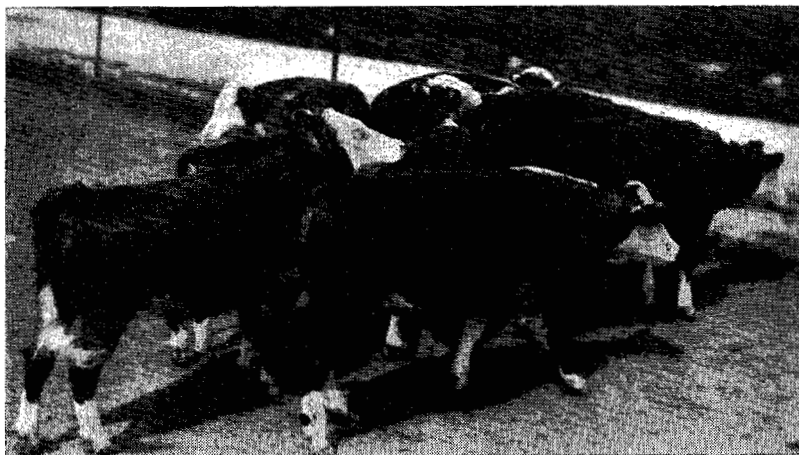


# AGRICULTURAL EXPERIMENT STATION

KANSAS STATE AGRICULTURAL COLLEGE  
MANHATTAN, KANSAS

DEPARTMENT OF ANIMAL HUSBANDRY



BABY BEEF (LOT 1) FATTENED ON GROUND CANE SEED.

## CATTLE FEEDING INVESTIGATIONS, 1921-22.<sup>1</sup>

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### PART I.

#### THE MAXIMUM UTILIZATION OF SILAGE IN FATTENING BABY BEEF.

Baby beeves were fed again in 1921-'22<sup>2</sup> in order that more interest might be developed in this class of cattle while studies were being made of the feeding value of different feeds and combinations of feeds. There are many reasons why cattle feeders should be interested in feeding baby beeves.

It is generally believed that heavy cattle mill in the main be unpopular in the future because the average home can not use the

1. Contribution No. 69 from the Department of Animal Husbandry.

2. The fattening of baby beeves, especially the value of silage in fattening baby beeves, constituted a part of the cattle feeding experimental work of the Agricultural Experiment Station during the years 1919-'20 and 1920-'21. The results of these tests are reported in station circulars 86 and 92, respectively. Copies may be secured, as long as available, by addressing Kansas Agricultural Experiment Station, Manhattan, Kan.

large cuts from heavy cattle as satisfactorily as the smaller cuts from lighter cattle. Even the public eating place can no longer use the heavier cuts advantageously. Light cattle, particularly baby beeves, furnish smaller cuts with a minimum amount of waste in the form of excess fat. A large portion of the gain made by young, light cattle is largely lean meat, whereas most of the gain made by the aged steer is fat, a large portion of which is not utilized by the consumer. The consumer is demanding smaller, leaner cuts of good quality; and younger, lighter cattle meet this demand most satisfactorily making them a more desirable class of cattle to feed.

The initial investment in feeders is less in fattening baby beeves. A calf will cost approximately one-half as much as an aged steer but will make more gain during the winter feeding season when full-fed and will make a given amount of gain on one-fourth less feed than the aged steer. Comparisons of gains and feed required to make 100 pounds of gain on calves and aged steers have been made at the Kansas Agricultural Experiment Station three different years. The calves averaged 426 pounds into the feedlot, the older steers, 1,063 pounds per head. The calves gained an average of 420 pounds each, the older steers 390 pounds. It required 25 percent less grain to make 100 pounds of gain on the calves than on the older cattle, and each kind was full-fed.

After a baby beef has reached a marketable finish it will continue to make economical gains for several months, thus giving the feeder a much longer marketing period than in the case of aged steers which have to be marketed within a very short period of time after reaching a marketable finish.

Calves feed more easily than older cattle in spite of the oft repeated statement that feeding calves is a different matter, probably because they eat less greedily and masticate their feed more thoroughly than older cattle, thus lessening the danger of getting off feed, bloat, founder, and other feedlot ills.

There is an old tradition still prevailing in many quarters that one cannot successfully make baby beef out of a calf that has lost its baby or milk fat. The Kansas Agricultural Experiment Station finds that the thin calf will make baby beef very satisfactorily; in fact the thinnest calves fed have made the best baby beef. There is another tradition that still prevails in some quarters to the effect that buyers discriminate against heifers as baby beef, but such is not the case and furthermore heifer calves fatten and ripen faster than steer calves.

Tests have shown that when corn is comparatively cheap a full-feed of corn during the entire feeding period is the most profitable method of feeding aged steers but when corn is exceedingly high in price a full-feed of silage with a very short finish on corn is most profitable.

Feeders are interested to know whether or not calves respond to the heavy silage ration in the same manner as aged steers. During the winter of 1919-'20 when corn was worth \$1.60 a bushel and cane silage \$8 a ton, calves fed a full silage ration and no grain for 120 days and then full-fed on shelled corn for an additional 90 days returned a greater net income than calves full-fed on corn and all the silage they would consume for the entire period of 210 days.<sup>1</sup>

During the winter of 1920-'21 when corn was worth 56 cents a bushel and cane silage \$5 a ton, calves fed a full silage ration and no grain for 120 days and then full-fed on shelled corn for an additional 87 days returned a smaller net profit than calves full-fed on corn and all the silage they would consume for the entire period of 207 days.<sup>2</sup>

This test was repeated during 1921-'22. Two additional lots were fed. One received corn after 90 days on a full-feed of silage and no corn and another after 60 days on a full-feed of silage and no corn. All four lots also received 1.7 pounds of cottonseed meal and 2 pounds of alfalfa hay per head per day.

#### RESULTS.

Detailed results of this test together with data relative to the comparative feeding value of yellow and white corn of the same market grade, also the comparative value of ground cane seed and shelled corn are given in Table I.

#### STOCK USED IN EXPERIMENT.

The calves used in this test were bred in northern New Mexico but were purchased in the Stocker and Feeder sale conducted by the Kansas Livestock Association at Emporia, Kan., November 11, 1921. They were supposed to have been vaccinated on the range but were revaccinated and dehorned after arriving at the feedlot. The cost of the calves in the experiment represents the original purchase price, freight, feed, and all other expenses from the time they were purchased until the test began.

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1. See Table III, Part III of Kansas Agricultural Experiment Station circular 86, cited also on page 1 of this circular.

2. See Table I, Part I of Kansas Agricultural Experiment Station circular 92, cited also on page 1 of this circular.

TABLE I.—Results of a 195-day feeding experiment in fattening baby beef.  
(December 6, 1921, to June 19, 1922.)

Lot No.	1	2	3	4	5	6
Number of steer calves in lot	10	10	10	10	10	10
Av. initial weight per steer at feedlot	Pounds 370.20	Pounds 368.53	Pounds 372.53	Pounds 369.93	Pounds 371.87	Pounds 371.60
Av. final weight per steer at feedlot	738.60	749.27	737.07	723.00	686.47	671.20
Av. total gain per steer at feedlot	368.40	380.74	364.54	353.07	314.60	299.60
Av. daily gain per steer at feedlot	1.92	1.98	1.90	1.84	1.64	1.56
Selling weight per steer at Kansas City	704.00	733.00	725.00	714.00	679.00	657.00
Av. gain per steer based on selling weight at Kansas City	333.80	364.47	352.47	344.07	307.13	285.40
Av. daily gain per steer based on selling weight at Kansas City	1.71	1.87	1.81	1.76	1.58	1.46
Av. shrinkage per steer in shipping	34.60	16.27	12.07	9.00	7.47	14.20
Percent shrinkage in marketing	3.87	2.17	1.63	1.26	1.09	3.60
Av. dressing percent	58.30	59.80	58.90	59.20	57.90	57.50
Average daily ration per steer:	Pounds	Pounds	Pounds	Pounds (a)	Pounds (b)	Pounds (c)
Shelled corn (yellow)		8.57				
Shelled corn (white)			8.07	6.51	4.85	2.87
Ground cane seed	11.51					
Cottonseed meal	1.72	1.72	1.72	1.72	1.72	1.72
Alfalfa hay	2.01	2.01	2.01	2.00	1.98	2.00
Cane silage	10.16	8.38	8.33	13.68	15.86	19.25
Feed required for 100 pounds gain based on selling weights:						
Shelled corn (yellow)		451.66				
Shelled corn (white)			439.58	363.16	303.33	193.06
Ground cane seed	601.98					
Cottonseed meal	98.82	90.56	93.57	95.98	107.52	115.88
Alfalfa hay	115.33	105.73	109.24	111.43	123.79	134.37
Cane silage	584.45	441.60	453.93	763.46	991.22	1,294.99
Cost of feed for 100 pounds gain based on selling weights	\$8.87	\$6.34	\$6.35	\$6.41	\$6.67	\$6.03
Av. cost per steer at feedlot	\$24.99	\$24.88	\$25.15	\$24.97	\$25.10	\$25.08
Av. feed cost per steer	29.61	23.11	22.39	22.05	20.49	18.94
Int. per steer on investment in cattle and feed at 8 percent	2.18	1.92	1.90	1.88	1.82	1.76
Shipping expense per steer	2.46	2.46	2.46	2.46	2.46	2.46
Total cost per steer on the Kansas City market when sold, not including hog profits	59.24	52.37	51.90	51.36	49.87	48.24
Hog profits per steer	3.77	3.67	3.81	2.85	1.73	.20
Total cost per steer on the Kansas City market when sold after deducting hog profits	55.47	48.70	48.09	48.51	48.14	48.04
Selling price per steer at Kansas City	59.84	65.97	65.25	62.48	59.41	54.20
Av. net return per steer for labor	4.37	17.27	17.16	13.97	11.27	6.16
Selling price per cwt. at Kansas City	8.50	9.00	9.00	8.75	8.75	8.25
Cost per cwt. in feedlot	6.75	6.75	6.75	6.75	6.75	6.75
Necessary selling price per cwt. at Kansas City to break even	7.88	6.64	6.63	6.79	7.09	7.31
Necessary margin per cwt. to break even on all expenses	1.13	-.11	-.12	.04	.34	.56

(a), (b), (c). No corn fed for first 60, 90, and 120 days, respectively.

Price of feeds: Shelled corn, 40 cents per bushel; ground cane seed, 40 cents per bushel (50 pounds); cottonseed meal, \$40 per ton; alfalfa hay, \$10 per ton; cane silage, \$3.50 per ton.

DISCUSSION OF RESULTS.

A study of lot 3 which received a full-feed of corn from the beginning of the feeding period and lot 6 which did not receive corn until after 120 days on a heavy silage ration, shows the same results that were secured during the 1920-'21—a greater net return per steer when corn was fed from the beginning of the feeding period due to the cheapness of corn, the more rapid and greater-gain, and the greater selling price per hundred.

One acre produced enough silage and corn to feed 1.33 steers where corn was full-fed from the beginning of the test (lot 3) and 2.86 steers where corn was not fed until after 120 days full-feeding on silage (lot 6), but in spite of this the per acre profit over and above the price charged the steers for corn and silage was \$22.88 where corn was full-fed from the beginning and \$17.61 where corn feeding was delayed 120 days.

A study of lot 5 where corn was added after a 90-day period of full-feeding on silage and lot 4 where corn was added after a 60-day period of full-feeding on silage, shows that the per steer profits were less than those in lot 3 where the calves were full-fed on corn from the beginning of the test, but the per acre income in each case was almost as great. In the case of lot 5 one acre produced enough corn and silage to feed two steers and the per acre profit over and above the price charged the steers for corn and silage consumed, was \$22.54. In the case of lot 4 one acre produced enough corn and silage to feed 1.6 steers and the per acre profit over and above the price charged the steers for corn and silage consumed, was \$22.35.

Since the average daily consumption of corn and the amount of corn required to produce 100 pounds of gain have been practically the same each year for three years in lots where corn has been full-fed from the beginning of the test and in lots where corn has not been full-fed until after 120 days on a heavy silage ration, it seems safe to say that when corn is cheap it will pay best to full-feed on corn (or other grain) from the beginning of the feeding period, but when corn is high in price it will pay best to full-feed on a heavy silage ration for three or four months and finish for 90 days on corn (or other grain). In this connection it may be interesting to note that when it paid best to full-feed on silage with a short-time corn finish (1919-'20), the ratio between the price of a bushel of corn and a hundred pounds of baby beef when sold was 1 to 10; whereas when it paid best to full-feed on corn from the beginning of the feeding period, the ratios were 1 to 15 in 1920-'21 and 1 to 22 in 1921-'22.

The per acre profit over and above the price charged steers for feed consumed, is a matter that should be given thoughtful consideration by every person who markets the feed he produces through cattle.

A study of lots 2 and 3 indicates that for cattle feeding purposes there is very little difference in the ultimate feeding value of white

and yellow corn when fed to cattle as a part of an average well-balanced farm ration. The calves in this test seemed to like yellow corn somewhat better than white corn, ate more of it and consequently made slightly larger daily gains, but on the other hand it required somewhat less white corn to make a 100 pounds of gain and both lots sold for the same price per hundred pounds indicating that there was little difference in the finish of the two lots when marketed.

A study of lots 1 and 2 shows that cattle like ground cane seed better than corn and will fatten practically as rapidly when full-fed on ground cane seed as they will on shelled corn. However, it requires considerably more cane seed to produce a hundred pounds of gain than it does corn. The lot fed cane seed ate or drank very little when they reached the market while all the other lots took on a very good fill. The more ragged appearance due to manner of shipping, together with the fact that two of the calves in this lot developed into rather "leggy" off-type individuals, is responsible for the fact that lot 1 sold for less per pound than lots 2 and 3 which had been full-fed on corn.

These steers were bought by Swift & Co. and the carcasses were ranked after cold as follows: First, lot 3; second, lot 2; third, lot 4; fourth, lot 1; fifth, lot 5; sixth, lot 6.

## PART II.

### THE EFFECT OF WINTERING CATTLE ON ALFALFA AND ON SILAGE UPON SUMMER PASTURE GAINS.

Many cattlemen have expressed the opinion that steers which have been wintered on silage and a small amount of cottonseed cake will not graze as well the following summer as cattle wintered on alfalfa hay. In order to secure definite data relative to this question a group of steer calves dropped in the spring of 1919 was divided into two groups in the fall of 1919. One group received only alfalfa hay as a winter ration and the other, silage and a small amount of cottonseed cake. These two groups of steers have received the same ration for three winters, 1919-'20, 1920-'21, and 1921-'22. Each summer, 1920; 1921, and 1922, they have been grazed together on blue-stem pasture.

Detailed results to May 1, 1922, when they went to pasture as three-year-old steers, are given in Table 11.

CATTLE FEEDING INVESTIGATIONS

TABLE II.—Silage versus alfalfa hay for wintering steers.

Effect of each winter ration upon summer pasture gains. Report of progress covering period from December 17, 1919, to May 1, 1922—865 days.

Lot No.....	1	2
Number of steers in lot.....	19	20
Average daily ration per steer.		
Winter, 1919-'20 (134 days):		
Silage.....	25.0 lbs.	
Cottonseed meal.....	1.0 lbs.	
Alfalfa hay.....		10.49 lbs.
Summer, 1920 (210 days).....	Pasture	Pasture
Winter, 1920-'21 (161 days):		
Silage.....	35.76 lbs.	
Cottonseed meal.....	1.40 lbs.	
Alfalfa hay.....		20.16 lbs.
Summer, 1921 (210 days).....	Pasture	Pasture
Winter, 1921-'22 (150 days):		
Silage.....	35.86 lbs.	
Cottonseed meal.....	1.40 lbs.	
Alfalfa hay.....		24.58 lbs.
Summer, 1922.....	Pasture	Pasture
	<i>Pounds</i>	<i>Pounds</i>
Weight per steer, December 17, 1919.....	438.03	440.37
Weight per steer, April 29, 1920.....	534.59	500.70
Gain per steer, winter, 1919-20.....	96.56	60.33
Daily gain per steer, winter, 1919-'20.....	.72	.45
Weight per steer, November 25, 1920.....	811.79	803.20
Gain per steer on pasture, summer, 1920.....	277.19	302.50
Daily gain per steer on pasture, summer, 1920.....	1.32	1.44
Weight per steer, May 5, 1921.....	967.51	878.93
Gain per steer, winter, 1920-'21.....	153.72	75.73
Daily gain per steer, winter, 1920-'21.....	.97	.47
Weight per steer, December 1, 1921.....	1,111.29	1,118.40
Gain per steer on pasture, summer, 1921.....	143.79	239.47
Daily gain per steer on pasture, summer, 1921.....	.68	1.14
Weight per steer, April 30, 1922.....	1,130.63	1,158.08
Gain per steer, winter, 1921-'22.....	19.34	37.97
Daily gain per steer, winter, 1921-'22.....	.13	.25
Gain per steer, December 17, 1919, to April 30, 1922.....	692.60	716.00
Daily gain per steer, December 17, 1919, to April 30, 1922.....	.80	.83

DISCUSSION.

It will be noted that the silage-fed steers gained somewhat more as calves during the winter of 1919-'20 than did the alfalfa-fed steers and weighed 34 pounds more when they went to grass in the spring of 1920. When they were weighed off of grass in the fall of 1920 the steers that had been fed silage the previous winter still weighed more than the steers that had received alfalfa. However, the steers winter-fed on alfalfa gained 302.50 pounds while the steers winter-fed on silage gained 277.19 pounds, which means that the alfalfa-wintered steers failed by 11 pounds to make up on grass the greater gain made by the silage-wintered steers during the winter.

The silage-fed steers as yearlings were given all the silage they would eat during the winter of 1920-'21 and the alfalfa steers all the alfalfa they would eat. The silage-fed steers gained 80 pounds per head more than the alfalfa-fed steers during the winter, but the steers wintered on alfalfa gained on grass the following summer

(1921) approximately 85.5 pounds more and weighed 7 pounds per head more off of grass than the steers wintered on silage.

These results seemed to indicate that the summer gains on pasture depend upon the amount of flesh the steers carry when they are turned on pasture rather than upon the kind of feed they have consumed during the winter. Since silage-fed cattle put on more flesh during the winter than alfalfa-fed cattle, unless the silage is restricted, the amount of silage fed these steers as two-year-olds during the winter of 1921-'22 was restricted to an amount that would keep their gains just a little below those of the cattle that were receiving all the alfalfa they would consume. If the amount of flesh cattle carry when they go to pasture, rather than the kind of feed they have eaten during the winter, determines the amount of gain on pasture, then the steers fed silage during the winter of 1921-'22 should make greater gains on pasture during the summer of 1922 than the steers wintered on alfalfa hay. To date, July 1, 1922, the steers have been on pasture 60 days and the silage-wintered steers have gained 164 pounds and the alfalfa-wintered steers 127 pounds.

The average monthly gain per head on pasture for each group is given in Table III.

TABLE III.—Summer pasture gains of silage-wintered steers and alfalfa-wintered steers compared.

PASTURE SEASON		Pounds gained per head per month	
		Silage-wintered	Alfalfa-wintered
1920	May.....	51.51	52.65
	June.....	92.42	104.45
	July.....	36.42	35.70
	August.....	36.11	45.50
	September.....	42.21	45.70
	October.....	26.32	29.00
	November.....	-7.79	-10.50
1921	May.....	35.23	76.77
	June.....	42.32	40.40
	July.....	40.11	43.20
	August.....	39.74	51.70
	September.....	43.26	44.70
	October.....	-24.63	-6.00
	November.....	-32.28	-11.30
1922	May.....	91.05	59.03
	June.....	72.75	67.70

It should be remembered that a protein supplement must be fed with silage. In this test approximately 1 pound per head per day of cottonseed meal has been fed with the silage.

