by the previous treatment and were 7.7%, 7.4%, and 8.1% of their November 15 weight for 24 mo, 30 mo-Maint, and 30 mo-Gain, respectively. Treatment did not influence conception or date of conception during the first breeding season.

The 30 mo-Gain heifers gave birth to the heaviest calves (81 lb), followed by the calves from the 30 mo-Maint heifers (76 lb), and the 24 mo heifers (72 lb). The heifers calving at 24 months of age suffered more calving difficulty (calving difficulty score 2.9 vs 2.2). A greater number of 24 mo heifers had calving difficulty (72%) than did the 30 mo-Maint and 30 mo-Gain heifers (53% and 50%, respectively). Calf losses at birth were less than 3.5% for all treatments. Compared to trial 1, calf losses and calving difficulty were greatly reduced in trial 2. However, it is important to note that the percentage of heifers requiring some level of assistance was the same in each trial, and at least 50% of the older heifers required assistance.

The postpartum interval to conception was similar for the 24 mo heifers (91 days) and the 30 mo-Gain heifers (84 days). Conception rates during the second breeding season were slightly less for the 24 mo and 30 mo-Maint heifers (80% and 83%, respectively) than for the 30 mo-Gain heifers (93%). Adjusted weaning weight of calves from the 24 mo heifers (400 lb) was lighter than that of the calves from the 30 mo-Maint heifers (458 lb) and the 30 mo-Gain heifers (453 lb). The number of calves weaned per number of heifers exposed was similar for 24 mo heifers (90%) and 30 mo-Gain (93%), but slightly less for 30 mo-Maint (83%).

During the first wintering period (172 days) the 24 mo heifers required an average of 27 lbs more CSM and 178 lbs more corn per heifer than did the 30 mo-Gain heifers. They also required 70 lbs more CSM and 232 lbs more corn than did the 30 mo-Maint heifers.

Body condition scores of the heifers ranged from about 6.5 at the beginning of the second winter to about 5.2 at rebreeding after calving and the 24 mo heifers were consistently 0.3 of a score lower than the 30 mo heifers. Body weights were not significantly different between the

Table 2. Performance of Heifers Calved at 24 Months of Age or 30 Months of Age Fed to Maintain or Gain Weight After Reaching 600 lbs Until Breeding.

Item	(TRIAL 2)		
	24 Month	30 Mo-Maint	30 Mo-Gain
No. of Heifers (11/13)	30	31	28
Heifer Weights (lbs)			
Beg. 1st Winter (11/13)	395	515	523
Beg. 1st Brdg. (5/7)	563	639	703
Beg. 2nd Winter (11/13)	798	922	954
Beg. 2nd Brdg. (5/7)	706	805	823
Weaning (10/13)	869	971	984
Body Condition Scores (Avg) (Scale = 1 to 9)			
Beg. 2nd Winter (11/13)	6.3	6.6	6.5
End 2nd Winter (4/15)	5.7	6.0	5.9
Beg. 2nd Brdg. (5/7)	5.0	5.3	5.3
Weaning (10/13)	5.7	6.0	5.8
First Breeding Season:			
Conception Rate (%)	96	100	100
Date of Conc. (Avg)	May 22	May 25	May 25
Calving Data:			
No. heifers calving	29	28	28
No. live calves	27	27	28
Calf Birth Wt (lbs)	72	76	81
Heifers Req. Assist. (%)	72	53	50
Calv. Diff. Score (Avg) (Scale - 1 to 5)	2.9	2.2	2.2
Second Breeding Season:			
Conception Rate (%)	80	83	93
Post Partum Interval to conception (Days)	91	87	84
205 Day Adj Wn Wt (lbs)	400	458	453
Supplemental Winter Feed per Hfr 1st Wint (lbs)			
Cottonseed Meal	483	413	456
Corn	432	200	254

30 mo-Maint heifers (971 lb) and the 30 mo-Gain heifers (984 lbs) by the end of the trial, however heifers that calved at 24 mo were about 100 pounds lighter when the calves were weaned.

Considering the results from both trials, it is apparent that when weaner heifers are fed at a level as high as was used in this trial, delaying calving until 30 months did not improve conception rates for either the first or second breeding season, or reduce the postpartum interval to conception. This was not unexpected since the high level in previous Ft Reno studies, although costly, had given good reproductive performance in young heifers. Heifers calving at 30 months of age did wean heavier calves than the heifers calving at 24 months of age. In addition, heifers calving at 30 months of age had less calving difficulty than did the heifers calving at 30 months of age; their calving difficulty was less severe; and they required less supplemental feed the winter prior to breeding.

Economic Analysis:

An analysis of costs and returns for calving at 24 months vs 30 months was made using the COWHERD E microcomputer program developed by Dr. Keith Lusby, Animal Science Dept., and Dr. Odell Walker, Agricultural Economics Dept., Oklahoma State University. The budgets developed by this analysis suggests that calving heifers at 30 months is a favorable alternative when they could be maintained on forage following weaning until 1 year of age, and subsequently fed to weigh at least 600 lbs by the beginning of the breeding season. Calving at 30 months would also be advantageous when cash outlay for additional feed is high, and heifers must be fed greater amounts in order to conceive by 15 months of age. However, when cash outlay for additional feed is potentially low, calving at 24 months may be justified.

Literature Cited

- Lusby et al. 1979. Twenty-four vs 30-month-old calving with Hereford heifers. Okla. Agr. Exp. Sta. MP-104:90.