

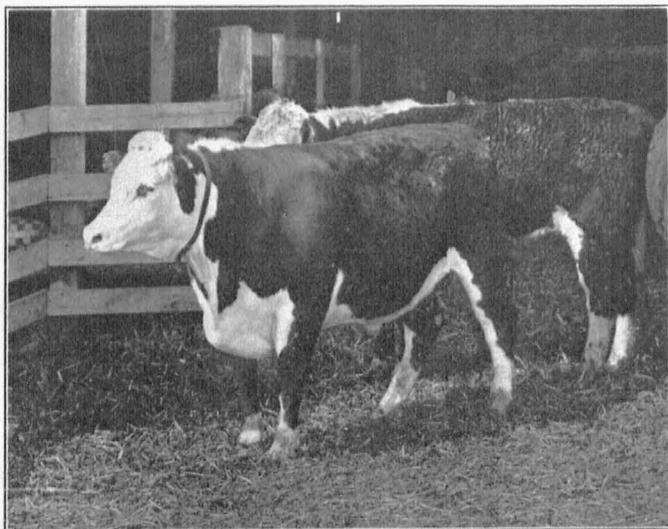
UNIVERSITY OF MISSOURI

COLLEGE OF AGRICULTURE

AGRICULTURAL EXPERIMENT STATION

BULLETIN 218

Limited Use of Shelled Corn in Fattening Two-Year-Old Cattle



COLUMBIA, MISSOURI

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How to Judge a Ration

Three of the most important factors in judging the results of a cattle feeding enterprise are:

1. The rapidity of gain; that is, the average daily gain in weight of the cattle (Table 3) and the weights of the cattle at the beginning and the close of the feeding period; and the total gain in weight on cattle and hogs which follow them. (See Table 4).

2. The amount of feed consumed per pound of gain produced during the various stages of the feeding period and in total. (See Table 5).

3. The condition of the cattle at the close of the feeding period as judged by dressing percentages, the finished appearance of the cattle, and any other factors which may be available.

Limited Use of Shelled Corn in Fattening Two-Year-Old Cattle

E. A. TROWBRIDGE AND H. D. FOX*

Abstract.—In the feeding experiment here reported forty two-year-old steers were divided into five lots and fed for 100 days. All received as much corn silage and clover hay as they would clean up. Shelled corn in varying amounts was fed to three lots and withheld from the other two; while linseed oil cake was fed in varying amounts to all lots. The total and daily consumption of the various feeds are recorded and compared; likewise the total and daily gains made by the several lots. A difference is noted in the gains obtained by adding a full feed of shelled corn to the ration during the last forty days as compared to gains obtained by using a half-portion of shelled corn throughout the entire experiment. The pork produced behind certain lots is also compared. The relative costs of the several feeds are noted and shown to be an important consideration in planning cattle feeding operations.



Fig. 2.— Lot 1, as finished. These cattle were fed a ration of shelled corn, linseed oil cake, corn silage, and clover hay.

The best method of preparing two-year-old beef cattle for market varies with conditions surrounding the operation. When corn is relatively high in price and when there is not a considerable market appreciation of highly finished beef, rations containing a small amount of corn and greater proportions of other concentrated feeds and roughness, may prove most satisfactory. The availability and prices of corn silage, legume hay and nitrogenous supplements during such times may indicate their more extensive use in cattle feeding.

With a more generous market appreciation of well finished cattle there may be conditions when rations involving extensive use of corn silage, legume

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hay and nitrogenous concentrates during the early part of a feeding period may be advisable.

To add further information to the data already obtained on this subject by the Missouri and other experiment stations, the present investigation was inaugurated and carried to completion.

OBJECTS OF EXPERIMENT

The direct objects of the experiment reported in this bulletin were to secure data on the following points:

(1) The possibility of fattening cattle by the extensive use of corn silage without the use of additional corn in the ration.

(2) The possibilities of feeding half a full feed of corn during the entire feeding period, in conjunction with linseed oil meal and a full feed of corn silage and clover hay.

(3) The possibilities of feeding a full feed of corn during the last half of the feeding period only.

(4) The possibilities of feeding a small versus a large allowance of linseed oil meal with corn silage and clover hay.

PLAN

Forty two-year-old feeder steers were divided into five lots of eight head each. The cattle were divided so that the lots were made as nearly alike as it was possible to make them in respect to weight, quality, condition, and thriftiness. The following rations were fed to the various lots:

Lot 1.—Shelled corn. Linseed oil cake (*1 pound to 6 pounds of shelled corn.*) Corn silage. Clover hay.

Lot 2.—Shelled corn (*half as much as fed in Lot 1.*) Linseed oil cake (*same quantity as fed in Lot 1.*) Corn silage. Clover hay.

Lot 3.—Shelled corn (*full-feed for last 40 days only.*) Linseed oil cake (*same quantity as fed in Lots 1 and 2.*) Corn silage. Clover hay.

Lot 4.—Linseed oil cake (*same quantity as fed in Lots 1, 2, and 3.*) Corn silage. Clover hay. *No shelled corn.*

Lot 5.—Linseed oil cake (*58 per cent more than was fed in Lot 4.*) Corn silage. Clover hay. *No shelled corn.*

Each of the five groups of steers from the start received all the corn silage and clover hay they would eat. In addition, those in Lot 1 received a full feed of shelled corn and linseed oil cake in the proportion of 6 pounds of corn to 1 pound of the linseed cake. The cattle in Lot 2 received the same amount of linseed oil cake as those in Lot 1, but only half as much shelled corn. Those in Lot 3 received the same amount of linseed oil cake as those in Lots 1 and 2, but were fed a full feed of corn only during the last 40 days. The steers in Lot 4 received the same amount of linseed oil cake as did those in each of the first three lots, which averaged 2.77 pounds per steer daily, while those in Lot 5 received an average daily allowance of 4.4 pounds.

Pigs were allowed to follow the steers in order to utilize any undigested feed and any that might otherwise be wasted. Four shotes which averaged about 100 pounds in weight at the beginning of the test followed the cattle in Lot 1. Three 90-pound shotes were placed in Lot 2, and one 100-pound shote was placed in each of the three remaining lots. Two additional shotes were placed in Lot 3, when corn was added to the ration fed the cattle in this lot.

After the experiment had been in progress about 60 days it was decided to remove the shotes from Lots 4 and 5 where no corn was fed except that contained in the silage. It was found that the amount of corn which the hogs were able to get in these lots was insufficient to make any appreciable gain. The pigs in no case received feed other than that wasted by the cattle.

EQUIPMENT, SHELTER, AND WATER SUPPLY

The test was conducted at the University experimental feeding plant. This includes a series of lots, 100 feet long, and 19 feet wide, with a shed 20 feet deep along the north side. The lots slope slightly to the south, allowing reasonably good surface drainage, but they are not paved and consequently become muddy during bad weather. Flat-bottomed feed bunks were provided in which grain and silage were fed. Mangers, in which hay was fed, were provided in the shed. Water was supplied in galvanized steel tanks, located in the lots.



Fig. 3.—Lot 2, as finished. They were fed a ration of shelled corn ($\frac{1}{2}$ that of Lot 1), linseed oil cake, corn silage and clover hay.

CATTLE USED IN THE EXPERIMENT

The cattle used in the experiment were good to choice grade Shorthorn and Hereford steers which were purchased on the Kansas City market, weighing in the feedlot 1,028 pounds. They were shipped directly to the experimental lots, and after they had been allowed a few days to obtain a normal fill, were divided into five lots, and the experimental records were started. This experiment was conducted during the winter of 1917 and 1918.

WEIGHT RECORDS

The weights of the cattle and of the pigs which followed were taken in the morning before feeding and watering. After feeding, on the evening previous to the weighing, the tank lids were closed, and the hog troughs emptied. The cattle were weighed individually. Each steer was identified by means of a neckstrap number.

To minimize daily variations in the weights of the steers at the beginning of the test they were weighed on three consecutive mornings. The average of these was taken as the initial weight, and the test was begun on the second day. Similarly, the final experimental weights of the animals were the average of weights taken on three consecutive mornings, and the test closed on the second morning of the three days. Periodic weights were taken at the close of each 30-day feeding period.

QUALITY AND COST OF FEEDS

An effort was made to use feeds of uniform quality throughout the test. With the exception of the hay, a carefully taken composite sample of the various feeds used was collected during the test and analyzed.

Table 1 gives the chemical composition of the feeds that were analyzed. The analyses were made by the department of agricultural chemistry of the Missouri Experiment Station.

TABLE 1.—CHEMICAL COMPOSITION OF FEEDS

Feed	Water (per cent)	Crude protein (per cent)	Fibre (per cent)	N. free extract (per cent)	Crude fat (per cent)	Ash (per cent)
Corn	9.37	8.84	2.57	73.05	4.15	2.025
Linseed oil cake	8.51	35.71	8.85	35.28	4.58	7.07
Corn silage	66.42	2.82	7.92	19.60	1.04	2.20

The corn silage used in this test was made from corn estimated to yield about 50 bushels per acre. The clover hay was of good quality and would have graded as Number 2. Pea-size old process linseed oil cake was fed and the corn used graded as Number 2 mixed.

METHOD OF FEEDING

The cattle were fed twice daily at regular hours; in the morning and the evening. They were fed all the silage and hay they would clean up from the start. Those which received a full feed of shelled corn were started on about 3 pounds per head daily. The amount fed was gradually increased until the close of the first 30-day feeding period, at which time they were practically on a full feed. They were consuming about 16 pounds per head per day at this time. The quantity fed during the remainder of the test varied with the appetites of the steers. In the lots where shelled corn was fed the grain was fed first, the linseed oil cake being mixed with the corn. After the grain was practically all eaten, the silage was fed in the same feed bunks. In the lots where no shelled corn was fed, the linseed oil cake was mixed with the silage at the time of feeding. Hay was fed in mangers provided for that purpose in the shed. Each lot of cattle had access to barrel salt, and the sheds were kept uniformly well bedded.

FEED LOT DATA AND DISCUSSION

The average daily and total consumption of feed is here presented in order that the data may be most conveniently used in application to feedlot problems on farms. (See Table 2).

Three of the most important factors in evaluating the results of a cattle feeding enterprise are:

1. The rapidity of gain; that is, the average daily gain in weight of the cattle (Table 3), and the weights of the cattle at the beginning and the close of the feeding period; and the total gain in weight on cattle and hogs which follow them. (See Table 4).

2. The amount of feed consumed per pound of gain produced during the various parts of the feeding period and in total. (See Table 5).

3. The condition of the cattle at the close of the feeding period as judged by dressing percentages, the finished appearance of the cattle, and any other factors which may be available.

TABLE 2.—AVERAGE DAILY RATION PER STEER BY PERIODS AND AVERAGE FOR 100 DAYS WITH TOTAL.

Feed	First period 30 days	Second period 30 days	Third period 30 days	Fourth period 10 days	Av. Daily ration 100 days	Total feed consumed per steer
	<i>Pounds</i>	<i>Pounds</i>	<i>Pounds</i>	<i>Pounds</i>	<i>Pounds</i>	<i>Pounds</i>
Lot 1.						
Shelled corn	12.41	17.32	18.93	20.00	16.60	1660
Linseed oil cake	2.06	2.88	3.15	3.33	2.77	277
Corn silage	33.06	29.01	21.83	20.00	27.21	2721
Clover Hay	3.64	1.39	1.13	1.43	2.00	200
Lot 2.						
Shelled corn	6.205	8.66	9.46	10.00	8.30	830
Linseed oil cake	2.06	2.88	3.15	3.33	2.77	277
Corn silage	34.68	39.31	36.01	36.00	36.23	3623
Clover hay	5.16	1.204	1.10	1.39	2.38	238
Lot 3.—						
Linseed oil cake	2.06	2.88	2.15	3.33	2.77	277
Shelled corn			11.93	20.00	5.58	558
Corn silage	38.01	49.20	32.26	20.00	37.85	3875
Clover hay	6.00	1.34	1.15	1.31	2.68	268
Lot 4.						
Linseed oil cake	2.06	2.88	3.15	3.33	2.77	277
Corn silage	37.61	49.17	46.81	54.00	45.48	4548
Clover hay	5.77	1.18	1.05	1.32	2.54	254
Lot 5.						
Linseed oil cake	2.85	4.13	5.55	6.40	4.40	440
Corn silage	37.55	48.55	46.23	52.80	44.98	4498
Clover hay	6.00	1.23	1.08	1.26	2.61	261

Table 2 shows the average daily ration consumed per steer for the entire test and by periods, and the total amount of each feed consumed per steer.

The cattle in Lot 1, which were given a full feed of concentrates for the entire period, consumed a gradually increasing amount of these feeds during

each successive period. The quantity of corn silage consumed gradually decreased during the experiment as the concentrated feeds were increased. The amount of clover hay consumed shows a somewhat similar decrease after the first period, although it is not so uniform.

The cattle in Lot 2, which were fed a limited amount of corn (just half as much as was fed to those in Lot 1), consumed more corn silage than did the cattle of Lot 1. The amounts of corn silage consumed during the different periods show less variation than is found in the case of Lot 1. Considerably more clover hay was consumed during the first period, but during the remaining periods the amount differed only slightly from that consumed by the steers in Lot 1. Limiting the amount of corn fed to one-half a "full feed" to the cattle in this lot resulted in the consumption of approximately 33 per cent more corn silage and about 15 per cent more clover hay.

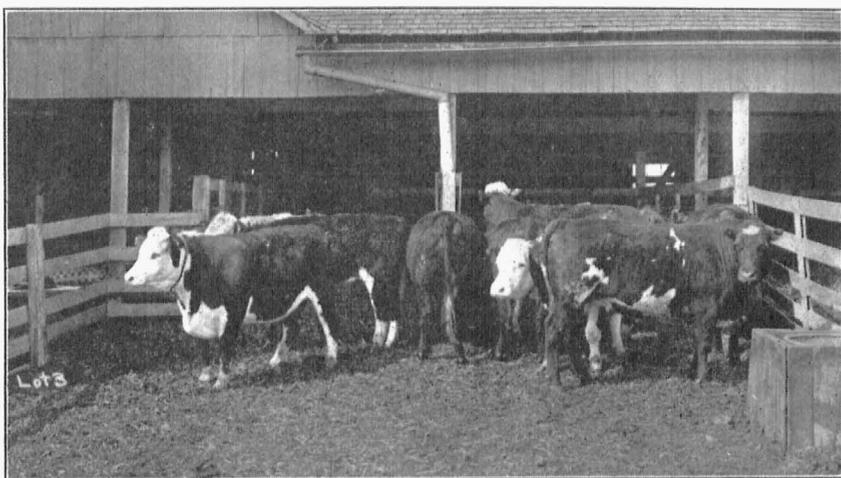


Fig. 4.—Lot 3, as finished. They were fed a ration of shelled corn (full feed for last 40 days only), linseed oil cake, corn silage and clover hay.

The entire elimination of shelled corn from the ration fed the cattle in Lot 3, during the first 60 days of the test, resulted in a greatly increased consumption of corn silage and clover hay during this period. These cattle were given a full feed of corn for the last 40 days. When corn was added to the ration, the consumption of corn silage materially decreased as the corn was increased. The variation in the amounts of clover hay consumed during each period is very similar to the results observed in Lot 2. The consumption of both corn silage and clover hay by Lot 3 varied inversely with the amount of corn fed during each period.

The cattle in Lot 4 received no corn during the entire feeding period and as a result approximately 67 per cent more corn silage was consumed during the period than in Lot 1, and about 17 per cent more than in Lot 3. The consumption of corn silage increased during each successive period, but the amount of hay eaten corresponds closely to that consumed by Lot 3.

The complete elimination of corn from the ration fed the cattle in Lot 5 for the entire feeding period resulted in a periodical and total consumption of both corn silage and hay very similar to that in Lot 4. The only significant difference in the feeds consumed by the two lots of cattle was in the amount of linseed oil cake. The steers in Lot 5 were fed approximately 58 per cent more linseed oil cake than was fed to the cattle in Lot 4.

Table 3 shows the average daily gains per steer in each lot by periods and for the entire feeding period.

Where a full feed of corn was fed to the cattle in Lot 1 the largest gains were made during the first period and the gains decreased each period as the stage of fattening advanced. These cattle made greater average gains for the entire feeding period than the cattle in other lots.

Limiting the corn allowance 50 per cent in Lot 2 resulted in uniformly smaller gains than were obtained in Lot 1 where a full feed of corn was fed.

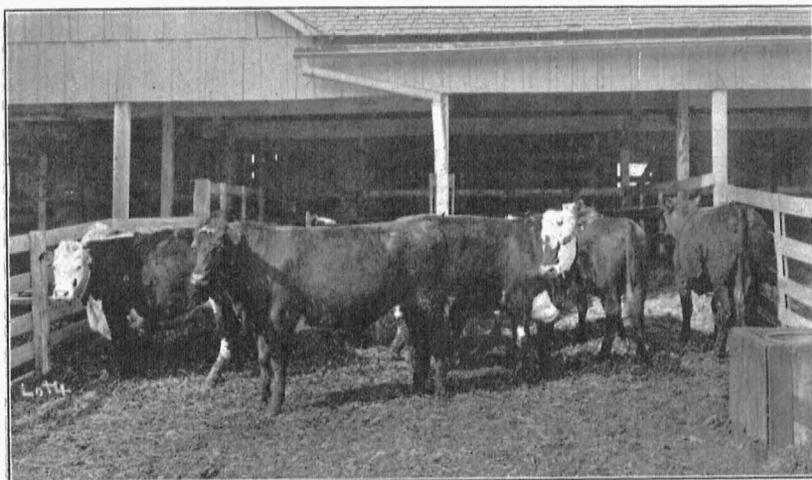


Fig. 5.—Lot 4, as finished. They were fed a ration of linseed oil cake, corn silage and clover hay.

TABLE 3.—AVERAGE DAILY GAINS IN POUNDS PER STEER BY PERIODS AND FOR 100 DAYS.

Lot	First period 30 days	Second period 30 days	Third period 30 days	Fourth period 10 days	Average Daily Gain for 100 days
Lot 1.	3.680	3.062	2.583	2.520	3.05
Lot 2.	3.027	2.458	2.062	1.06	2.37
Lot 3.	2.943	1.612	2.916	2.062	2.448
Lot 4.	3.034	1.979	2.541	0.895	2.356
Lot 5.	2.602	2.341	2.791	-0.354	2.285

Except for the last 10-day period a gradual decrease in daily gains as the feeding period advanced was noted here as in Lot 1. The average daily gains for the entire feeding period are approximately 20 per cent less, than were obtained in Lot 1.

The elimination of corn from the ration during the first 60 days of the feeding period resulted in decidedly greater variation in the periodical gains of the cattle in Lot 3 than occurred in either Lots 1 or 2. The daily gains made during the second period were small, but when corn was added to the ration during the third period, they increased and nearly equalled those made during the first period. A material decrease in daily gain occurred during the fourth period (10 days). The average gains for the entire period are slightly greater than those obtained in Lot 2, which tends to indicate the desirability of a gradually increasing ration.

The gains made by the cattle in Lot 4, where corn was eliminated from the ration for the entire feeding period, varied much during the different periods. The largest daily gains were made during the first and third periods, while those during the fourth period were extremely small. The average gains for the entire period are smaller than those made by any of the lots previously mentioned.

Although the cattle in Lot 5 consumed a larger amount of linseed oil cake and approximately the same amounts of other feeds, they did not make as large gains for the entire period as did the cattle in Lot 4. The largest gains were obtained during the third period, and decidedly the smallest during the fourth period. The gains made during the different periods show more variation than is seen in any of the other lots. The loss indicated during the fourth period may have been due, in part, to the fact that the cattle were disturbed considerably at this time.

Table 4 contains a summary of the weights and gains made on steers and the amount of pork produced per steer during the entire period.



Fig. 6.—Lot 5, as finished. They were fed a ration of linseed oil cake (58% more than Lot 4), corn silage and clover hay.

TABLE 4.—SUMMARY OF WEIGHTS AND GAINS ON STEERS AND PIGS

Rations fed	Average weight per steer		Average gain per steer 100 days	Gain on pigs produced per steer 100 days
	Beginning of test	Close of test		
Lot 1 Shelled corn, Linseed oil cake, Corn silage, Clover hay.	1035.83	1340.83	305.00	50.5
Lot 2 Shelled corn, Linseed oil cake, Corn silage, Clover hay.	1042.29	1279.37	237.08	30.21
Lot 3 Shelled corn, Linseed oil cake, Corn silage, Clover hay.	1023.96	1268.75	244.79	19.5
Lot 4 Linseed oil cake, Corn silage, Clover hay.	1011.46	1247.08	235.62	-----
Lot 5 Linseed oil cake, Corn silage, Clover hay.	1029.81	1258.33	228.52	-----

Comparing the total gains made per steer for the entire period in the various lots, it will be noted that as a general thing the less the amount of concentrated feeds fed the smaller the gain made. Some slight variation, however, will be noted in Lots 2 and 3 and also in Lots 4 and 5.

The amounts of pork produced per steer in the lots where the cattle were fed different amounts of corn, are proportional to the total amounts of corn consumed by the steers. No pork was credited to the cattle where the corn was entirely eliminated from the ration. It had also been observed in previous tests, that under these conditions practically no pork was produced and in some instances the pigs actually lost in weight.

Table 5 shows the feed consumed per pound of gain on steers by periods and for 100 days.

The grain required to produce 1 pound of gain on the cattle in Lot 1, which was full-fed on corn, increased as the fattening period advanced, while the amount of silage required did not change materially and the amount of hay decreased. With feeds at usual Corn Belt prices the cost of gain increased

at each successive period and the gains during the fourth period required nearly twice the amount of feed as those of the first period.

The cattle in Lot 2, which were fed just half as much corn as those in Lot 1, required uniformly less grain but more corn silage and hay to produce a pound of gain during each period than the full-fed cattle in Lot 1. With feed at usual prices the cost of gain increased as the experiment advanced, although there was little difference during the last two periods.

TABLE 5.—POUNDS OF FEED CONSUMED PER POUND OF GAIN ON STEERS BY PERIODS AND FOR 100 DAYS.

Feeds	Lot 1	Lot 2	Lot 3	Lot 4	Lot 5
First 30 days					
Shelled corn	3.37	2.05			
Linseed oil cake	0.56	0.68	0.69	0.67	1.09
Corn silage	8.71	11.45	12.91	12.39	14.43
Clover hay	0.98	1.70	2.03	1.90	2.30
Second 30 days					
Shelled corn	5.65	3.52			
Linseed oil cake	0.94	1.17	1.78	1.45	1.76
Corn silage	9.47	15.99	30.52	24.84	20.73
Clover hay	0.45	0.49	0.83	0.59	0.52
Third 30 days					
Shelled corn	7.32	4.58	4.09		
Linseed oil cake	1.22	1.52	1.08	1.24	1.98
Corn silage	8.45	17.46	11.06	18.42	16.56
Clover hay	0.43	0.52	0.39	0.41	0.38
Fourth 10 days					
Shelled corn	7.39	4.34	9.69		
Linseed oil cake	1.32	1.44	1.61	3.83	Loss
Corn silage	7.93	15.65	9.69	60.34	in
Clover hay	0.56	0.60	0.63	1.48	weight
100-Day Period					
Shelled corn	5.44	3.42	2.28		
Linseed oil cake	0.90	1.14	1.13	1.17	1.92
Corn silage	8.92	14.93	15.46	19.30	19.68
Clover hay	0.65	0.98	1.09	1.07	1.14

A comparison of the feed required per pound of gain during the entire period, shows that the cattle in Lot 2 consumed 1.78 pounds less grain and 6.34 pounds less silage and hay than the cattle in Lot 1.

The feed required to produce a pound of gain in lot 3 was lowest in the first 30-day period, during which the cattle received no corn. While they received no corn during the second 30-day period, the feed requirement per pound of gain increased materially. Corn was fed these cattle during the last 40 days of the test. During the 30-day period following the addition of corn

to the ration the feed required per pound gain was about one-half as much as during the last 10-day period. With feed at usual prices the gain would cost less during the first 60 days than after the addition of corn to the ration. The gain per pound on these cattle during the entire period required 1.15 pounds less grain and 0.55 of a pound more silage and hay than were required in Lot 2, and 2.93 pounds less grain and 6.98 pounds more roughage than were required in Lot 1.

The cattle in Lot 4, which were fed a ration containing no corn during the entire period made their gains for the entire period on slightly less nutrients than were required by Lot 3.

The cattle in Lot 5, which received no corn, but about 58 per cent more linseed oil meal than the cattle in Lot 4, required somewhat more feed, on the average, to produce their gain than was required by Lot 4, that is, the addition of the 58 per cent of linseed meal to this ration fed Lot 4, did not prove profitable.

The percentage of dressed beef produced by each lot is shown in the following summary:

	Dressing percentage
Lot 1	60.50%
Lot 2	61.50%
Lot 3	60.10%
Lot 4	60.70%
Lot 5	61.40%

No great differences in dressing percentages among the lots of cattle are observed, and such differences as do exist cannot in all cases be attributed to the rations fed. Some differences may be due to individual differences in the cattle.

It usually requires 120 to 180 days with a gain of 400 to 500 pounds per steer to put good thrifty 2-year-old steers in a condition that is considered prime or "finished" on a strong cattle market. It is therefore evident that none of these cattle were in this condition when marketed.

Lot 1, the cattle full-fed on shelled corn, lacked 125 to 150 pounds of producing the amount of gain suggested, and under ordinary conditions, approximately 60 days of full feeding on a satisfactory ration would have been required to have finished these cattle.

Lots 2, 3, 4, and 5 lacked 200 to 250 pounds of making the gain suggested and were somewhat more than half finished, when marketed. From 75 to 120 days of full feeding would have been required to put these cattle in prime condition. Lots 4 and 5 showed somewhat less finish than Lots 2 and 3.

SUMMARY

1. Two-year-old cattle on full feed of grain consumed approximately three-fourths as much corn silage and hay during a 100-day feeding period as cattle fed one-half as much grain during a 100-day feeding period, or as cattle full-fed corn during the last 40 days of that feeding period. They consumed about one-half as much silage and hay as cattle fed all the silage and hay they would eat and 2.77 pounds to 4.4 pounds linseed oil meal daily, in addition, during the 100-day feeding period.

2. The daily feed consumption of 2-year-old cattle fed on the rations here treated, increased gradually throughout the 100-day feeding period.

3. Two-year-old cattle full-fed for 100 days on shelled corn, linseed oil meal, corn silage and legume hay made a daily gain of 3.05 pounds, which was approximately 25 per cent more than the average daily gain made by cattle fed one-third to one-half the same amount of corn, the same amount of linseed oil meal and all the silage and hay they would eat. They also gained approximately 25 per cent more than cattle fed from 2.77 pounds to 4.4 pounds linseed oil meal daily and all the corn silage and legume hay they would eat.

4. Two-year-old cattle fed one-half a ration of corn, and in addition 2.77 pounds linseed oil meal, and all the silage and hay they would eat for a 100-day feeding period, gained only slightly more than cattle fed linseed oil meal, silage and hay. The same is true of cattle fed corn silage, hay and linseed meal during the first 60 days with a full feed of corn added during the last 40 days.

5. No pork was produced behind the cattle which did not receive corn, and the amount of pork produced behind the cattle which received either one-half ration of corn or corn for the last 40 days of the feeding period, was about three-fifths and two-fifths respectively of the quantity produced behind cattle full-fed on corn for 100 days. Where no corn was fed or where the corn was limited, the consumption of silage and hay was increased materially.

6. The addition of 58 per cent more of linseed oil meal to a ration of 2.77 pounds linseed meal and corn silage, and legume hay at will did not increase the gains materially.

7. Cattle fed all the corn silage and legume hay and either 2.77 pounds linseed oil meal daily, or 4.4 pounds linseed oil meal daily, or 2.77 pounds linseed oil meal and one-half feed of corn, or 2.77 pounds linseed oil meal and corn for the last 40 days, produced gains and showed a condition which indicated that they were slightly more than half finished.

8. Slightly better results were obtained where cattle were started on corn silage, legume hay and linseed meal, with a full feed of corn added during the last 40 days of a 100-day feeding period, than where cattle were fed corn silage, legume hay, linseed meal and half a ration of corn throughout the 100-day feeding period.

9. When corn silage and legume hay are relatively cheap, as compared with corn, their extensive use, with or without a small quantity of linseed oil meal, is shown to be advisable, especially during the early part of a feeding period.

10. It is evident from the data here presented that the relative prices of feeds, cattle and pork must be considered, together with other conditions surrounding the feeding operation, in planning cattle feeding operations, if the best results are to be obtained.

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