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Abstract

Heifers with faster gain the first and second winter (weaning to yearling and 18 months to 2 years old) had better production and reproduction than heifers with low or moderate gains. Gains during the first winter (weaning to yearling) had more influence on future performance than gains during the second winter as bred heifers.

Keywords

Cattlemen's Day, 1979; Report of progress (Kansas State University. Agricultural Experiment Station); 350; Beef; Growth rate; Performance; Heifers; Gains

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Effect of Growth Rate from Birth Through Thirty Months on Performance of Heifers

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Summary

Heifers with faster gain the first and second winter (weaning to yearling and 18 months to 2 years old) had better production and reproduction than heifers with low or moderate gains. Gains during the first winter (weaning to yearling) had more influence on future performance than gains during the second winter as bred heifers.

Introduction

Opinions of cattle producers differ on how replacement heifers should be fed for best development. Feeding too well has shortened life span and impaired milking ability, while low feeding has caused poor reproduction, reduced milk production and low weaning weights.

Experimental Procedure

Data were collected during three years from 156 Polled Hereford heifers born in the spring, within 60-day calving seasons. They ran with their mothers on native Flint Hills range until weaned at 6 to 7 months. The first winter after weaning they were randomly allotted to various high roughage rations and gained from 0.2 to 2.0 lb per day. All sound heifers were bred artifically as yearlings for 45 days followed by 15 days with bulls. Heifers grazed as a group from May 1 to November 1 on native bluestem range. In November, heifers were palpated to confirm conception date, and open heifers were removed from the study. Pregnant heifers were randomly allotted within weight, condition, and expected calving date into winter treatment groups with various energy levels. They remained on the second winter nutrition level until parturition. Then they were put on the same ration balanced to meet NRC requirements for energy, protein, and minerals until May 1. From May 1 to October 1 (weaning) heifers and their calves grazed native bluestem range. Starting May 20, heifers were rebred artifically for 45 days followed by 15 days with bulls. At weaning, heifers were again palpated to confirm conception dates.

Results and Discussion

The effects of weaning and yearling weight, prebreeding condition, and first winter gains on reproduction the first breeding season as yearlings, are shown in Table 4.1. Heifers' adjusted 205-day weight and adjusted 365-day weight did not significantly affect first-service conception, breeding-season conception, or conception date. Low gains the first winter (from weaning to yearling) resulted in lower ($P<.01$) first-service conception rates, but the conception rate for the 60-day breeding season was only slightly lower. Heifers that gained the most the first winter had the highest breeding-season conception rates. Heifers in moderate condition as yearlings (weight-height ratio) had the highest conception rate, indicating that thin and fleshy heifers had more difficulty conceiving.

Birth weight of a heifer's first calf was lower ($P<.05$) if its dam had low first winter gain. However, heifers with high first winter gain had the largest pelvic area and fewest calving problems.

Heifers with high first winter gains (Table 4.2) a year later produced calves 15 lb heavier at 90 days and 35 lb heavier at weaning than heifers with low first winter gains. The difference did not result from milk production, and may reflect fewer calving problems and superior mothering ability. Monthly milk production during the first lactation was not affected by first winter gains (Table 4.3).

Second winter gains (Table 4.2) had no significant effect on the heifers' pelvic area, ease of calving, or calf's birth weight. Calves from heifers that gained slowly the second winter were heavier at both 90 days and at weaning than calves from heifers that gained moderately or fast. However, the high and moderate gaining heifers gave more milk (Table 4.3). There were no significant differences in rebreeding among groups whose gains were low, moderate, or high the second winter.

From our data it appears that the nutrition level the first winter (weaning to yearling) influenced heifer production and reproduction more than nutrition level during the second winter as bred heifers. Considering all factors, fast gain the first winter and moderate to high gain the second winter appear to produce the best performance so long as the heifers do not become too fat.

Table 4.1. The effects of first-year weight, weight change, and condition on reproductive efficiency at first breeding.[a]

	No. of heifers	Conceived 1st service, %	Conceived final, %[b]	Conception date
Weaning weights, lb				
Low (<380)[c]	88	38	94	June 12
High (>380)	68	41	91	June 10
Yearling weights, lb				
Low (<625)	78	41	92	June 10
High (>625)	78	38	94	June 13
First winter gains, lb				
Low (<210)	31	19	90	June 6
Mod (210-290)	92	49	93	June 10
High (>290)	33	33	94	June 18
Yearling weight/height:				
Low (<12.9 lb/in)	35	40	88	June 7
Mod (12.9-14.3 lb/in)	79	38	96	June 13
High (>14.3 lb/in)	42	43	90	June 12

[a]Weaning weight, yearling weight, first winter gain, yearling weight-height ratio, and sire of heifer were included in the model to obtain least squares means.

[b]Final conception for a 60-day breeding season.

[c]< = less than; > = more than.

Table 4.2. Effects of first and second winter gains of dams on calf birth weight, calving ease, pelvic area, calf performance, milk production, and rebreeding performance.

Gains	First winter[a]			Second winter[b]		
	Low (<210 lb)[c]	Moderate (210 to 290 lb)	High (>290 lb)	Low (< -20 lb)[c]	Moderate (-20 to 60 lb)	High (> 60 lb)
Calf birth weight, lb	64	68	70	68	66	68
Calving ease score[d]	3.08	3.39	2.71	3.17	3.10	2.90
Precalving pelvic area, sq cm	250	247	270	263	245	258
Calf 90-day weight, lb	185	189	200	205	183	187
Calf weaning weight, lb	306	330	341	350	319	308
Milk production, lb/24 hr	10.5	9.7	9.9	9.4	10.4	10.4
Heifers re-exposed	27	84	29	25	88	27
Conceived 1st service, %	48	33	48	40	44	22
Conceived final[e], %	81	66	66	80	70	56
Conception date	June 11	June 12	May 28	June 11	June 6	June 5
Calving to conception, days	72	86	73	81	77	73

[a]Sire of heifer, sire of calf, first winter gain, summer gains, first winter by summer gain interaction, and second winter gain were included in the model to obtain least squares means.

[b]Sire of heifer, sire of calf, first winter gain, summer gains, and second winter gain were included in the model to obtain least squares means.

[c]< = less than, > = more than.

[d]Calving ease score: 1 = no assistance, 2 = slight assistance, 3 = difficult delivery, 4 = very difficult delivery, 5 = caesarean delivery.

[e]Final conception for a 60-day breeding season.

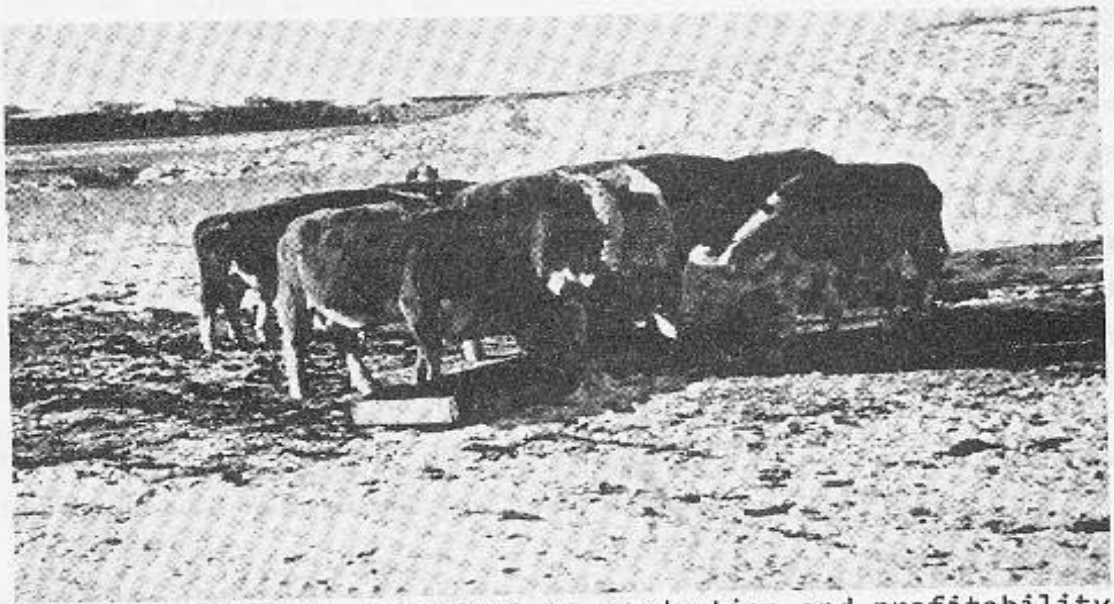
Table 4.3. Effects of first and second winter gains on milk production the first lactation period (lb/24 hr).

Gains	First winter[a] Low (< 210 lb)[c]	Moderate (210 to 290 lb)	High (> 290 lb)	Second winter[b] Low (< -20 lb)[c]	Moderate (-20 to 60 lb)	High (> 60 lb)
Milk production						
May	14.6	12.1	13.6	13.7	13.6	12.9
June	14.2	12.9	10.7	12.3	12.5	13.1
July	11.7	11.3	12.3	9.9	13.1	12.3
Aug	9.3	9.2	9.3	8.5	9.6	9.7
Sept	7.7	6.9	7.6	7.0	7.2	8.0
Oct	5.8	6.0	6.0	5.2	6.2	6.3
6-month avg.	10.6	9.7	9.9	9.4	10.4	10.4

[a]Sire of heifer, first winter gain, summer gain, second winter gain, and summer and second winter interaction were included in the model to obtain least squares means.

[b]Sire of heifer, first winter gain, first winter by summer gain interaction, and second winter gain were included in model to obtain least squares means.

[c]< = less than;> = more than.



Winter nutrition is important to production and profitability.