

Kansas Agricultural Experiment Station Research Reports

Volume 0
Issue 1 *Cattleman's Day (1993-2014)*

Article 1112

1983

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Recommended Citation

Bolze, R.P.; Pruitt, R.J.; and Corah, L.R. (1983) "Cause and effect of calving difficulty in first calf heifers on subsequent reproductive performance and weaning weights of progeny," *Kansas Agricultural Experiment Station Research Reports*: Vol. 0: Iss. 1. <https://doi.org/10.4148/2378-5977.2515>

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Cause and Effect of Calving Difficulty
in First Calf Heifers on Subsequent Reproductive
Performance and Weaning Weights of Progeny¹

R.P. Bolze, R.J. Pruitt and L.R. Corah

Summary

Eight years of records for 1495 2-year old beef heifer calvings from two Kansas ranches were analyzed to determine the cause and effect of calving difficulty on subsequent reproductive performance and weaning weights of progeny. The study involved two herds of Simmental cattle (spring and fall calving) and one herd of fall calving Angus cattle. Heifers were classified as either requiring or not requiring assistance with their first calf. Herds were analyzed separately. Percentages of heifers requiring assistance for the Angus, spring calving Simmental and fall calving Simmental herds were 36%, 57% and 38%, respectively. In all herds, calves from 2-year-old heifers requiring assistance were 5.5 to 10.3 lbs heavier at birth and had a 4.5 to 10% higher mortality rate than calves from unassisted heifers. Overall conception during a subsequent 63 day breeding season after their first calf was 9% lower for assisted than unassisted heifers. Angus heifers requiring assistance were 8 days younger at their first parturition. Spring calving Simmental heifers requiring assistance delivered 15% fewer calves within the first 21 days of the subsequent calving season. Calves from fall calving Simmental heifers requiring assistance weaned (unadjusted) 18 lb heavier. Nineteen percent more heifers requiring assistance with their first calf also had required assistance during their own birth. Maternal grand sires had a significant effect upon their daughters' reproductive and growth performance and upon their daughters' progeny performance.

Introduction

To maximize the production from a herd, heifers must first calve as 2-year-olds. Those heifers have not yet reached their mature size, and resulting calving difficulties cause increased veterinary labor expense, increased death losses of cows and calves and decreased subsequent reproductive performance. The objectives of this study were to determine the cause and effect of calving difficulty on subsequent reproductive performance and on weaning weights of progeny in purebred cattle.

¹Appreciation is expressed to Henry Gardiner, Gardiner Angus Ranch, Ashland, Ks, and Roy Parsons, Ecco Simmental Ranch, Buffalo, Ks for making data available.

Experimental Procedure

One Kansas ranch with fall calving Angus and another with both spring and fall calving Simmental cattle provided 8 years of records for 1495 2-year-old first calf heifers. Data collected included the heifer's birthdate, sire, degree of calving difficulty at her own birth, her birth weight, actual weaning weight and actual yearling weight (Table 8.1). For the Simmental cattle the heifer's percent Simmental breeding was also recorded. At the heifer's first parturition, we recorded her age in days, her calf's birth date, birth weight, degree of calving difficulty, calf mortality and sire. Unadjusted calf weaning weights were also recorded. Rebreding data included first service and overall conception rates, days open from parturition to conception, percent of heifers detected in heat and bred by 21-day periods and percent of heifers delivering their second calf during the first 21 days of the following calving season. Second calf data included dam's age in days and the calf's unadjusted weaning weight. Heifer's sire and sire of her first calf were analyzed for their effect on the reproductive and performance traits.

Results and Discussion

Thirty-six percent of the first calf Angus heifers required assistance. Assisted calves were 6.8 lbs heavier at birth and had a 4.46% higher mortality rate than unassisted calves. Assisted heifers were 7.96 days younger at their first parturition and had a 8.96% lower subsequent overall conception rate.

Fifty-seven percent of the spring calving Simmental heifers required assistance. The calves were 10.32 lbs heavier at birth and had a 9.99% higher mortality rate than those unassisted. Percent of 1/2, 3/4 and 7/8 percentage Simmental heifers requiring assistance were 50, 71 and 55, respectively. Of assisted heifers, 15.25% fewer calved in the first 21 days of the subsequent calving season. Assisted heifers also had a 12.58% lower first service conception rate.

Thirty-eight percent of the fall calving Simmental heifers required assistance. Calves from assisted heifers were 5.54 lbs heavier at birth, 18.04 lbs heavier at weaning and had a 9.12% higher mortality rate. Subsequent overall conception rate was reduced in assisted heifers by 9.17%. Also, 57.78% of heifers requiring assistance at their own birth required assistance with their first calf. In contrast, only 38.88% heifers born unassisted required assistance with their first calf. Thus, cattlemen can probably reduce calving difficulty by using replacement heifers that were themselves delivered without assistance.

Our data indicate that sire selection significantly affects progeny growth performance and daughters' reproductive and growth performance. There were significant differences between maternal grand sires for daughters' birth weight, weaning weight, yearling weight, age in days at first and second parturition, days open, and weaning weights of first and second calves. There were significant differences between sires for calf birth weights and unadjusted weaning weights.

Although we did not intend to compare spring and fall calving Simmental herds, some differences are quite evident. The fall calving herd had an advantage in first service and overall conception rate, percent of heifers detected in heat and bred during the first 21 days of the breeding season and percent of heifers calving during the first 21 days of the following calving season (Table 8.2). The spring herd had higher actual weaning weights of first and second calves (Table 8.3).

Table 8.1. Relationship Between Heifers' Performance Data and Degree of Calving Difficulty

Trait	Fall calving Angus herd		Spring calving Simmental herd		Fall calving Simmental herd	
	First calf Unassisted	First calf Assisted	First calf Unassisted	First calf Assisted	First calf Unassisted	First calf Assisted
Heifers birth weight, lbs	72.15	70.72	71.98	72.69	73.02	73.07
Calving difficulty at heifer's birth, %						
Unassisted			47.02	52.98	61.67 ^a	38.33 ^b
Assisted			31.25	68.75	42.22 ^a	57.78 ^b
Heifer's unadjusted weaning wt, lbs	420.58	414.04	495.74	500.58	423.50	419.23
Heifer's unadjusted yearling wt, lbs	627.43	643.83				
Age first parturition (days)	723.93 ^a	715.97 ^b	714.39	716.15	719.58	717.52
Age second parturition (days)	1101.33	1100.37	1118.51	1107.11	1110.63	1115.79

^{ab}($P < .05$) within a trait and herd.

Table 8.2. Influence of Calving Difficulty on Subsequent Reproductive Performance

Trait	Fall calving Angus herd		Spring calving Simmental herd		Fall calving Simmental herd	
	Unassisted	Assisted	Unassisted	Assisted	Unassisted	Assisted
Days open	93.26	97.78	122.04	111.03	113.05	115.07
Conception rates						
First service, %	56.35	47.33	46.25 ^c	33.67 ^d	54.55	54.14 ^b
Overall, %	84.25 ^a	75.29 ^b	73.68	64.57	79.26 ^a	70.09 ^b
% detected in heat and bred, 21 day periods						
First	83.67	80.24	50.00	47.52	76.16	69.57
Second	11.55	16.77	48.75	47.52	13.52	20.73
Third	4.78	2.99	1.25	4.96	10.32	9.76
% heifers calving first 21 days of second calving season	61.64	59.09	51.65 ^a	36.36 ^b	62.18	58.87

^{ab}(P<.05) within a trait and herd.

^{cd}(P=.08).

Table 8.3. Relationship of Calving Difficulty to Calf Mortality, Birth Weight and Weaning Weights

Trait	Fall calving Angus herd		Spring calving Simmental herd		Fall calving Simmental herd	
	Unassisted	Assisted	Unassisted	Assisted	Unassisted	Assisted
Calf mortality, %	3.84 ^a	8.30 ^b	2.11 ^a	12.10 ^b	1.43 ^a	10.55 ^b
Birth weight first calf, lbs	65.90 ^a	72.71 ^b	70.43 ^a	80.75 ^b	71.21 ^a	76.73 ^b
Unadjusted weaning weight first calf, lbs	396.89	403.51	471.27	475.60	420.71 ^a	438.74 ^b
Unadjusted weaning weight second calf, lbs	413.65	417.45	461.60	486.31	458.13	466.83

^{ab}(P<.05) within a trait and herd.