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Corn Silage for Beef Production

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BULLETIN No. 182

AUGUST, 1918

**AGRICULTURAL
EXPERIMENT STATION**

**SOUTH DAKOTA
STATE COLLEGE OF AGRICULTURE
AND MECHANIC ARTS**

Animal Husbandry Department

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CORN SILAGE FOR BEEF PRODUCTION.

By James W. Wilson and B. L. Thompson.

Silos are highly valued by all who have used them. The entire corn plant is utilized for feed as contrasted with the old system of gathering this crop when only a part was used and the remainder allowed to waste. They are conservators of feed for livestock.

After cattle are taken off of the pasture in the late fall or early winter many do not gain a pound during the next five months and some are put back on pasture in spring much thinner and in a poorer condition to gain than in the fall. To keep them gaining nothing compares with silage made from the corn plant. They will not only hold their grass weights but will gain at a comparatively rapid rate and the next spring will be in condition for the butcher instead of for the pasture.

Our experiments show that these cattle will sell close to the top of the market when receiving nothing but all the corn silage, water and salt they will eat. It is a comparatively cheap method of making beef.

Years ago corn silage was considered a dangerous feed for cattle. Because of the probable tendency of some farmers to feed silage as a sole ration, it appeared advisable to give this feed a thorough trial. In 1911 we selected four yearling steers from a car load purchased, for an experiment in wintering steers, and for 90 days gave them nothing but all the corn silage they would eat. To another lot of equal number and breeding we gave them one-half as much silage as the first lot was receiving and all the hay they would eat. The gains per head daily were 2.40 and 1.25 respectively, showing that the hay was a detriment rather than a benefit. No bad

results were received with either lot and not a steer missed his feed.

Since that time we have been feeding corn silage with other feeds and find that it has no equal for putting cattle in good condition for the butcher.

Farmers who have tried corn silage alone and silage plus oilmeal are well pleased with the result and would not feed any other way even if they do take a cent less per pound in the market.

Object.

The object of this experiment was to ascertain the feeding value of silage made from corn cut at different stages of growth. In other feeding trials made at this Station it has been shown that corn silage when fed alone without other supplementary feeds produces very satisfactory gains and at a comparatively low cost.

Sometimes corn does not mature or is frosted before being put into the silo. These feeding trials were conducted to determine the feed value of corn silage for steers when made under the following conditions:

1. When in the blister or milk stage.
2. When in the dough stage.
3. When in the glazed or dented stage.
4. When well matured but frosted.

The Experiment.

In order to carry out the above plan steers have been fed during the winter months, two different years. Four small silos were filled in the fall of 1916 and again in 1917 with corn cut at stages mentioned. Twenty head of grade yearling Aberdeen Angus steers were purchased December, 1916, and divided into four lots of five head each. These steers were divided so that each lot would

be as uniform as possible in respect to individuality, condition and weight.

Lot I received silage from frosted corn.

Lot II received silage from corn in glaze or dent stage.

Lot III received silage from corn in dough stage.

Lot IV received silage from corn in blister or milk stage.

These steers went on feed December 21, 1916, and were fed until April 19, 1917, a period of 119 days.

For the second trial twenty head of grade two-year-old Herefords were used. These steers were of good quality and would grade as good feeders but were not fleshy. They were divided into four lots of five head each so that each lot would be as uniform as possible in respect to individuality, condition and weight. These steers went on feed January 3, 1918, and were fed until April 3, 1918, a period of 90 days.

Results.

The results of each year's trial are given by lot in tabular form in tables Nos. 1, 2, 3, 4. Tables Nos. 5 and 6 give the individual weights and gains made for each 30 day period, the gain for each steer for the entire feeding period and the daily gain of each steer. In table No. 7 the results of the two trials are combined. This table shows the average daily gain per head for each of the four lots, the number of pounds of silage required per pound of gain by each lot, the pounds of silage consumed per head in each lot, and the pounds of dry matter consumed for a pound of gain by each lot.

Table No. 8 gives the chemical analysis of the silage used in these experiments.

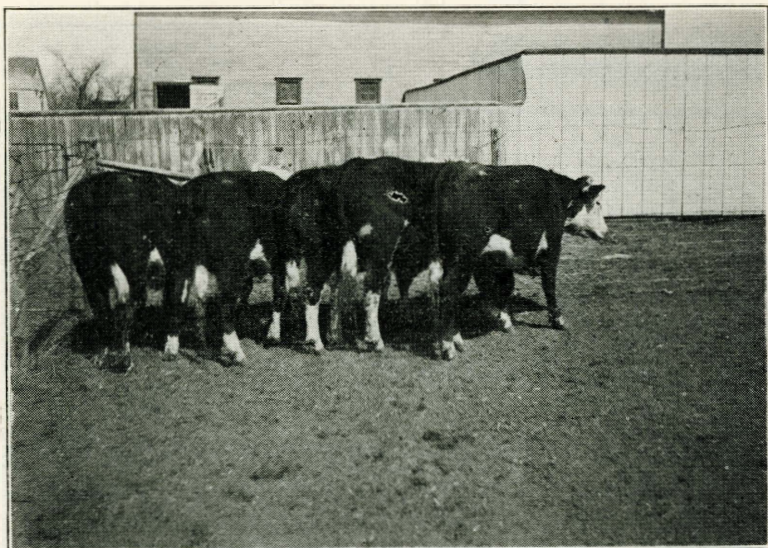


These steers were used for the 1917-'18 test.

Lot I

The silage for this lot was made from corn cut after first frost. The corn was well matured. The lower leaves were dead and the husks on the ears well browned. Some prefer this condition before filling their silo as the corn is lighter to handle.

During the fall and winter months of.....	1916-'17	1917-'18
Number of days fed.....	119	90
Average weight at beginning.....	709	945
Average weight at close.....	969	1125
Average gain per head.....	260	180
Average gain per head daily.....	2.18	2.00
Total pounds of silage consumed.....	32374	26020
Pounds of silage consumed daily per head.....	54.5	57.8
Pounds of silage for a pound of gain.....	24.9	28.8
Pounds of dry matter for pound of gain.....	10.9	10.5

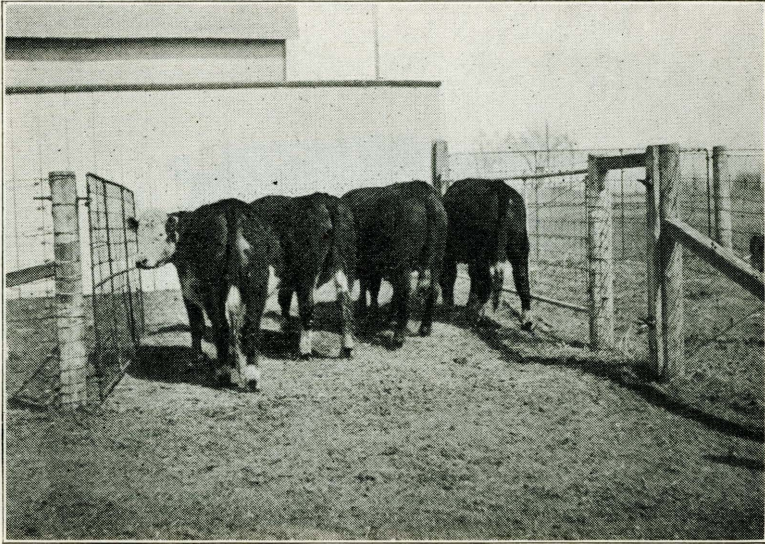


These steers were used for the 1917-'18 test.

Lot II.

The silage used for this lot was made from corn when the kernels were well dented or glazed. It was cut about a week earlier than the corn used for silage in Lot I and before there was a killing frost. This corn was of the same variety and grown on land similar to that of Lot I. It was well enough matured at the time it was cut to cure into merchantable corn. This is the stage usually recommended for cutting corn for fodder and also for filling silos.

During the fall and winter months of.....	1916-'17	1917-'18
Number of days fed.....	119	90
Average weight at beginning.....	765	943
Average weight at close.....	997	1178
Average gain per head.....	232	235
Average gain per head daily.....	1.94	2.61
Total pounds of silage consumed.....	37144	36404
Pounds of silage consumed daily per head.....	62.4	80.9
Pounds of silage for a pound of gain.....	31.9	30.9
Pounds of dry matter per pound of gain.....	8.	8.12



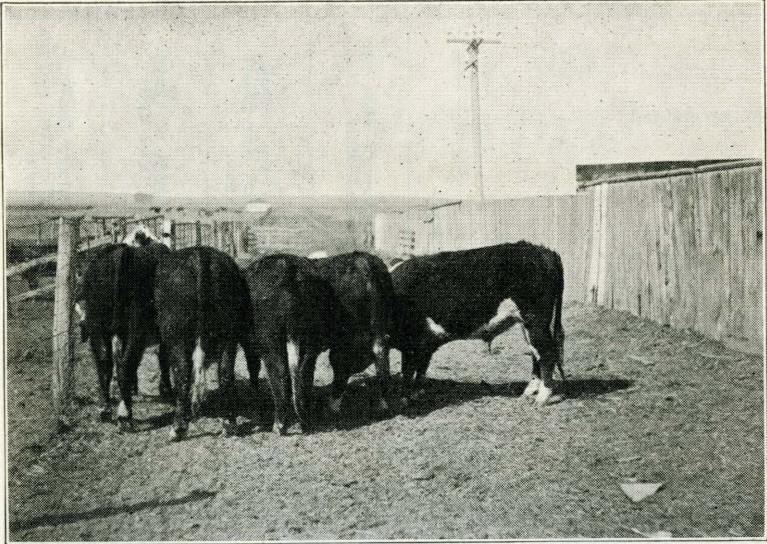
These steers were used for the 1917-'18 test.

Lot III.

The silage used for this lot was made from corn when kernels were in the dough stage. The corn was of the same variety as used in the other lots and grown in the same field.

The analyses of this silage for the two years show it to be practically the same in regard to nutrients as the silage used in Lots II.

During the fall and winter months of.....	1916-'17	1917-'18
Number of days fed.....	119	90
Average weight at beginning.....	737	947
Average weight at close.....	977	1176
Average gain per head.....	240	229
Average gain per head daily.....	2.01	2.54
Total pounds of silage consumed.....	38293	37065
Pounds of silage consumed daily per head.....	64.4	82.4
Pounds of silage for a pound of gain.....	31.9	32.3
Pounds of dry matter per pound of gain.....	8.35	8.85



These steers were used for the 1917-'18 test.

Lot IV.

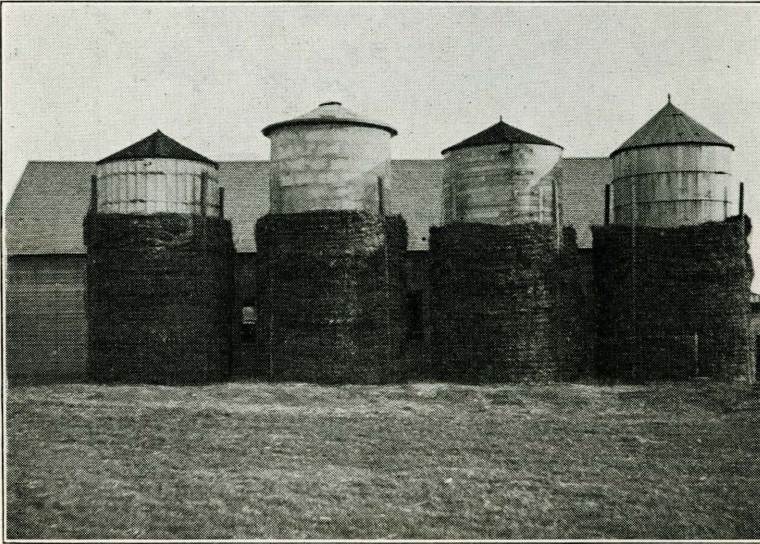
The silage used for this lot was made from corn when the kernels were in the blister or milk stages. It was the same variety of corn as for other lots and from the same field.

Silage made from corn in this stage has a low per cent of dry matter and a higher per cent of acid than any of the other stages. This did not seem to make it less palatable, as the steers in this lot consumed a larger amount daily than in any other lot.

During the fall and winter months of.....	1916-'17	1917-'18
Number of days fed.....	119	90
Average weight at beginning.....	733	945
Average weight at beginning.....	972	1113
Average gain per head.....	239	168
Average gain per head daily.....	2.01	1.86
Total pounds of silage consumed.....	43319	36512
Pounds of silage consumed daily per head.....	72.8	81.1
Pounds of silage for a pound of gain.....	36.1	43.6
Pounds of dry matter per pound of gain.....	7.5	9.1

Average of Results of Two Trials.

No. steers fed	Lot	Average gain per head daily	Average pounds silage per pound of gain	Pounds of silage per head daily	Average lbs. of dry matter per lb. of gain
10.....	I	2.09	28.99	56.15	10.7
10.....	II	2.275	31.4	71.65	22.06
10.....	III	2.27	32.1	73.4	22.6
10.....	IV	1.935	33.3	76.95	23.3



The above picture is of four small silos used for feed in this experiment. To prevent silage from freezing, poles were set one foot from the silos, woven wire stapled on outside of poles and space between silos and wire filled with straw. We consider this valuable because cattle eat more in a cold day if silage is not frozen. It is much cheaper to prevent the freezing than to compel animals to use body heat for thawing it.

We believe this straw will prevent the wooden silo, when empty in summer, from shrinking and blowing

down.

The following is the analysis of silage fed to different lots, also the cubic centimeters of alkali required to neutralize acid in silage for each lot each year. These data were furnished by Mr. Reginald Sherwood, Chemist.

Silage, 1917.

	Moisture	Ether Extract	Crude Fiber	Protein	Ash	N-free Extract
Air dry						
Lot 1	6.30	3.08	23.25	9.18	6.08	52.11
Lot 2	5.39	2.65	24.08	8.81	5.49	53.63
Lot 3	7.73	3.28	21.52	9.75	5.08	52.64
Lot 4	7.64	4.98	22.90	10.25	6.07	48.16
Original Sample						
Lot 1	55.91	1.45	10.94	4.31	2.86	24.53
Lot 2	74.88	.70	6.39	2.34	1.45	14.24
Lot 3	73.88	.93	6.09	2.76	1.44	14.90
Lot 4	79.18	1.12	5.16	2.31	1.37	10.86
Water-free						
Lot 1 .....	....	3.29	24.81	9.77	6.48	55.65
Lot 2 .....	....	2.78	25.44	9.31	5.77	56.70
Lot 3 .....	....	3.56	23.32	10.57	5.51	57.04
Lot 4 .....	....	5.38	24.79	11.09	6.58	52.16

Acidity of original sample in terms of cc of N|10 NaOH to neutralize acid in one gram of silage.

Lot 1	2.2
Lot 2	2.2
Lot 3	2.4
Lot 4	3.4

Silage, 1918.

	Moisture	Ether Extract	Crude Fiber	Protein	Ash	N-free Extract
Air dry						
Lot 1	6.31	3.15	22.38	8.22	5.57	54.37
Lot 2	8.15	3.50	20.93	9.36	5.60	52.46
Lot 3	7.65	3.02	24.05	9.83	5.18	50.27
Lot 4	7.56	3.60	27.23	10.25	6.89	44.47
Original Sample						
Lot 1	63.69	1.22	8.67	3.18	2.16	21.08
Lot 2	73.76	1.00	5.98	2.67	1.60	14.99
Lot 3	72.59	.89	7.14	2.92	1.54	14.92
Lot 4	79.11	.81	6.16	2.33	1.56	10.03
Water-free						
Lot 1 .....	....	3.36	23.88	8.77	5.94	58.05
Lot 2 .....	....	3.81	22.78	10.19	6.09	57.13
Lot 3 .....	....	3.27	26.04	10.64	5.60	54.45
Lot 4 .....	....	3.89	29.44	11.08	7.44	49.15

Acidity of original sample in terms of cc of N|10 NaOH to neutralize acid in one gram of silage.

Lot 1	1.4
Lot 2	1.8
Lot 3	1.56
Lot 4	2.64

SUMMARY.

The results show that the steers in Lot No. II, which received silage made from corn when the kernels were glazed or dented, made the best daily gains.

Lot No. III, which received silage made from corn when the kernels were in the dough, made practically as large daily gains, the gains being 2,275 and 2,27 pounds respectively.

Lot No. IV, which received silage made from corn when kernels were in the blister or milk stages, made the poorest daily gains.

The number of pounds of silage required for a pound of gain was greatest in Lot No. IV, which received the silage made from corn when the kernels were in the blister or milk stage; and least in Lot I, which received silage made from corn which was frosted after it was mature. This evidently was due to the comparatively large quantity of water in the early cut corn.

The amount of dry matter required for a pound of gain was least for Lot II and greatest for Lot I.