Level of Wintering Fall-Calving Beef Cows

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The effect of feeding different levels of supplemental winter feed to fall-calving cows grazing dry grass has been under study for several years. The original study with mature cows, which had previously produced at least one calf, was conducted at the Lake Blackwell range area where adequate native grass was available. Four-year average results indicated that the low level of wintering (1.5 lbs. of cottonseed meal per cow daily) was more profitable than the high level (2.5 lbs. of CSM plus 3 lbs. of grain). It should be emphasized that these cows had completed much of their growth when placed in the test. They had first calved in the spring as two-year-olds and their second calf was born in the fall when they were three and one-half-years old. Therefore, they had several additional months of growth between calvings without the added burden of reproduction.

In later studies with young cows fed at different levels, production usually has not been satisfactory with losses of from 20 to 30 percent of their body weight resulting during the winter when grazing dry grass. The level of nutrient intake has been increased in current studies by feeding prairie hay in a small trap instead of allowing the cattle to graze the dry native grass during the winter.

This report presents the results of (1) feeding three-year-old cows prairie hay and two levels of supplemental winter feed and (2) feeding two-year-old cows prairie hay in a small trap vs. grazing dry range grass and two levels of supplemental winter feed within each of these groups.

Part 1. Results with Three-Year-Old Cows, 1960-61

Procedure

The heifers had previously been subjected to different levels of supplemental winter feed as yearlings (1958-59) and as two-year-olds (1959-60). As two-year-olds the two lots of cows were retained in adjacent traps (approximately three acres per trap) during the winter feeding period when prairie hay was fed ad libitum. The feed intake in Lot 1 was 25.5 lbs. of prairie hay and 1.43 lb. of pelleted cottonseed meal per head daily. In Lot 2, the intake was 17.8 lbs. of prairie hay, 1.56 lb. cottonseed meal, and 4.69 lbs. ground milo. The winter weight losses of the cows were 140 and 111 lbs., respectively. The calf weaning weights were nearly equal (370 vs. 374 lbs.).

In the current test these cows were three and one-half years old in October and were again fed prairie hay during the winter. They were weighed on October 7 but supplemental feeding was not started until

October 27. The low level of supplemental feed was 1.43 lbs. of cottonseed meal. The high level group was self-fed a mixture which contained an average of 59 percent ground milo, 20 percent cottonseed meal, and 21 percent salt. The daily consumption was 1.80 lb. cottonseed meal, 5.32 lbs. ground milo, and 1.84 percent salt. During the summer all cattle grazed the native grass pasture. A mineral mixture of 2 lbs. salt and 1 lb. steamed bone meal was available at all times.

Results

A summary of the results may be found in Table 1. There was only a small difference in the winter weight losses of the two groups of cows (—158 and —144 lbs.), although there was a considerable difference in intake of supplemental feed. The consumption of hay was inversely related to the level of supplement fed. The group that was fed the low level consumed 24.4 lbs. of hay per head daily and those fed the higher quantity of supplement consumed 16.9 lbs. of hay.

The difference in gain from spring to weaning of 63 lbs. (—40 vs. 23) was reduced to 10 lbs. (21 vs. 31) by August 31. The average spring weights of the calves were 214 and 264 lbs. for the low and high levels, respectively. This difference is considerably larger than that recorded in any previous test. The level of winter feeding also had a marked effect on weaning weight of the calves. The difference of 91 lbs. (382 vs. 473 lbs.) was considerably greater than differences obtained in other tests. The average weight of 473 lbs. was considered satisfactory, although a high level of winter feeding was necessary to produce such calves.

The calves were weaned on July 17 and sold at the Oklahoma City stockyards. The steers in Lot 1 sold for $29.50 per 100 lbs., and the heifers in this lot sold for $26. The heavier calves in Lot 2 sold at $28 and $25 per 100 lbs. for the steers and heifers, respectively.

The total feed costs, including pasture, were relatively high ($57.73 and $68.38) because both groups were fed prairie hay ad lib. instead of being allowed to graze the dry range grass. Even though the heavier calves sold at a lower price per 100 lbs., their selling value per head was higher and the selling value minus feed cost was also higher.

Part 2. Results with Two-Year-Old Cows, 1960-61

Procedure

Seventy-one two and one-half-year-old heifers were divided into four lots on October 13, 1960. During the two previous winters they had been fed at different levels. As calves (1958-59) all were fed prairie hay as the roughage and one-half was provided with supplemental feed adequate to maintain body weight. The other group was fed to gain about 1 lb. per head daily. During the second winter feeding season

(1959-60), the heifers were continued on their respective levels of supplemental feed; however, one-half of the heifers on each feeding level was fed prairie hay in a small trap and one-half was allowed to graze the native grass. Within each roughage group, the heifers were fed a low and a high level of supplemental winter feed. The heifers were bred during this winter so that they would calve in October, November, and December when they were about two and one-half-years-old.

Table 1. Levels of Supplemental Winter Feeding of Three-Year-Old Beef Cows, 1960-61.

Lot Number Level of Feeding		1 Low[1]	2 High[2]
Number of cows raising calves[3]		11	8
Average weight per cow, lbs.			
Initial	10-7-60	1025	1036
Spring	4-28-61	867	892
Weaning	7-17-61	985	1059
Late summer	8-31-61	1046	1067
Winter gain		—158	—144
Gain to weaning		—40	23
Total gain		21	31
Average weight per calf, lbs.			
Birth[4]		71	72
Spring[5]		214	264
Weaning[6]		382	473
Average birth date of calves, Nov.		3	6
Winter feed per cow, lbs.[7]			
Prairie hay		4474	3096
Cottonseed meal		262	329
Ground milo		---	974
Financial, dollars			
Feed cost per cow[8]		57.73	68.38
Selling value			
Per 100 lbs.			
Steers		29.50	28.00
Heifers		26.00	25.00
Per head[9]		100.42	121.22
Selling value minus feed cost		42.69	52.84

[1]Fed 1.43 lb. of pelleted cottonseed meal per head daily in addition to prairie hay starting October 27.
[2]Self-fed a cottonseed meal-milo-salt mixture as supplement to prairie hay during winter. The average daily consumption was 1.80 lb. cottonseed meal, 5.32 lbs. ground milo and 1.84 lb. salt.
[3]Originally there were 14 cows in Lot 1 and 10 cows in Lot 2. In Lot 1, one calf drowned, one calf was born deformed, an done cow failed to calve. In Lot 2, one calf was born dead and one cow died for causes apparently unrelated to nutritional treatment.
[4]Corrected for sex by the addition of 3 lbs. to the birth weight of each heifer.
[5]Corrected for sex by the addition of 18 lbs. to the weight of each heifer after a 170-day age correction.
[6]Corrected for sex by the addition of 43 lbs. to the weight of each heifer after a 260-day age correction.
[7]Not including salt and steamed bone meal.
[8]Using prices of feeds and pasture at the time tests were conducted.
[9]Based on an equal number of steers and heifers in each lot using the age- and sex-corrected weaning weights as the steer selling weight and this weight minus 43 lbs. (sex-correction factor) as the average weight of the heifers.

In the fall of 1960, the same heifers were continued in the test. Prairie hay was fed ad lib. The low level of supplemental feed for heifers on the range was 2.78 lbs. of cottonseed meal pellets per head daily, and the high level of supplemental feed was 7.35 lbs. of a pellet containing 35 percent cottonseed meal and 65 percent ground milo. The supplemental feed for the cows fed hay in the traps was 1.39 lb. of pelleted cottonseed meal for the low level and a milo-cottonseed meal-salt mixture self-fed for the high level. The average daily consumption was 4.85 lbs. of milo, 1.76 lb. of cottonseed meal, and 1.78 lb. of salt. Supplemental feeding was started on October 17, 1960 and discontinued on April 19, 1961.

All cattle grazed the native grass pastures during the summer. A mineral mixture of 2 lbs. salt and 1 lb. steamed bone meal was available at all times.

Estimates of milk production of the cows were obtained on December 2, December 31, February 11, March 11, April 20, May 30, June 23, and July 18. The technique used in estimating milk production was weighing the calf immediately before and after nursing and any increase in weight was recorded as the quantity of milk produced by the cow. The 24-hour estimates are the average of three 8-hour estimates on December 8 when the calves were young, and the average of two 12-hour estimates on subsequent dates.

Results

A summary of the level of wintering data is given in Table 2.

The cows fed the low level of supplement in the traps (Lot 1) consumed more hay than those fed the high level (Lot 2). The average daily consumption was 19.9 and 15.0 lbs., respectively. Estimated total digestible nutrient intakes were 9.68 and 11.65 lbs. This difference of 1.97 lb. of TDN per head daily was reflected in the winter weight losses of 140 and 17 lbs. for the cattle in Lots 1 and 2, respectively.

When dry range grass was the forage available, the cows on the low level lost 179 lbs. and those on the high level lost 190 lbs. It is probable that the TDN intakes of these two groups were nearly equal. Apparently the cows fed the lower quantity of supplemental feed consumed more dry range grass, although no estimates of consumption are available.

Differences in spring calf weights favored the higher levels of supplemental feed. The difference was 17 lbs. for the groups fed prairie hay and 6 lbs. for those on the range. Average weaning weights were 357 and 371 lbs. for the low and high levels of feeding in the traps, and 337 and 343 for the low and high levels on the range, respectively. Therefore, the high level of feeding increased weaning weights only 14 lbs. in the traps and 6 lbs. on the range.

Both the steers and heifers were weaned in July and sold as good-choice feeder calves at the Oklahoma City Stockyards. The steers sold

Table 2. Levels of Supplemental Winter Feeding of Two-Year-Old Beef Cows.

Location	Trap		Range	
Lot Number Level of Supplemental Feed	1 Low[1]	2 High[2]	3 Low[3]	4 High[4]
Number of cows raising calves[5]	15	11	13	11
Average weight per cow, lbs.				
Initial 10-13-60	948	965	909	972
Spring 4-19-61	808	948	730	782
Weaning 7-18-61	927	1016	857	911
Winter gain	—140	—17	—179	—190
Gain to weaning	—21	51	—52	—61
Average weight per calf, lbs.				
Birth[6]	73	72	69	72
Spring[7]	193	210	165	171
Weaning[8]	357	371	337	343
Average birth date of calves, Nov.	18	17	18	12
Average winter feed per cow, lbs.[9]				
Cottonseed meal	253	336	512	477
Ground milo	---	893	---	789
Prairie hay[10]	3670	2766	---	---
Range	---	---	ad lib.	ad lib.
Total feed cost per cow ($)	51.79	69.45	42.41	54.09
Selling value ($)				
Per 100 lbs.				
Steers	29.50	29.50	29.50	29.50
Heifers	26.00	26.00	26.00	26.00
Per head[11]	93.48	97.36	87.93	89.59
Selling value minus feed cost ($)	41.69	27.91	45.52	35.50

[1]Fed 1.39 lbs. of cottonseed meal per head daily in addition to prairie hay.
[2]Cows fed same as those in Lot 1 until October 27, at which time the cows started receiving a milo-salt-cottonseed meal mixture from a self-feeder. Over the entire wintering period, the average consumption was 4.85 lbs. of milo, 1.76 lb. of cottonseed meal, and 1.78 lb. of salt.
[3]Fed 2.78 lbs. of cottonseed meal pellets per head daily.
[4]Cows fed same as those in Lot 3 until November 5, at which time the daily feed was increased to 7.35 lbs. of pellets consisting of 35 percent cottonseed meal and 65 percent ground milo.
[5]There were 18, 18, 18, and 17 heifers in Lots 1, 2, 3, and 4, respectively, in the experiment in 1959-60. In Lot 1, two cows failed to calve and one calf was born dead. In Lot 2, two cows failed to calve three calves were born dead, and two calves died. In Lot 3, four cows failed to calve and one calf died. In Lot 4, three cows aborted, two cows failed to calve, and one calf died.
[6]Corrected for sex by the addition of 3 lbs. to the weight of each heifer.
[7]Corrected for sex by the addition of 18 lbs. to the weight of each heifer after a 150-day age correction.
[8]Corrected for sex by the addition of 43 lbs. to the weight of each heifer after a 240-day age correction.
[9]184 days of feeding which started 10-17-60.
[10]Total pounds of prairie hay consumed per cow. Average daily consumption was 19.9 lbs. per head daily in Lot 1 and 15 lbs. in Lot 2.
[11]Using prices of feeds and pasture at the time tests were conducted.
[12]Based on an equal number of steers and heifers in each lot using the age- and sex-corrected weaning weights as the steer selling weight and this weight minus 43 lbs. (sex-correction factor) as the average weight of heifers.

for an average of $29.50 per 100 lbs. and the heifers for $26 with no differences among the lots. When 1960-61 feed costs were used, the total feed cost (including pasture) per cow was $51.79, $69.45, $42.41, and $54.09 for Lots 1, 2, 3, and 4, respectively. Since weaning weights were increased only slightly by the high level of wintering but feed costs were increased considerably, the higher level of feeding was not economical.

A summary of the milk production data is presented in Table 3. Only those cows which had calved prior to December 2 (date of the first milk production estimate) were included in the data, although milk yields were obtained for all lactating cows within each of the four lots.

Table 3. Average Daily Gains of Calves and Milk Yields of Cows, and Their Correlations, 1960-61.

Location	Trap		Range	
Lot Number Level of Supplemental Feed	1 Low	2 High	3 Low	4 High
Average daily gain, lbs.	1.16	1.27	1.06	1.18
Average milk yield, lbs.	6.82	6.88	5.33	6.54
Correlation coefficient	.75	.91	.80	.80

The average yields were nearly equal in Lots 1 and 2 but there was more than a 1 lb. difference in average yield of the cows in Lots 3 and 4. The correlation coefficients between average daily gain of the calves and average milk yield of the cows were relatively high (.75 to .91). These indicate that the fastest gaining calves were those which obtained the most milk from their mother.

The yields were highest on December 2. Both groups of cows fed hay in the traps produced a greater quantity of milk during the entire wintering period than those on the range. Milk production gradually declined until April 20 (when supplemental feeding was stopped) for all lots except the high level in the trap. The milk production of the three lots increased when green grass was available and then declined until weaning in July. The production of the lot fed on the high level in trap stayed higher than that of the other lots during the winter, was relatively high in April, and then gradually declined to July without the increase in May as was noted in the other lots.

Summary

Fall-calving cows were fed at different levels of supplemental winter feed in two experiments. In the experiment with three and one-half-year-old cows, prairie hay was the roughage during the winter feeding season. Feeding a high level of supplement decreased winter weight losses of the cows and markedly increased weaning weights of the calves compared to feeding a low level of supplement. With first-calf two and one-half-year-old heifers fed prairie hay in a trap and those grazing the dry range, the level of winter feeding had little effect on weaning weights of the calves. Weight losses of the cows were less and weaning weights of the calves were heavier for cows fed prairie hay than for those grazing dry grass. Estimated milk production of the cows was relatively low but was highly correlated with average daily gain of the calves.

Effect of Alternate Low-High or High-Low Winter Feed Levels on Growth and Reproduction of Replacement Heifers

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A serious obstacle in maintaining a cow-calf herd is the long interval between birth and the time the young heifer gets into production. In well-managed herds, heifers usually calve at two or three years of age. This results in considerable expense in rearing the replacement heifer, much of which is related to the cost of supplemental feed during the first and second winter periods. Any method of reducing this cost without affecting reproduction or future usefulness, therefore, would improve the net return.

As a part of an extensive study on the effect of different planes of nutrition to which the beef female is exposed during the winter, one phase was directed toward the problem of how seriously poor feed levels may effect body development and reproductive processes during the first winter as a weaner calf, or the second winter as a bred yearling.

Plan of Experiment

In the fall of 1960, 75 weaner, Hereford, heifer calves were selected from the Ft. Reno Experimental herd for similarity in age, weight, sire, and productivity of dam. Five uniform groups were started on winter feeding tests in early November at aproximately eight months of age.