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for Fattening Steers in the Black
Belt of Alabama**

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Cottonseed Meal as a Supplement to Pasture for Fattening Steers in the Black Belt of Alabama

By

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THERE is no system or practice in fattening steers which will prove profitable every year. A system which is highly profitable one year may be unprofitable another year because of changed conditions. The kind and quality of cattle, the locality, the season, the available feed supply, the price of feed, and the market price of cattle are all factors which influence the profitability of any system.

The aim of the cattleman should be to determine the system that is best adapted to his conditions, the one which will pay him the greatest profit on the average over a period of years, and follow this system more or less regularly. The system most commonly practiced in the Black Belt is to fatten the cattle on pasture during the summer months and sell them in the fall. Due to the very cheap gains, steers managed in this manner usually return a profit if they can be sold for as much per pound in the fall as they cost the previous spring.

Cottonseed meal or cottonseed cake is sometimes fed to steers on pasture in order to increase their gains and to get them in condition for the summer market when fat cattle are generally not plentiful.

In 1908 and 1909 Gray and Ward² conducted two tests in feeding cottonseed cake to steers on grass. They found that the use of cake increased the rate of gain, the selling price, and the profits. The conditions under which these tests were conducted would probably not be typical of Black Belt conditions of today. During that time much of Alabama was infested with the cattle tick, the cattle were of much lower grade, and the pastures were not as good as they are today.

Barnett and Goodell³ reported an experiment in feeding cottonseed meal to steers on pasture. They found that the addition of meal increased slightly the rate of gain and the selling price per hundred weight. This, however, was more than offset by the greater cost of the meal-fed lot.

¹The authors wish to acknowledge their indebtedness to H. P. Shedd and U. C. Jenkins for valuable cooperation and assistance in carrying out these experiments.

²Alabama Experiment Station Bulletin 151.

³Mississippi Experiment Station Circular 50.

Since the results of these two experiments are not in complete agreement and the effects of feeding cottonseed meal to steers on pasture in the Black Belt are not altogether clear, it was thought that additional experiments on this subject would be helpful. Consequently, in the spring of 1927, through a cooperative arrangement, an experiment was started on Kirkwood plantation, Faunsdale, Alabama, with the object of determining the affects of feeding cottonseed meal to steers that were being finished on pasture for the July market. After the experiment had been conducted for about three years the plan was expanded and another group of steers was added. The added objective was to compare two systems of management; namely, the feeding of cottonseed meal to steers on pasture and selling the steers in July versus the fattening of steers on pasture alone and selling them in September.

PROCEDURE

Steers Used.—All steers used in these experiments were two-year-old, high-grade Herefords. They were raised on the farm where the experiments were conducted or on adjoining farms in the community. These steers were strong and thrifty at the beginning of the experiment. All steers were weighed individually on three consecutive days at the beginning and at the close of the experiment. The average of the three weights was taken as the initial and the final weight, respectively.

Feeds Used.—Each group of steers was turned into a large Black Belt pasture where there was an abundance of grazing at all times. The pastures were composed mostly of black medic, Dallis grass, white clover, and Bermuda grass. Steers in Lot I received in addition to the pasture an average allowance of 4.69 pounds of 7 per cent cottonseed meal per head daily. Steers in Lot II (check lot) were on pasture with no supplement. Both lots were sold in July. Steers in Lot III (during the last three years of the experiment) were on pasture with no supplement and were sold in September.

Valuation of Steers.—All steers were valued by competent cattle buyers at the beginning and at the close of the experiment.

FINISHING STEERS FOR THE JULY MARKET

Effect of Cottonseed Meal on Gains of Steers

When Lot I is compared with Lot II, Table 1, it will be seen that the steers which received cottonseed meal made fairly uniform gains during each of the six years, while the gains made by

the steers on pasture alone were much less uniform. This condition was probably due to the fact that the steers in Lot II were dependent entirely on pasture for feed and they were affected more by the variation in seasons than those in Lot I. The average daily gain in Lot I was 2.47 pounds during the test while in Lot II it was 1.92 pounds.

TABLE 1.—Total and Daily Gains of Steers During Six Summers.

Lot. No.	Ration	Summer	No. of steers	Days on pasture	Av. wt. at beginning of experiment in pounds	Total gain per steer in pounds	Daily gain per steer in pounds
I	Pasture and cottonseed meal	1927	10	70	527	177	2.53
		1928	10	70	633	181	2.59
		1929	14	91	561	224	2.46
		1930	26	77	568	202	2.63
		1931	20	96	654	240	2.50
		1932	25	98	659	209	2.13
	Average ¹		17.5	84	600	205	2.47
II	Pasture only	1927	10	70	526	119	1.70
		1928	10	70	630	178	2.54
		1929	14	91	560	147	1.62
		1930	26	77	562	183	2.38
		1931	10	96	663	202	2.11
		1932	26	98	661	115	1.18
	Average ¹		16	84	600	157	1.92

¹Average obtained by adding six years' results and dividing by six (6).

Effect of Cottonseed Meal on Cost of Gains and Profits

The data in Table 2 show that the average feed cost of making 100 pounds gain in Lot I was \$3.76 and in Lot II was 98 cents. It will be seen from these figures that the steers on pasture alone made very cheap gains. It should be remembered, however, that cheap gains alone do not determine profits; the rate of gain, the finish of the steers, and the price at which they sell are important factors. Notwithstanding the fact that the steers on pasture alone made much cheaper gains, the meal-fed steers returned the greater profit. This was due to more rapid gains, a better finish, and a higher selling price of the meal-fed steers. The steers which received meal not only gained 48 pounds more per head during the 84-day period but sold for an average of 65 cents more per hundred weight and returned \$2.32 more profit per head. It was advantageous to feed cottonseed meal to steers on pasture for the July market during five of the six years.

TABLE 2.—Feed Allowance, Feed and Pasture Cost, Initial Cost of Steers, Selling Price, and Profit per Steer for Six Summers.

Lot No. ¹	Summer	Daily meal allowance per steer in pounds	Feed and pasture cost ³ per cwt. gain	Initial cost per cwt.	Selling price per cwt.	Profit or loss per steer	Price of meal per ton
I	1927	4.73	\$4.45	\$ 5.75	\$ 7.53	\$12.70	\$40.00
	1928	4.80	4.39	9.62	10.25	11.29	40.00
	1929	4.00	3.97	12.03	11.00	5.52	40.00
	1930	5.33	4.12	9.37	8.25	—0.55	34.00
	1931	5.00	3.41	7.47	5.88	—6.56	27.00
	1932	4.27	2.24	5.09	5.60	8.44	14.00
Average ²		4.69	3.76	8.22	8.08	5.31	32.50
II	1927	Pasture only	1.05	5.74	6.61	9.40	—
	1928		0.70	9.63	10.25	17.60	—
	1929		1.10	12.36	10.50	0.44	—
	1930		0.75	9.38	7.25	—2.21	—
	1931		0.84	7.39	5.25	—7.08	—
	1932		1.52	5.12	4.75	—0.19	—
Average ²		0.98	8.27	7.43	2.99	—	

¹Both Lots I and II were on pasture throughout the experiment.

²Average obtained by adding six years' results and dividing by six (6).

³Pasture was charged at 50 cents per head per 4-week period.

Value of a Ton of Cottonseed Meal When Fed to Steers on Pasture with Cattle Selling at Various Prices

Under the conditions which existed during the experiment reported on the previous pages and with pasture charged at 50 cents per head for each 4-week period, the meal-fed steers returned a value of \$44.90 per ton for the meal which they consumed. In view of the fact that the market price of cattle and the market price of cottonseed meal changes from year to year and since these two factors influence materially the financial results in fattening cattle, it would be desirable to know the value of cottonseed meal when pasture-fed cattle were selling at various prices. Therefore, Table 3 was prepared. This table is

TABLE 3.—Value of a Ton of Cottonseed Meal when Fed to Steers on Grass with Cattle Selling at Various Prices.

With grass-fat cattle selling for—	A ton of 7 per cent cottonseed meal was worth—
5 cents per pound	\$38.75
6 cents per pound	41.18
7 cents per pound	43.62
8 cents per pound	46.05
9 cents per pound	48.49
10 cents per pound	50.93

based on the results reported in the previous pages. It is shown here, for example, that if grass-fat cattle are selling for 5 cents per pound, cottonseed meal can be fed at a profit if purchased for less than \$38.75 per ton.

Feed and Pasture Cost of Gains with Cottonseed Meal at Various Prices

When other things are equal the cost of producing beef varies with the cost of feed. In this experiment the pasture was charged at 50 cents per head for each 4-week period and that cost was the same in both groups of steers; the cost of cottonseed meal was the variable factor. Table 4 was prepared to show the effect of the price of cottonseed meal on the cost of producing beef. By referring to this table it will be seen that it will cost \$2.65 to produce 100 pounds of gain on steers with cottonseed meal valued at \$20 per ton, or \$3.61 to produce 100 pounds of gain with cottonseed meal charged at \$30 per ton.

TABLE 4.—Average Feed and Pasture Cost of Producing 100 Pounds of Gain on Steers with Cottonseed Meal at Various Prices.

Cost of cottonseed meal per ton	Cost of 100 pounds gain
\$20.00	\$2.65
25.00	3.13
30.00	3.61
35.00	4.09
40.00	4.58
45.00	5.05
50.00	5.54

FINISHING STEERS FOR THE JULY VERSUS THE SEPTEMBER MARKETS

The experiment reported in the previous pages had not progressed far before it became apparent to the authors that if steers were to be sold in July they should be fed cottonseed meal as a supplement to pasture. The addition of the meal to the ration of the steers, caused them to sell for more per pound and return a greater profit than the steers which were on pasture alone. Although the steers on pasture alone made very cheap gains they were not finished sufficiently in 70 to 90 days to meet the demands of the butcher. The question naturally arose as to which would be the better practice, to feed steers cottonseed meal on pasture and market them in July (apparently there would be very little virtue in feeding meal and selling the steers in September because the main object in feeding meal is to in-

crease the rate of gain and get the cattle ready for the early market when grass-fat cattle are not plentiful) or to fatten them on pasture alone and sell them in September.

In order to compare these two systems of management, a third group of steers, Lot III, was added to the experiment in the spring of 1930. This group was managed similarly to that of Lot II with the exception that they were continued on pasture until September.

By comparing Lot I with Lot III, Table 5, it will be seen that the steers which were on pasture and received meal made an average gain of 217 pounds in 90 days and the steers on pasture only made an average gain of 258 pounds in 154 days. Data in Table 6 show that the steers which were fed meal and sold in July made the greatest profit in 1932 but that the steers which were on pasture alone and which were sold in September made the most profit in 1930 and 1931. Apparently, the two factors which had the greatest influence in determining the most profitable practice were (1) the price of cottonseed meal and (2) the relative price of grass-fat cattle in July as compared to September. In 1932 cottonseed meal was worth \$14 per ton and the general level of the cattle market was higher in the summer than in the fall. The feeding of meal was very profitable under those conditions. In 1930 and in 1931 cottonseed meal was worth \$34 per ton and \$27 per ton, respectively. The cattle market was only fair in the summer of 1930 and weak in the summer of 1931 when compared with the fall market. During these two years the feeding of meal was unprofitable.

TABLE 5.—Total and Daily Gains of Steers During Three Summers.

Lot No.	Ration	Summer	No. of steers	Days on pasture	Av. initial weight	Total gain per steer	Daily gain per steer
					(pounds)	(pounds)	(pounds)
I	Pasture and cottonseed meal. Steers sold in July	1930	26	77	568	202	2.63
		1931	20	96	654	240	2.50
		1932	25	98	659	209	2.13
	Average ¹		23.67	90.33	627	217	2.42
II	Pasture only. Steers sold in July	1930	26	77	562	183	2.38
		1931	10	96	663	202	2.11
		1932	26	98	661	115	1.18
	Average ¹		20.67	90.33	629	167	1.89
III	Pasture only. Steers sold in September	1930	19	169	556	288	1.70
		1931	10	147	663	269	1.83
		1932	26	147	661	218	1.49
	Average ¹		18.33	154	627	258	1.67

¹Average obtained by adding three years' results and dividing by three (3).

DISCUSSION

The financial returns shown in these experiments varied considerably from year to year due, no doubt, to the financial condition of the country in general and to the cattle and feed markets in particular. The first three years (1927 to 1929 inclusive) covered by these experiments were a part of one of the most prosperous periods in the history of America, whereas, the last three years (1930 to 1932 inclusive) were a part of one of the greatest depressions. The average results of the six years, which covered a part of both periods, should be fairly indicative of what might be expected during normal times. It is evident that the kind, amount, and quality of pasture available for the steers as well as the price of cottonseed meal and the condition of the cattle market would influence the results of an experiment of this kind. Pastures in general in the Black Belt are better than those in any other part of the Cotton Belt. The pastures used in these experiments were excellent in both quantity and quality. With less favorable pastures greater returns from the feeding of meal on pasture would be expected.

TABLE 6.—Feed Allowance, Feed and Pasture Cost, Initial Cost of Steers, Selling Price, and Profit per Steer for Three Summers.

Lot No.	Ration	Summer	Daily meal allowance per steer in pounds	Feed and pasture cost, per cwt. gain	Initial cost per cwt.	Selling price per cwt.	Profit or loss per steer	Price of meal per ton
I	Pasture and cottonseed meal. Steers sold in July	1930	5.33	\$4.12	\$9.37	\$8.25	\$-0.55	\$34.00
		1931	5.00	3.41	7.47	5.88	-6.56	27.00
		1932	4.27	2.24	5.09	5.60	8.44	14.00
	Average ¹		4.87	3.26	7.31	6.58	0.44	25.00
II	Pasture only. Steers sold in July	1930	—	0.75	9.38	7.25	-2.21	—
		1931	—	0.84	7.39	5.25	-7.08	—
		1932	—	1.52	5.12	4.75	-0.19	—
	Average ¹			1.05	7.29	5.75	-3.16	
III	Pasture only. Steers sold in September	1930	—	1.04	9.39	7.00	1.56	—
		1931	—	0.97	7.39	6.17	3.55	—
		1932	—	1.20	5.12	4.52	1.69	—
	Average ¹			1.07	7.30	5.90	2.27	

¹Average obtained by adding three years' results and dividing by three (3).

²Pasture was charged at 50 cents per head per four-week period.

SUMMARY AND RECOMMENDATIONS

The average results of the experiments in feeding cottonseed meal to steers that were being finished on pasture for the July market show that:

(1) Steers which received 4.69 pounds of cottonseed meal per head daily made a daily gain of 2.47 pounds while steers on pasture alone gained only 1.92 pounds daily.

(2) The feed cost of making 100 pounds of beef with pasture charged at 50 cents per head for each 4-week period and with cottonseed meal charged at \$32.50 per ton was \$3.76 for the meal-fed group and 98 cents for the pasture-alone group.

(3) Steers which received meal not only gained 48 pounds more per head during the 84-day feeding period but sold for 65 cents more per hundred weight and returned a profit of \$2.32 more per head than steers on pasture alone.

(4) It was profitable to feed meal during five of the six years of the experiment.

(5) When grass-fat cattle were worth 5 cents a pound, a ton of cottonseed meal fed to cattle on pasture was worth \$38.75.

(6) When cottonseed meal cost \$20 per ton the feed cost of 100 pounds of gain made on meal and pasture was \$2.65.

The second phase of this experiment was to compare the results of feeding cottonseed meal to steers on pasture and selling the steers in July versus fattening steers on pasture alone and selling them in September. The results show that:

(1) The steers which received cottonseed meal made an average gain of 217 pounds in 90 days and the steers on pasture alone made an average gain of 258 pounds in 154 days which were daily gains of 2.42 and 1.67 pounds, respectively.

(2) The feed cost of making 100 pounds of beef with pasture charged at 50 cents per head for each 4-week period and cottonseed meal charged at \$25 per ton was \$3.26 for the meal-fed group and \$1.07 for the pasture alone group.

(3) It was more profitable to fatten steers on pasture alone and sell the steers in September than to feed cottonseed meal on pasture and sell the steers in July during two of the three experiments.

General recommendations based on the results reported in the previous pages are:

(1) Black Belt farmers who wish to market grass-fat steers in July or August should feed the steers an average of from 4 to 5 pounds of cottonseed meal per head daily.

(2) The price of cottonseed meal, the market price of cattle, and the amount and quality of pasture available should determine whether to feed cottonseed meal and market steers in July or to fatten steers on pasture alone and sell them in September.

(3) If cottonseed meal is relatively cheap or if pasture is scarce or poor in quality or if the market on which the cattle are to be sold is usually one dollar or more per hundred weight higher in the summer than in the fall, steers should be fed meal and sold in July or August, otherwise they should be fattened on pasture alone and sold in September.

