Effect of Level of Wintering Upon the Growth and Reproductive Performance of Beef Heifers

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Results of a long-time study on the effects of different amounts of winter feed on spring-calving beef cows are reported elsewhere in this publication. At 10½ years of age, low levels of winter supplemental feed (1.0 pound of cottonseed meal per head daily) fed to cows grazing native grass have failed to produce adverse effects.

During this experiment, it became apparent that more studies were necessary to critically evaluate the effects of different levels of wintering, particularly on the growing and developing heifer. It seemed necessary to repeat range trials of this type several times in order to minimize the year to year variation in climate and range conditions. This report summarizes the results obtained to date in four trials at the Fort Reno station.

Procedure

In the fall of 1954, a series of trials was initiated at Fort Reno to further study the effects of three planes of nutrition during the winter period. Each trial consisted of three lots of 14 or 15 weanling Hereford heifers. Heifers for each trial were selected in the fall (1954 to 1958) soon after weaning. The majority of these calves were from the cows in the original study, and it was possible to allot them according to age, sire, dam's average productivity, body weight, and grade.

All heifers grazed year-long on native grass pastures (primarily little bluestem, Indian, switch grass, and less desirable annual grasses). All heifers were pasture-mated to purebred Hereford bulls between May 1 and August 15 and calved first at two years of age. The calves were weaned in early October. None of the calves were creep fed. The amounts of winter supplemental feed (cottonseed meal and milo) were varied in an attempt to obtain the following gains from early November to mid-April.

First winter as calves

Low level—no gain during the winter period.
Medium level—0.5 pound gain per day.
High level—1.0 pound gain per day.

Second and subsequent winters

Low level—200 pounds loss
Medium level—100 pounds loss
High level—no loss in weight

Experience with the first trial indicated that, due to favorable winter conditions in some years, the desired amount of winter weight loss for the low level could not be attained—even with no supplemental feed. In subsequent trials, the low level heifers have only been allowed to graze two or three days a week during the early winter when this practice seemed necessary to insure the desired loss in body weight. The remainder of the time they were confined to dry lot and fed a limited amount of wheat straw. Later, the heifers were placed on native grass with limited supplement.

Results

Table 1 gives a summary of growth data from weaning to 1½ years of age for the heifers in the first four trials. One low level heifer and two high level heifers were lost during the first year after allotment.

TABLE 1. Weight changes and body measurements to 1 1/2 years of age for beef heifers wintered at three levels (summary of 4 trials).

Lot number Level of winter supplement	1 Low	2 Med.	3 High
No. of heifers at start of experiment	58	58	58
No. of heifers remaining at 1½ yrs. of age	57	58	56
Average weights (lbs.)			
Fall—initial weight	486	486	487
Winter gain	+22	+95	+153
Spring (1 yr. old)	508	581	640
Summer gain	+295	+265	+245
Fall wt. (1½ yrs. old)	803	846	885
Body measurements (in.)[1]			
Height at withers			
Fall (initial measurement)	39.00	39.06	38.96
Spring (1 yr. old)	41.22	41.55	41.84
Fall (1½ yrs. old)	43.12	43.36	43.73
Width at hips			
Fall (initial measurement)	13.58	13.76	13.75
Spring (1 yr. old)	14 06	15.00	15.54
Fall (1½ yrs. old)	17.36	17.96	17.97
Length of body			
Fall (initial measurement)	44.18	44.15	44.16
Spring (1 yr. old)	43.65	45.63	46.41
Fall (1½ yrs. old)	50.12	51.35	51.68
Heart girth			
Fall (initial measurement)	54.14	54.64	54.54
Spring (1 yr. old)	54.14	57.78	60.16
Fall (1½ yrs. old)	64.10	66.35	67.23
Total feed, pasture and mineral cost/ heifer (initial to 1½ yrs. of age)	20.92	31.15	43.56

None of these losses were attributed to the winter treatment since all occurred very soon after initial allotment.

Weight gains during the first winter averaged 0.13, 0.58, and 0.93 pounds per head daily for the low, medium, and high level heifers, respectively. Summer gains were inversely related to winter gains. The difference in average weight between low and high level lots was reduced from 132 to 82 pounds during the summer grazing season.

Body measurements taken in early November and again in mid-April (3rd and 4th trials only) indicate that height and length of body were not affected greatly by the winter treatments. Width at hips was affected somewhat more than the above, while heart girth was affected most and was closely related to body weight gain. As was true with body weight, there was a strong tendency for the low level heifers to increase more in each measure during the summer, so that the difference between low and high level lots was much smaller in the fall than it was the preceding spring.

In three trials, the heifers have now weaned their first calf (Trial 1, 1956; Trial 2, 1957; Trial 3, 1958). A summary of two-year-old calving performance for these three trials is shown in Table 2. The desired amount of winter loss for the low level lots was not attained in any of the trials, despite grazing restrictions. The amount of loss seemed to be rather closely related to the condition of the heifers in the fall. The heifers in Trial 3 were most severely restricted, but were thinner in the fall as bred yearlings than heifers in the other trials. However, the desired loss was still not attained. The summer gains were again inversely related to the amount of winter loss, so that the average difference in body weight between low and high level lots was only about half as large in the fall as the previous spring.

The percent calf crop weaned was about 10 percent less for low level lots than for medium and high level lots. This difference is due primarily to poor calving performance of the low level lot in Trial 3. The average calving date was 17 days later for the low level heifers than for those on the high level, and 10 days later than for the medium level heifers.

There have been no consistent difference in difficulty at calving. The most difficulty was experienced with the high level lot in Trials 1 and 2, while in Trial 3, the most difficulty was experienced with the low level lot and least with the high level group. Only one heifer out of 126 which have been bred to calve at two years of age in this experiment has been lost due to calving difficulty as a two-year-old. This was a low level heifer in Trial 2.

Both birth weights and weaning weights of the calves have been directly related to the level of wintering. However, differences in percent calf crop and weaning weight combined were not great enough to pay for the increased amount of supplemental feed for the medium and high level lots.

TABLE 2. Two-year-old calving performance of beef heifers wintered at three levels (summary of 3 trials).

Lot number Level of winter supplement	1 Low	2 Med.	3 High
No. of heifers at start of experiment	43	43	43
No. of heifers remaining at 2½ yrs. of age	37	39	41
Average weights (lbs.)			
Fall (1½ yrs. of age)	804	844	883
Winter gain	—90	—44	—7
Spring (2 yrs. of age)	714	800	876
Summer gain	+201	+150	+128
Fall (2½ yrs. of age)	915	950	1004
No. of heifers bred to calve	42	42	42
No. of calves born	38	39	40
No. of calves weaned	29	33	33
% Calf crop	69.0	78.6	78.6
Ave. calving date	3/10	2/28	2/21
Ave. difficulty at calving score[1]	2.7	2.8	2.9
Ave. calf weights (lbs.)			
At birth (corrected for sex)	68	72	74
At weaning (corrected for age and sex)	353	385	397
Total feed, pasture and mineral cost/ heifer ($) (initial to 2½ yrs. of age)	47.87	66.51	92.81
Cost per cwt. calf weaned ($)	20.08	21.89	29.94

[1]A numerical score was used to evaluate difficulty at calving. A score of 1 indicates cow calved normally without assistance, and 7 indicates extreme difficulty in which both cow and calf were lost.

In two trials, heifers have weaned their second calves. Table 3 gives a summary of weight gains and calving performance for the second calf crop for Trial 1 in 1957 and Trial 2 in 1958. The average winter weight loss was much less than desired. This is primarily due to exceptionally good wintering performance among Trial 1 heifers. A very favorable winter during 1956-57 resulted in gains in weight even with no supplemental feed.

The differences in percent calf crop were rather small and no consistent trend was apparent among the level of wintering treatments. The low level heifers calved an average of 7 days later than the medium level heifers, and 16 days later than the high level heifers. As with the two-year-old calf crop, there was a direct relationship between the amount of supplemental feed and the birth and weaning weight of the calves. However, when the total feed and pasture cost and weaning weights and percent calf crop of both the two- and three-year-old calf crop were considered, the low level was still the most economical in this study.

TABLE 3. Three-year-old calving performance of beef cows wintered at three levels (summary of 2 trials).

Lot number Level of winter supplement	1 Low	2 Med.	3 High
No. of heifers at start of experiment	27	28	28
No. of cows remaining at 3½ yrs. of age	22	23	25
Average weights (lbs.)			
Fall (2½ yrs. of age)	897	930	985
Winter gain	—19	+44	+91
Spring (3 yrs. of age)	878	974	1076
Summer gain	+184	+132	+82
Fall (3½ yrs. of age)	1062	1106	1158
No. of cows bred to calve	24	25	28
No. of calves born	21	25	26
No. of calves weaned	20	22	24
% calf crop	83.3	88.0	85.7
Ave. calving date	3/17	3/10	3/1
Ave. calf weights (lbs.)			
At birth (corrected for sex)	73	79	79
At weaning (corrected for age and sex)	390	430	439
Total feed pasture and mineral cost/ cow ($) (initial to 3½ yrs. of age)	74.34	101.94	142.42
Cows cost per cwt. calf weaned ($)[1]	12.34	15.04	20.50

[1]Includes total feed, pasture and mineral cost to 3½ yrs. of age for the cows and weight of calves produced at both 2 and 3 yrs. of age.

Table 4 includes a summary of weight gains and calving performance for the third calf crop (1958) for the first trial cows. These cows were in very good condition in the fall of 1957 and the desired amount of loss was attained with the low level lot. The losses in the medium and high level lots were greater than desired, but these cows were still in very good condition at the end of the wintering period. Summer gains were very good for all lots during 1958, but were inversely related to the amount of winter loss.

The calving performance was rather poor in all lots. Reasons for calf losses were varied and no apparent reason can be found for this poor calving percent. The trend for a later average calving date for the low level lots, which was apparent in previous years, was not observed here. This was possibly because of the very favorable winter preceding the breeding season for this calf crop.

The birth weights and weaning weights were again directly related to the amount of winter supplemental feed, but when total feed and pasture cost to 4½ years of age and weaning weights and percent calf crop of the first three calf crops are considered, the low level proved to be most economical.

TABLE 4. Four-year-old calving performance of beef cows wintered at three levels (summary of 1 trial).

Lot number Level of winter supplement	1 Low	2 Med.	3 High
No. of heifers at start of experiment	14	14	14
No. of cows remaining at 4½ yrs. of age	11	13	11
Average weights (lbs.)			
Fall (3½ yrs. of age)	1091	1111	1175
Winter gain	—211	—136	—85
Spring (4 yrs. of age)	880	975	1090
Summer gain	+303	+240	+177
Fall (4½ yrs. of age)	1183	1215	1267
No. of cows bred to calve	12	13	11
No. of calves born	11	12	11
No. of calves weaned	8	11	7
% calf crop	66.7	84.6	63.6
Ave. calving date	3/9	3/14	3/9
Ave. calf weights (lbs.)			
At birth (corrected for sex)	64	80	74
At weaning (corrected for age and sex)	405	440	473
Total feed pasture and mineral cost/ cow ($) (initial to 4½ yrs. of age)	100.32	132.22	189.99
Cow cost per cwt. calf weaned ($)[1]	11.25	12.43	21.43

[1]Includes total feed, pasture and mineral cost to 4½ yrs. of age for the cows and weight of calves produced at 2, 3 and 4 yrs. of age.

It has been the policy to cull from these trials only those cows that failure to wean a calf two years in a row or those cows that obviously could not continue to reproduce because of diseased condition or injury. As of the fall of 1957, in Trial 1 there were 11, 13, and 11 cows left, in Trial 2, 10, 10, and 14, and in Trial 3, 14, 14, and 13 in the low, medium, and high level lots, respectively.

In Trial 1, one low level heifer died of ketosis at 4 years of age. One low level heifer and three high level heifers were removed for failure to wean a calf two years in a row. In Trial 2, one low level heifer died in calving as a two-year-old. One low level and two medium level heifers failed to wean a calf two years in a row. In Trial 4, one failure to wean a calf two years in a row. In Trial 2, one low level open upon pregnancy examination following the 1958 breeding season. Other losses were for varied reasons which were not believed to be related to the treatments imposed in this experiment.

Summary

Data are presented on growth and reproductive performance for four trials involving three lots of 14 or 15 heifers per lot in each trial. Three levels of winter supplemental feed were studied. No consistent differences have been observed in difficulty at first calving or percent calf crop weaned.

Birth weights have been reduced in the low level lots. Low level heifers have calved an average of about 1 week later than medium level heifers and 2 weeks later than high level heifers. Higher levels of winter supplement have resulted in heavier calves at weaning, but the increased weaning weights have not offset the increased cost of winter supplement. Body measurements taken in the fall and spring indicate that the winter treatment did not greatly affect the skeletal size of the heifers.

Levels of Supplemental Winter Feeding of Beef Cows And Creep-Feeding Fall Calves

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In recent years there has been an increased number of cows calving in the fall. This change in calving season has resulted in a need for additional data on feeding and managing such cattle grazing native grass (Bluestem and associated grasses) yearlong. Because of the increase in nutritive requirements of a cow suckling a calf, it is of primary importance to determine the most satisfactory level of supplemental winter feed.

The cost of supplemental feed constitutes a large portion of the total cost of producing a calf. The amount of supplemental winter feed will vary according to the amount and quality of forage available in a pasture. In some areas of our state the native grasses furnish practically all of the roughage consumed by a cow herd.

The effects of feeding level upon the productive life of a cow herd as well as the cost of supplemental winter feed must be considered when determining the optimum level of wintering.

Questions which arise in planning a fall-calving program include: (1) What is the effect of level of winter feeding on weaning weights of calves and re-breeding rate of cows? (2) What percent of her body weight can a cow lose during the winter without affecting percentage calf crop and weaning weights of calves? (3) Should creep-feeding be recommended for fall-dropped calves which are to be marketed as feeders in mid-summer?