Effect of Level of Wintering Fall-Calving Beef Cows and Replacement Heifers

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An increased number of cows calving in the fall has resulted in a need for additional data on feeding and managing such cattle grazing native grass (Bluestem and associated grasses) yearlong. The nutritive requirements of a cow suckling a calf are markedly greater than for a pregnant cow. Thus, the primary problem in a fall-calving program is to determine the most satisfactory level of supplemental winter feed for the cow. The quantity of supplemental feed will vary according to the amount and quality of forage available in a pasture. In many areas of our state the native grasses furnish practically all of the roughage consumed by a cow herd.

For several years we have been feeding different levels of supplemental winter feed to fall-calving cows grazing dry grass. In the original study with mature cows (Okla. Agr. Exp. Sta. MP-55:72), at the Lake Blackwell experimental range area where adequate native grass was available, the low level of wintering (1.5 pounds of cottonseed meal per head daily) was more profitable than the high level (2.5 pounds of C.S.M. plus 3 pounds of grain). In later studies with young cows fed at different levels the production usually has not been satisfactory.

This report summarizes the data collected during 1959-60 using: (1) four-year-old cows producing their third calf, (2) three-year-old cows producing their second calf, (3) two-year-old heifers producing their first calf, (4) yearling heifers, and (5) heifer calves.

Part 1. Results with Four-Year-Old Cows, 1959-60.

Procedure

The four-year-old cows used in this study had been wintered at different levels of supplemental feed the previous two seasons. Thus, they were subjected to different levels of supplemental winter feed as heifers calving in the fall at 2½ years of age (1957-58) and again during the winter of 1958-59 as 3½ year-olds. In both tests neither group of cows produced calves of desirable weaning weight, although the higher level of feed increased calf weights. These same cows were continued on test for another season in order that accumulative effects of the different levels of supplemental winter feed could be studied. Both lots of cows were allowed to graze the native grass pastures yearlong. The stocking rate was approximately 8 acres of pasture per cow. The low level of supplemental feed was increased from 1.1 pounds pelleted

cottonseed meal to 2.5 pounds. The high level was 6.58 pounds of pellets consisting of 40 percent cottonseed meal and 60 percent ground milo. Thus, daily consumption per head in Lot 2 (high level) was 2.63 pounds of cottonseed meal and 3.95 pounds of ground milo. These pellets were fed in bunks every other day in amounts to furnish the above pounds per head daily. Supplemental winter feeding started October 13, 1959, and was discontinued April 22, 1960 (192 days).

Hereford bulls were placed with the cows January 8, 1959. Consequently, the first calves were born in mid-October. One cow in Lot 1 was found to be not pregnant upon examination in June and was removed from the experiment. In Lot 2, one cow was open, one cow failed to calve, and one calf was born dead. Therefore, 12 of the 13 cows in Lot 1 which raised calves in 1958-59 weaned calves in 1959-60. In Lot 2, 13 of the 16 cows weaned calves. None of the calves were creep-fed.

Results

A summary of the data collected in this test is given in Table 1. The cows in Lot 1 lost an average of 306 pounds or 28 percent of their body weight. The loss in Lot 2 was 279 pounds or 25 percent.

The average birth weight of the calves was 3 pounds in favor of Lot 2 and these calves were born an average of 3 days earlier than those in Lot 1. The spring weights of both lots of calves were relatively light. These average weights were 201 and 233 pounds for those in Lots 1 and 2, respectively. Thus, the high level of wintering had increased calf weights an average of 32 pounds. This difference decreased to 9 pounds by weaning in July (388 vs. 397 pounds). These weights were an increase of 42 and 10 pounds for Lots 1 and 2, respectively, when compared to the weaning weights of calves from these same cows as three-year-olds (1958-59). However, it should be noted that the quantity of supplemental feed received by the low level cows was more than twice the amount they received in the 1958-59 season, whereas the quantity fed to the high level cows (Lot 2) remained about the same.

Both lots of calves were weaned and sold as feeders in July at the Oklahoma City stockyards. The steers sold for an average of $27 per 100 pounds and the heifers sold for $25. The cost of the increased feed for Lot 2 was greater than the increased value of the calves. The selling value minus feed cost was $11.66 in favor of the low level. ($55.38 vs. $43.72).

In the tests with mature cows (4-year-summary reported in 1959), it appeared that their production might not be greatly affected by losses of 25 to 30 percent of their body weight. However, results with four-year-olds, and with the same cows as two-year-olds and three-year-olds indicate that production of younger animals may be reduced unless the weight losses are considerably decreased. In the test just discussed (1959-60), both cows receiving the low and the high level of supplemental feed failed to produce calves with desirable weaning weights.

Table 1.—Levels of Supplemental Winter Feeding of Four-Year-Old Beef Cows, 1959-60.

Lot Number Level of Feeding	1 Low[1]	2 High[2]
Number of cows per lot raising calves[3]	12	13
Average weight per cow (lbs.)		
Initial 10-13-59	1089	1116
Spring 4-22-60	783	837
Weaning 7-22-60	994	1093
Fall 10-7-60	1037	1070
Winter gain (192 days)	—305	—279
Gain to weaning	—105	—113
Yearly gain	— 52	— 46
Average weight per calf (lbs.)		
Birth[4]	73	76
Spring[5]	201	233
Weaning[6]	388	397
Average birth date of calves, Nov.	10	7
Supplemental feed per cow (lbs.)[7]		
Cottonseed meal	480	503
Ground milo		699
Total feed cost per cow ($)[8]	40.12	54.12
Selling value ($)		
Per 100 lbs.		
Steers	27.00	27.00
Heifers	25.00	25.00
Per head[9]	95.50	97.84
Selling value minus feed cost ($)	55.38	43.72

[1] Fed 2.5 lbs. pelleted cottonseed meal per head daily.

[2] Fed same as Lot 1 until October 28, at which time the daily feed was increased to 6.58 lbs. of pellets consisting of 40% cottonseed meal and 60% milo. Daily consumption was 2.63 lbs. of cottonseed meal and 3.95 lbs. milo.

[3] There were 13 and 16 cows in Lots 1 and 2, respectively, in the experiment in 1958-59. One cow was open in Lot 1. In Lot 2, 1 cow was open, 1 cow failed to calve and 1 calf was born dead.

[4] Corrected for sex by the addition of 3 lbs. to the 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 by interpolatin.

[6] Corrected for sex by the addition of 43 lbs. to the weight of each heifer after a 260-day age correction by interpolation.

[7] 192 days of feeding which started 10-13-59.

[8] Includes pasture cost and prices of feeds 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 heifers.

Part 2. Results with Three-Year-Old Beef Cows, 1959-60.

Procedure

A second test was initiated in the fall of 1958 to study the effect of 20 and 30 percent body weight losses upon the production of fall-calving heifers. The heifers calved first as 2½ year-olds in the fall of 1958.

A summary of the results for the 1958-59 season was reported in Okla-Agr. Exp. Sta. MP-57.

The cows as mentioned above were continued in the test in the fall of 1959. Thus, the cows were 3½ years of age and suckling their second calf during the wintering season of 1959-60. The cows were weighed and divided into their respective lots on October 8, 1959. All three lots of cows had access to the native grass pastures. However, some changes were made in the supplemental feed allowances relative to the previous season. The cows in Lots 1 and 2 (low level) were fed an average of 2.5 pounds of cottonseed meal pellets per head daily. This was an increase of approximately 1.1 pounds. Those in Lot 3 (high level) were fed 6.25 pounds of a pelleted mixture consisting of 40 percent cottonseed meal and 60 percent ground milo. Thus, each cow received 2.5 pounds of cottonseed meal and 3.75 pounds of ground milo daily. The calves in Lot 1 were offered creep-feed starting December 31, 1959.

Results

A summary of the data collected in 1959-60 is given in Table 2. The average birth weights of the calves were nearly equal. However, the average birth date is considerably different; those in Lot 3 were 19 days younger than those in Lot 2 and 29 days younger than those in Lot 1. Much of these differences in average calving date were due to the presence of a sterile bull. Bulls were rotated among the lots at 2-week intervals during the breeding season, therefore the presence of the infertile bull is responsible for at least a portion of the later average calving date in both Lots 2 and 3. Both the spring and weaning weights have been corrected for sex and age.

The cows lost an average of 287, 301, and 252 pounds in Lots 1, 2, and 3, respectively. The percentage of body weight loss for the three respective lots was 26, 29, and 25 percent. Since the cows were suckling calves during most of the winter feeding period, any effect of the two levels of supplemental feed on calf weights should be apparent in the weights of the calves in mid-April when supplemental feeding was stopped. The increased level of winter feeding of the cows in Lot 3 increased the average calf weight 45 pounds when compared to the other non-creep-fed calves (Lot 2). Therefore, the high level of winter feeding increased spring weights of the calves in addition to decreasing winter weight losses of the cows. Creep-feeding was also reflected in the average spring calf weights. The difference in favor of creep-feeding calves whose mothers were fed at the low level was 62 pounds. These spring weight differences of 45 pounds (Lot 3 vs. Lot 2) and 62 pounds (Lot 1 vs. Lot 2) correspond very closely with 49 pounds and 61 pounds, respectively, noted during the previous season with these same cows.

The calves were weaned on July 22 and sold at the Oklahoma City stockyards. All calves sold as feeders. The steers sold for $27 per 100 pounds and the heifers for $25. The calves averaged 416, 331, and 392 pounds for Lots 1, 2, and 3, respectively. The high level of winter

Table 2.—Levels of Supplemental Winter Feeding of Three-Year-Old Beef Cows, 1959-60.

Lot Number Level of Feeding	1 Low[1] (Creep-fed)	2 Low[2]	3 High[3]
Number of cows per lot raising calves[4]	11	10	14
Average weight per cow (lbs.)			
Initial 10-8-59	1088	1040	1019
Spring 4-22-60	801	739	767
Weaning 7-22-60	1052	992	1021
Fall 10-7-60	1083	1062	1058
Winter gain (197 days)	—287	—301	—252
Gain to weaning	— 36	— 48	2
Yearly gain	— 5	22	39
Average weight per calf (lbs.)			
Birth[5]	72	71	73
Spring[6]	230	168	213
Weaning[7]	416	331	392
Average birth date of calves[8]	Oct. 19	Oct. 29	Nov. 17
Supplemental feed per animal (lbs.)[9]			
Cow			
Cottonseed meal	493	493	493
Ground milo			578
Calf (Creep-feed)	1042		
Total feed cost per head ($)[10]			
Cow	40.53	40.53	51.51
Calf	2605		
Total	66.58	40.53	51.51
Selling value ($)			
Per 100 lbs.			
Steers	27.00	27.00	27.00
Heifers	25.00	25.00	25.00
Per head[11]	102.78	80.68	96.54
Selling value minus feed cost ($)	36.20	40.15	45.03

[1] Fed 2.5 lbs. pelleted cottonseed meal per head daily. Creep-feeding of calves was started December 31.

[2] Cows fed same as those in Lot 1.

[3] Cows fed same as those in Lots 1 and 2 until November 20, at which time the daily feed was increased to 6.25 lbs. of pellets consisting of 40% cottonseed meal and 60% ground milo.

[4] There were 16, 15 and 15 cows in Lots 1, 2 and 3, respectively, in the experiment in 1958-59. In Lots 1, 2 and 3, respectively, 3, 2 and 1 cows were found to be open upon pregnancy examination 7-6-59 and were therefore removed from the experiment. In addition, 1, 2 and 1 cows failed to calve in Lots 1, 2 and 3, respectively. One calf was born dead in Lot 1 and 1 calf died in Lot 2. In Lot 3 one cow which was not included in the 1958-59 data was used in 1959-60.

[5] Corrected for sex by the addition of 3 lbs. to the birth weight of each heifer.

[6] Corrected for sex by the addition of 18 lbs. to the weight of each heifer after a 170-day age correction.

[7] Corrected for sex by the addition of 43 lbs. to the weight of each heifer after a 260-day age correction by interpolation.

[8] The bulls were rotated among the pastures at 2-week intervals during the calving season. One of the bulls was found to be sterile and this is probably responsible for a major portion of the differences in average calving date.

[9] 197 days of feeding which started 10-8-59.

[10] Includes pasture cost and prices of feeds at time tests were conducted.

[11] 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.

feeding increased average calf weights 61 pounds over the low level non-creep-fed calves (Lot 2 vs. 3). The increase in calf value due to the high level of wintering cows was $4.88 ($45.03-$40.15) greater than the increased cost of supplemental feed.

Creep-feeding resulted in an increased gain of 85 pounds for calves from the low level cows (Lot 1 vs. 2). Also creep-feeding and low level feeding of cows (Lot 1) resulted in calves which weighed 24 pounds more than calves from cows on the high level of feeding (Lot 3). The creep-fed calves consumed an average of 1042 pounds of creep-feed which cost $26.05. Subtracting both the cow and creep-feed cost from the selling value per calf resulted in decreased profits of $3.95 for creep-feeding on the low level of wintering. The average increase in return for calves in Lot 1, after subtracting both the cow and calf feed costs, was $8.83 less than the return for calves from Lot 3 cows (high level). Therefore, in contrast to the previous trial with these cows, it was more profitable to offer increased feed to the cows rather than to the calves.

Part 3. Results with Two-Year-Old Heifers, 1959-60.

It appeared from previous results that the production of young cows calving in the fall may be hindered when they are fed to lose 20 to 30 percent of their body weight. Because weaning weights of calves from both two and three-year-old cows were undesirable in previous seasons, the effects of reducing the winter weight losses of young cows calving in the fall are being studied. The nutrient intake of heifers used in this test was increased by feeding of prairie hay rather than allowing the cattle to graze the dry native grass.

Procedure

The heifers used in this test had previously been subjected to different levels of supplemental winter feed as yearlings (1958-59). During the winter as yearlings a certain bull was left in each lot for the entire breeding season. In the 1959-60 season, the 28 pregnant heifers were divided into 2 lots on the basis of weight and previous winter treatment (or breeding group). In Lot 1 (low level) there were 7 heifers which were fed on the low level as yearlings and 7 on the high level. In Lot 2 (high level) the numbers were 6 and 8 for the high and low levels, respectively.

Both lots of cows were retained in adjacent traps (approximately 3 acres per lot) during the supplemental feeding period. Prairie hay was fed ad libitum. The supplement in Lot 1 was 1.43 pounds of pelleted cottonseed meal per head daily. In Lot 2, 6.25 pounds of a mixture consisting of 25 percent cottonseed meal and 75 percent ground milo was fed. The intake was 1.56 pounds cottonseed meal and 4.69 pounds ground milo.

Results

A summary of the results may be found in Table 3. There was only a small difference in the winter weight losses of the two groups of heifers (140 vs. 111 pounds). The reason for the small difference is apparent when one notes the feed intake of the two groups. The cattle in Lot 1 consumed an average of 25.5 pounds of prairie hay and 1.43 pounds cottonseed meal. This 26.93 pounds of feed is estimated to contain 12.15 pounds total digestible nutrients (TDN). The TDN content of the 17.8 pounds of prairie hay and 6.25 of supplemental feed (24.05 pounds total) fed to those in Lot 2 is estimated to be 12.6 pounds. This is a difference of only 0.45 pound estimated TDN intake.

Four calves in Lot 2 were born dead. The assistance of a veterinarian was required for two of these calves. All four calves were in the high level group for the current winter but had been on the low level as yearlings. Whether or not these losses are related to the feeding practice is unknown. Certainly the cause of these losses is not related to the current level of feeding because the calves were born before or shortly after supplemental feeding was started. There were no calving losses in the low level group (Lot 1).

The average spring weights of calves were 193 pounds and 207 pounds for those in Lots 1 and 2, respectively. The spring weights appear to be rather light even though the cows had lost only 15 and 11 percent of their body weight in Lots 1 and 2, respectively, at the end of the wintering period. These spring weights show an increase of 11 pounds over those noted for calves from fall-calving 2½ year old heifers in 1957-58. The increased weight over the calves from the low level (Lot 2) and high level heifers (1958-59) was 41 and 6 pounds, respectively.

The calves were weaned on July 22 and sold as feeders at the Oklahoma City stockyards. The high level of winter feeding increased calf weaning weights an average of only 4 pounds (374 vs. 370 pounds) over the low level. However, practically no difference would be expected at weaning since the difference in the average spring weights was only 14 pounds. The small difference in the average weights of calves from the two groups would be related to the small difference in TDN consumed by the cows. Thus, one would not expect any large differences in weaning weights to exist in this trial.

The steers sold for an average of $27 per 100 pounds and the heifers sold for $25. Subtracting total cow feed cost from the selling value per calf resulted in increased profits of $6.26 ($60.49 vs. $66.75) in favor of the low level of wintering. The increased cost of concentrates for Lot 2 more than offset the increased cost of prairie hay for Lot 1. Therefore, the low level of wintering proved more profitable in this study.

The cows were rebred during the winter of 1959-60 and additional data are being collected during the 1960-61 season. More information on this system of raising fall calves from young cows will be available when the calves are sold in mid-summer.

Table 3.—Levels of Supplemental Winter Feeding of Two-Year-Old Beef Heifers, 1959-60.

Lot Number Level of Feeding	1 Low[1]	2 High[2]
Number of cows raising calves[3]	14	10
Average weight per cow (lbs.)		
Initial 10-8-59	964	976
Spring 4-23-60	824	865
Weaning 7-22-60	948	986
Fall 10-7-60	1005	1038
Winter gain (198 days)	—140	—111
Gain to weaning	— 16	10
Yearly gain	41	62
Average weight per calf (lbs.)		
Birth[4]	64	67
Spring[5]	193	207
Weaning[6]	370	374
Average birth date of calves, Nov.	6	9
Feed per cow (lbs.)[7]		
Cottonseed meal	283	306
Ground milo		835
Prairie hay[8]	5049	3519
Feed cost per cow ($)[9]	60.49	66.75
Selling value ($)		
Per 100 lbs.		
Steers	27.00	27.00
Heifers	25.00	25.00
Per head[10]	90.82	91.86
Selling value minus feed cost ($)	47.83	42.61

[1] Fed 1.43 lbs. of cottonseed meal pellets per head daily in addition to prairie hay.

[2] Cows fed same as those in Lot 1 until October 28, at which time the daily feed was increased to 6.25 lbs. of pellets consisting of 25% cottonseed meal and 75% ground milo. All cows received prairie hay in addition to the pellets.

[3] Originally, there were 14 cows in each of Lots 1 and 2. In Lot 2, 4 calves were born dead.

[4] Corrected for sex by the addition of 3 lbs. to the 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 by interpolation.

[7] 198 days of feeding which started 10-8-59.

[8] Total pounds of prairie hay consumed per cow. Average daily consumption was 25.5 and 17.8 lbs. per head in Lots 1 and 2, respectively.

[9] Includes prices of feeds at the time tests were conducted. The summer pasture charge was $17.50 per head.

[10] 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 4[illegible] lbs. [illegible]

Part 4. Results with Yearling Heifers, 1959-60.

Procedure

Heifer calves fed on two levels of supplemental winter feed during 1958-59 were continued on test and fed at the low and high levels during the 1959-60 winter feeding season as yearlings. Those on the low level in 1958-59 were continued on the low level; however, one-half was fed prairie hay in a trap and one-half was allowed to graze the native grass. Of the 35 head on the high level in 1958-59, 18 were fed prairie hay and the remaining 17 grazed the dry range grass in 1959-60.

The supplemental feed for those on the low level (both in traps and on range) was 1.11 pounds cottonseed meal. Those on the high level were fed 6.94 pounds of the 35 percent cottonseed meal and 65 percent ground milo pellet. In addition to a comparison of the two levels of supplementing each roughage, this design will allow a direct comparison of the value of prairie hay vs. dried range grass at two levels of supplemental feeding.

Results

As was true for the two-year-old heifers, the yearlings fed the lower level of supplement consumed more hay than those fed a high level of supplement (see Table 4). The average daily hay consumption was 18.9 pounds in Lot 1 and 10.8 pounds in Lot 2. The total amount of feed consumed was 20 and 17.7 pounds for the two lots, respectively. The estimated TDN intakes were 9.04 and 10.01 pounds. With this difference in TDN intake, a large difference in weight gain should not be expected. At the end of the supplemental winter feeding period in mid-April the difference in winter gain was 23 pounds (43 vs. 66 pounds). The average supplemental feed cost per head was $43.76 and $57.09 for the low and high levels in the traps, respectively. Therefore the supplemental feed cost was $13.33 greater for Lot 2 (high) than for Lot 1 (low level).

When dry range grass was the forage available, the winter gains on the low and high levels of supplemental feeding were —60 and 19 pounds, respectively. The average supplemental feed cost was increased $21.01 per head by increasing the level of feeding.

The gain of heifers fed the low level of supplemental feed was 43 pounds for those fed prairie hay and —60 pounds for those on dry range. This difference of 103 pounds is apparently due to the difference in nutritive value of the roughages. Actually, the difference was considerably greater prior to the appearance of green grass in the spring. Of those fed prairie hay, there was a difference in gain of 47 pounds (66 vs. 19 pounds) in favor of the high level heifers. The subsequent summer gains while grazing the native grass pastures were in favor of the low level heifers. Thus, the summer gains were inversely related to the winter gains. Yearly gains were approximately the same during the wintering period whereas the yearly

gains for the low level heifers in the trap were 41 pounds greater than the high level.

In this trial, increasing the quantity of concentrates decreased the amount of prairie hay consumed (Lots 2 vs. 1). Based upon these data, we must assume that the dry grass consumption by the cattle on the range was also reduced. These data indicate that when high levels of supplemental feed are offered we are reducing the roughage intake. A sound cow-calf enterprise is usually based on a high intake of roughage because this roughage is usually the cheapest source of energy. Only when the cost of grains is relatively low or when additional winter gains are desirable should a very high level of supplemental concentrate be fed to range cattle.

These heifers were bred to Hereford bulls and calved in the fall of 1959 when they were 2½ years old. They are presently being continued in the test while suckling a calf. These tests will allow a study of the effects of feeding at the different levels for several successive winters during the development of the beef female.

Table 4.—Levels of Supplemental Winter Feeding of Yearling Beef Heifers, 1959-60.

Location	Trap		Range	
Lot Number	1	2	3	4
Level of Feeding	Low[1]	High[2]	Low[1]	High[2]
Number of heifers per lot	18	18	18	17
Average weight per heifer (lbs.)				
Initial 10-23-59	654	720	669	730
Spring 4-23-60[3]	697	786	609	749
Fall 10-13-60	943	968	903	963
Winter gain	43	66	—60	19
Yearly gain	289	248	234	233
Average feed consumption per heifer (lbs.)				
Cottonseed meal	202	445	183	401
Ground milo	---	825	---	744
Prairie hay[4]	3462	1983	---	---
Range	---	---	ad. lib	ad. lib.
Feed cost per head ($)[5]	43.76	57.09	23.76	44.77

[1] Both the heifers in the trap and those on the range were fed 1.11 lbs. of pelleted cottonseed meal per head daily. In addition, the heifers in the trap received prairie hay. Supplemental feeding was started 10-23-59 and 11-10-59 for the heifers in the trap and those on the range, respectively.

[2] Heifers on the range fed 6.94 lbs. of pellets consisting of 35% cottonseed meal and 65% ground milo. Those in the trap were fed the same plus prairie hay. Starting dates for winter feeding were the same as those listed above.

[3] 183 and 165 days of supplemental feeding for the heifers in the trap and those on the range, respectively.

[4] Total pounds of prairie hay consumed per heifer. Average daily consumption was 18.9 and 10.8 lbs. in Lots 1 and 2, respectively.

[5] Yearly pasture cost of $18.00 per head for Lots 3 and 4 is included. Summer pasture cost was $14.00 per head for Lots 1 and 2.

Part 5. Results with Weanling Heifer Calves, 1959-60.

Procedure

On November 6, 1959, 60 heifers were divided into two groups of 30 head. All heifers were fed prairie hay, ad libitum. In addition, those in Lot 1 were fed 0.5 pounds of pelleted cottonseed meal per head daily. During the early part of the test those in Lot 2 were fed 5 pounds of a mixture consisting of 25 percent cottonseed meal and 75 percent ground milo. Although the quantity was increased to 7 pounds per head daily, the average daily consumption for the 161-day feeding period was 5.93 pounds. One heifer drowned in Lot 2 after falling through the ice on the pond which supplies the water for the cattle.

Results

The winter weight gains (Table 5) were —6 and 95 pounds for the low and the high level of wintering, respectively. This 101 pounds of increased gain resulted from feed consumption which cost an additional $15.32 per head. Average daily hay consumption was 10.58 pounds in Lot 1 and 7.58 pounds in Lot 2. The estimated daily TDN was 4.97 pounds for the low level and 7.88 pounds for the high level of supplemental feeding.

Table 5.—Levels of Supplemental Wintering Feeding of Weanling Heifer Calves, 1959-60.

Lot Number Level of Feeding	1 Low[1]	2 High[2]
Number of heifers per lot	30	29[3]
Average weight per heifer (lbs.)		
Initial 11-6-59	435	433
Spring 4-15-60	429	528
Fall 10-21-60	638	701
Winter gain (161 days)	—6	95
Yearly gain	203	268
Average feed consumption per heifer (lbs.)		
Cottonseed meal	80	238
Milo	---	716
Prairie hay[4]	1704	1221
Feed cost per head ($)[5]	28.02	43.34

[1] Supplemental feed was 0.5 lb. pelleted cottonseed meal per head daily.

[2] Quantity of concentrates was gradually increased. Average consumption was 5.93 lbs. per head daily of pellets consisting of 25% cottonseed meal and 75% ground milo. Daily consumption was 1.48 and 4.45 lbs. of these feeds, respectively.

[3] There were originally 30 heifers per lot; however, one heifer drowned after falling through the ice on the pond which supplied the water for the cattle.

[4] Total pounds of prairie hay consumed per heifer. Average daily consumption was 10.58 and 7.58 lbs. in Lots 1 and 2, respectively.

[5] [illegible] pasture cost and prices of feeds at the time tests were conducted.

The high level heifers gained 173 pounds during the subsequent summer grazing season resulting in a yearly gain of 268 pounds. The Lot 1 heifers gained 209 pounds during the summer after approximately maintaining their weight during the supplemental winter feeding period. Their yearly gain was 203 pounds. Therefore, the difference which was present in the spring was reduced but the overall yearly gain was 65 pounds in favor of Lot 2.

These heifers will be fed on a low and a high level of supplemental feeding for successive winters until they have produced two calves in order that accumulative effects of winter losses may be studied.

Summary

Winter weight losses of 20 to 30 percent of body weight appear to be detrimental to the production of young cows calving in the fall. These weight losses and the weaning weights of their calves are related to the quantity of supplemental feed. However, the weaning weights of calves from both the low and high level cows have not been satisfactory.

There are probably many factors related to the low weaning weights obtained in these studies. Certainly, there is a substantial decrease in the nutritive value of the forage during the winter. Also, the nutritive requirements are markedly increased during lactation in addition to the requirements for growth. Apparently, the amount of nutrients consumed by the cows was not adequate for growth and desirable lactation.

A notable reduction in winter weight losses resulted when the dry range grass was replaced by prairie hay. Also, weaning weights were increased by this method. The provision of large quantities of supplemental feed decreases considerably the voluntary intake of prairie hay.

Effect of Feeding Cottonseed Meal At Intervals of Two, Four and Six Days To Yearling Heifers Grazing Dry Range Grass

A. B. Nelson and R. D. Furr

One of the factors to consider in improving range beef cattle production is efficient use of labor. In many areas range cattle are commonly fed supplemental protein every other day instead of daily. In such cases twice the daily allowance is fed every other day. Weekly feeding of sheep in certain sections of Australia during a drouth has satisfactorily