BULLETIN No. 192 NOVEMBER, 1916

ALABAMA

Agricultural Experiment Station

OF THE

Alabama Polytechnic Institute

AUBURN

Cottonseed Meal Compared With Velvet Beans For Fattening Steers

---

By
G. S. TEMPLETON, Animal Husbandman
E. GIBBENS, Assistant

1916
Post Publishing Company
Opelika, Ala.

COMMITTEE OF TRUSTEES ON EXPERIMENT STATION.

HON. R. F. KOLB ..... Montgomery
HON. A. W. BELL ..... Anniston
HON. J. A. ROGERS ..... Gainesville
HON. C. S. MCDOWELL, JR. ..... Eufaula

STATION STAFF

C. C. THACH, President of the College.

J. F. DUGGAR, Director of Experiment Station and Extension.

AGRICULTURE:

J. F. Duggar, Agriculturist.
E. F. Cauthen, Associate.
M. J. Funchess, Associate.
J. T. Williamson, Field Agt.
O. H. Sellers, Assistant.
O. L. Howell, Assistant.
F. E. Boyd, Assistant.

VETERINARY SCIENCE:

C. A. Cary, Veterinarian.

CHEMISTRY:

J. T. Anderson, Chemist, Soils and Crops.
C. L. Hare, Physiological Chemist.
————, Assistant.

JUNIOR AND HOME ECONOMICS EXTENSION:

L. N. Duncan, Supt. *
Miss Madge J. Reese, State Agent. *
J. C. Ford, Pig Clubs. *
I. B. Kerlin, Corn Clubs. *
Miss Mary Feminear, Poultry Clubs.

BOTANY:

W. J. Robbins, Botanist.
A. B. Massey, Assistant.

PLANT PATHOLOGY:

G. L. Peltier, Pathologist.

HORTICULTURE:

————, Horticulturist.
J. C. C. Price, Associate.
P. O. Davis, Field Agent.

ENTOMOLOGY:

W. E. Hinds, Entomologist.
F. L. Thomas, Assistant.
E. A. Vaughan, Field Asst.

ANIMAL HUSBANDRY:

G. S. Templeton, Animal Husbandman.
H. C. Ferguson, Assistant.
E. Gibbens, Assistant.
F. W. Wendt, Assistant.
A. E. Hayes, Assistant.

AGRICULTURAL ENGINEER:

R. U. Blasingame, Agricultural Engineer.

*In co-operation with United States Department of Agriculture.

COTTONSEED MEAL COMPARED WITH VELVET BEANS FOR FATTENING STEERS

BY

G. S. TEMPLETON

AND

E. GIBBENS

INTRODUCTION.

The velvet bean is a comparatively new feed. The crop is usually fed by turning cattle and hogs into the field after the vines have been killed by frost. This method of harvesting is satisfactory on soils of a sandy character, but on the heavier types of soils a good many beans are wasted during bad weather and the fields are damaged by the stock tramping them.

The bean makes a very heavy vine growth and is grown extensively by some farmers to add humus to the soil. In this practice, after the frost kills the vines, the mature beans are gathered by hand and the vines are plowed under.

The experiment reported in this bulletin was made to determine the value of the velvet bean as a concentrate for fattening steers. This work is only a preliminary report of the experiments in feeding velvet beans. The test is to be repeated during the winter of 1916-1917.

OBJECT OF THE EXPERIMENT.

This experiment was planned with a view to comparing the relative feeding value of cottonseed meal and velvet beans in pods as the concentrate part of a ration for fattening steers.

THE CATTLE.

The pictures of Lot 6 and Lot 7, taken at the time the experiment was started and when completed, give a good idea of the type of steers used. Part of the steers were raised on the farm at Allenville and the remainder were purchased in Marengo and neighboring counties. None of the steers were pure bred, but

all were either Hereford, Shorthorn or Angus grades. The steers varied from one to two years of age. The average weight of each animal at the beginning of the experiment was 584 pounds.

General Plan of the Work.

The steers were fed under average farm conditions. The feeding test was conducted on the farm of Judge B. M. Allen, at Allenville, Alabama. Judge Allen furnished the cattle and the feeds, and the experiment was planned and carried on under the supervision of the authors of this bulletin. Mr. E. Gibbens had personal charge of the cattle throughout the experiment.

The feed lots were located in a cedar grove. The cedar trees gave all the protection the steers had during the experiment. The lots had a southern exposure and were well drained. The manure was hauled out of the lots every few days. No bedding was used, but the lots were dry enough so the steers could lie down comfortably. Pure water from a deep well was kept before the steers at all times. Rock salt was kept in the feed troughs continually.

The steers were fed twice each day. The concentrates and roughage were mixed thoroughly by hand in the feed troughs. The amount of feed was regulated so that it was consumed in a few hours. At the close of the experiment the steers were shipped, with sixty head used in other experiments, to the market in St. Louis, Missouri.

Price and Character of Feeds Used.

The prices used in this bulletin are the prices actually paid for the steers. The corn silage was made on the farm. The silage corn would have yielded twenty-five bushels of corn per acre. All of the feeds were of good quality. The corn silage was bright. The cottonseed meal was fresh, bright and of a high grade. The velvet beans were well matured and of a good quality.

The prices of feeds are as follows:

Cottonseed meal	$35.00 per ton
Velvet beans in pod	18.00 per ton
Corn silage	2.50 per ton

Method of Feeding and Handling the Steers.

As stated before, some of the steers were raised on the farm at Allenville and the remainder were bought in Marengo and neighboring counties in the spring and

early summer. The low cost of the steers at the time they went into the feed lot, 4.95 cents per pound, was due to the fact that they were purchased in thin condition in the spring and grazed during the summer. The cheap gains made during the summer considerably reduced the cost per pound of the steers at the beginning of the feeding period.

It is usually considered safe to feed steers when a two-cent margin is possible on them. That is, the selling price of the steer should be at least two cents per pound higher than the cost price. Usually the gains that are made in the feed lot, with feeds at the present prices, will cost as much as the pounds gained will sell for. The profit to the feeder comes largely from the increased value on the original weight of the steer, due to the gains the steer puts on in the feeding operation.

The steers had the run of the stalk fields after the permanent pastures began to fail. They were in the stalk fields during the entire month of November. They were all dehorned the first of November and were entirely healed by the time the experiment started.

The forty steers used in this experiment, and sixty others, were given a preliminary feed of sixteen days while they had the run of the stalk fields. The preliminary feeding was done to accustom them to feeding and handling and to secure a uniform fill. Each steer received two and one-half pounds of shelled corn, one-half pound of cottonseed meal and twelve pounds of silage daily for the sixteen day period. On the 18th day of December, 1915, the steers were weighed, and divided into lots for the test, and each steer tagged with a metal ear tag so that individual records could be kept. The steers were weighed on three consecutive days at the beginning of the experiment and the average of the three weights was used as the initial weight. Fourteen days later they were weighed by lots, and on the twenty-eighth day individual weights were taken, this procedure being repeated until the end of the test. The experiment continued for ninety-seven days. Hence the steers were fed for one hundred and thirteen days, including the preliminary period.

Daily Rations.

The amount of roughage was regulated by the appe-

tite of the steer. The concentrates were increased from time to time as the steer would take the increase without showing signs of going off feed.

The feeder should watch fattening steers very closely for signs of going off feed. Considerable time and loss of gain is usually experienced in getting a steer back on feed again. The symptoms that usually indicate that a steer is not doing well are the loss of the healthy appearance of the coat of hair and the droppings becoming thin and sour. If these symptoms develop, the amount of feed should be reduced. Steers will feed more uniformly if individuals of the same age and size are grouped together in the feed lot.

The following table outlines, by twenty-eight day periods, the amount of feed given each steer daily:

TABLE I. *Showing average amount of feed consumed daily, per steer, December* 18, 1915, *to March* 24, 1916, (97 *days.*)

Period	*Lot 6 Cottonseed Meal Corn Silage*	*Lot 7 Velvet Beans (in pods) Corn Silage*
	Pounds	Pounds
First 28 days	Cottonseed meal 2.76	Velvet beans 5.70
	Corn silage 35.4	Corn silage 31.07
Second 28 days	Cottonseed meal 4.00	Velvet beans 9.44
	Corn silage 40.43	Corn silage 26.80
Third 28 days	Cottonseed meal 4.75	Velvet beans 12.21
	Corn silage 39.42	Corn silage 20.21
Last 13 days	Cottonseed meal 6.46	Velvet beans 12.00
	Corn silage 43.03	Corn silage 25.60

During the first two weeks of the test the velvet beans and pods were ground coarse so they could be mixed thoroughly with the silage. At the end of the two-weeks period it was evident that the steers relished the ration and at this time the grinding of the beans was discontinued. During the remainder of the experiment the beans in the pods were fed whole. They were thoroughly mixed with the silage so that each steer would get only his share.

The steers in Lot 6 ate on an average 2.76 pounds of cottonseed meal and 35.40 pounds of silage daily during the first twenty-eight days. The amount of meal was gradually increased until at the close of the experiment each steer was eating 6.46 pounds of cottonseed meal per day.

The steers in Lot 7 ate on an average 5.70 pounds of velvet beans and 31.07 pounds of silage during the first twenty-eight days. The amount of beans was gradually increased until in the third period the steers consumed 12.21 pounds per day. This amount was decreased for the last thirteen days as the steers did not readily clean up this amount of beans. The steers in Lot 7 did not consume as much silage as Lot 6.

Both rations were relished by the steers and at no time during the test was there any trouble due to steers going off feed.

TABLE II. *Average weights and gains, December 18, 1915 to March 24, 1916, (97 days.)*

ot	*Number of Steers*	*Ration*	*Average Initial Weight of Each Steer*	*Average Final Weight of Each Steer*	*Average Total Gain of Each Steer*	*Average Daily Gain of Each Steer*
5	20	Cottonseed meal ----	Pounds	Pounds	Pounds	Pounds
		Corn silage --------	589	746.25	157.25	1.60
7	20	Velvet beans in pods				
		Corn silage --------	580.25	727.45.	147.20	1.50

All of the steers in both lots, except one in Lot 6, made satisfactory but not unusual gains. The lack of gain in this individual steer was due to his being a very poor feeder and could in no way be attributed to the ration, as the other nineteen head made good gains. The average gain daily, per head, for the 97 days was 1.60 pounds and 1.50 pounds in Lot 6 and Lot 7 respectively.

This experiment was closed earlier than had been planned, due to a shortage of silage. On account of the short feeding period the steers did not have the finish to be marketed to the best advantage. Careful inspection of the steers of the two lots on foot failed to show any perceptible difference in their finish. Moreover, careful inspection of the warm carcasses by packing house experts showed no appreciable difference between carcasses of the two lots.

QUANTITY AND COST OF FEED REQUIRED TO MAKE ONE HUNDRED POUNDS OF GAIN.

In feeding operation the real value of a feed, or combinations of feeds, is measured by the number of pounds of feed required to make one hundred pounds of gain in live weight. Table III shows the quantity

of feed required to make one hundred pounds of gain and the cost of the gains under the conditions of this experiment:

TABLE III. *Quantity and cost of feed required to make one hundred pounds of gain, December 18, 1915, to March 24, 1916, (97 days.)*

Lot	*Ration*	*Pounds of Feed to make 100 Pounds of Gain*	*Cost of Feed to Make 100 Pounds of Gain*
6	Cottonseed meal ----	258.18 meal	
	Corn silage --------	2408.58 silage	$7.52
7	Velvet beans in pod--	635.12 beans	
	Corn silage --------	1654.75 silage	$7.77

A comparison of the costs of gains of Lot 6 and Lot 7 shows a very slight difference in favor of Lot 6. In this test one pound of cottonseed meal was equal to two and one-half pounds of velvet beans in pods. Lot 7, however, consumed only two-thirds as much silage as Lot 6. It is evident that the pods tended to reduce the consumption of silage. The cost of making one hundred pounds of gain was practically the same for the two rations. This indicates that in this experiment velvet beans in the pod at $18.00 per ton were practically as profitable as high grade cottonseed meal at $35.00 per ton. That is, according to this experiment, a feeder could afford to pay nearly half as much per ton for unhulled and unground velvet beans as for a ton of high grade cottonseed meal.

FINANCIAL STATEMENT.

The statement for the feeding test is based on the prices the steers actually cost and the local prices for feeds. Steers of the same age and quality, fed under similar conditions, should return the same profits on the same rations. Prices of steers and of feeds vary from year to year, so the feeder must make corrections in his estimates for feeding operations on the basis of local prices.

LOT 6. COTTONSEED MEAL AND CORN SILAGE:

To 20 steers, 11780 lbs. @ 4.95 cents per lb. ----------	$583.11
To 8120 lbs. cottonseed meal @ $35.00 per ton ------	142.10
To 75750 lbs. corn silage @ $2.50 per ton ----------	94.68
To freight, yardage and commission ----------	98.00
	$917.80
By sale, 6 steers, 5180 lbs. @ 7.90 per cwt. ----------	$409.22

By sale, 13 steers, 8750 lbs. @ 7.50 per cwt.	656.25
By sale, 1 steer, 540 lbs. @ 5.50 per cwt.	29.70
	$1095.17
Total profit	$177.28
Profit per steer	8.86

LOT 7. VELVET BEANS IN POD AND CORN SILAGE:

To 20 steers, 11605 lbs. @ 4.95 per lb.	$574.44
To 18700 lbs. velvet beans @ $18.00 per ton	168.30
To 48716 lbs. corn silage @ $2.50 per ton	60.89
To freight, yardage and commission	98.00
	$901.63
By sale, 4 steers, 3290 lbs. @ 7.90 per cwt.	$259.91
By sale, 16 steers, 10670 lbs. @ 7.50 per cwt.	800.25
	$1060.16
Total profit	$158.53
Profit per steer	7.92

SUMMARY STATEMENTS.

1. In this experiment one pound of cottonseed meal took the place of two and one-half pounds of velvet beans in pods. The velvet bean lot, however, required only two-thirds as much silage as the cottonsseed meal lot.

2. The cost per 100 pounds of gain was practically equal, when cottonseed meal cost $35.00 per ton and unhulled velvet beans $18.00 per ton.

3. On the above basis, the profit per steer was, on the velvet bean ration, $7.92, and on the cottonseed meal ration, $8.86.

4. The velvet bean ration was relished by the steers.

5. In feeding velvet beans in pods with silage it was found that it was not necessary to grind the beans.

6. The gains made by the steers in each lot were satisfactory: Lot 6, (cottonseed meal) gained an average of 1.6 pounds per day; Lot 7, (velvet beans) gained an average of 1.5 pounds per day.

LOT 6. *Fed cottonseed meal and corn silage.*

Fig. 1. Photo taken at beginning of experiment.

Fig. 2 Photo taken at end of experiment.

PLATE II

LOT 7. *Fed velvet beans in pod and corn silage.*

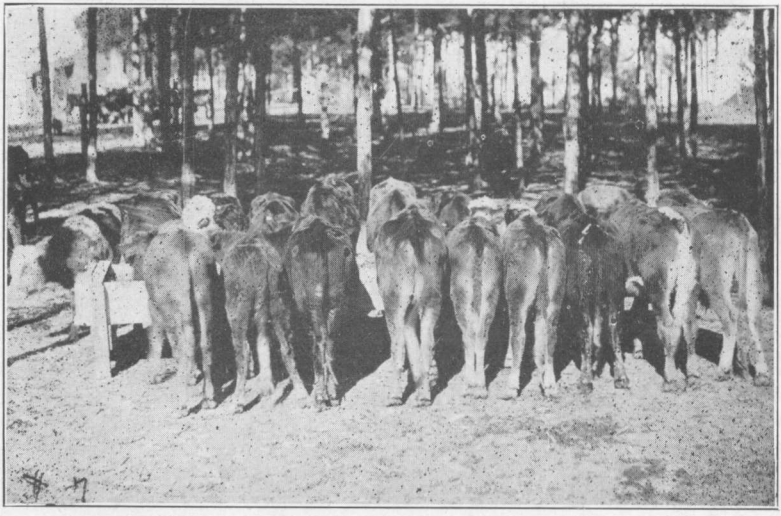

Fig. 1. Photo taken at beginning of experiment.

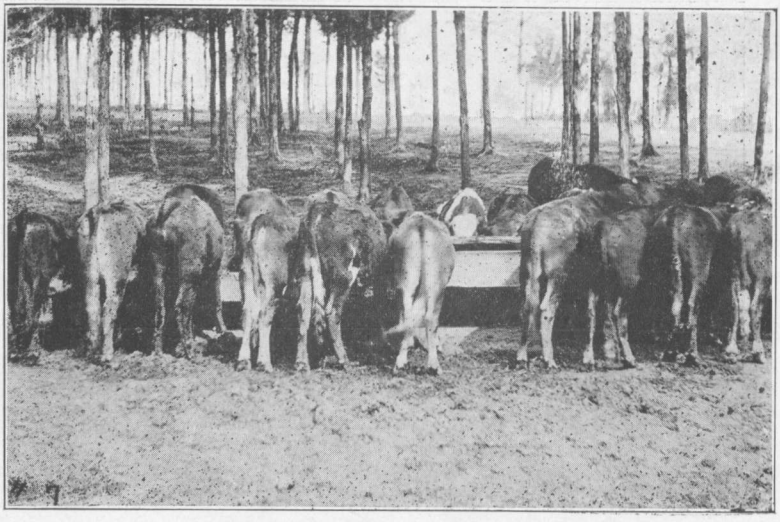

Fig. 2. Photo taken at end of experiment.