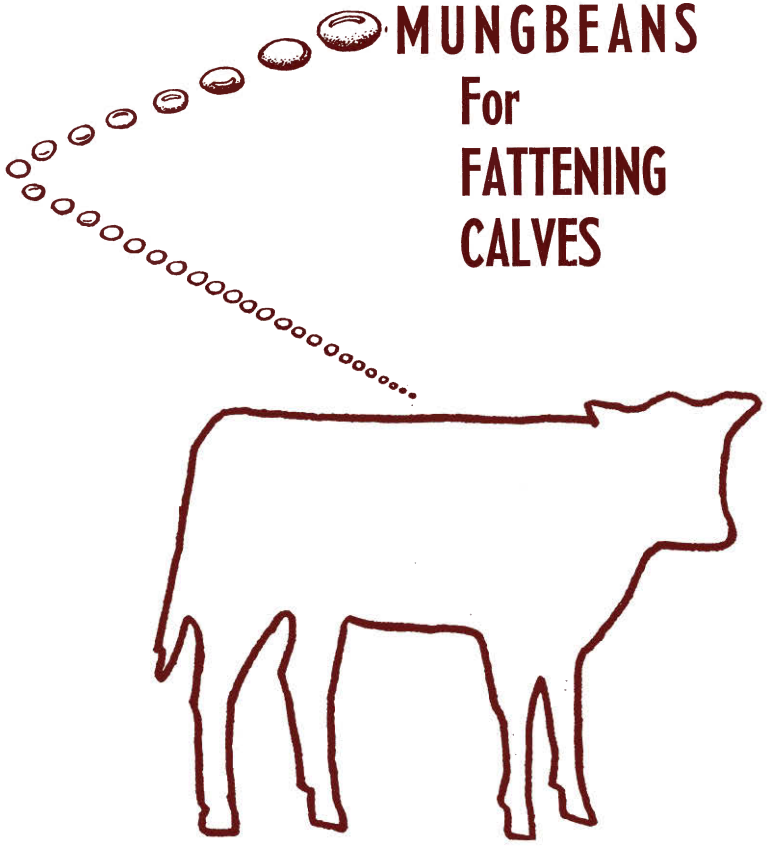
The Value Of MUNGBEANS For FATTENING CALVES



OKLAHOMA AGRICULTURAL EXPERIMENT STATION
Oklahoma A. & M. College, Stillwater
W. L. Blizzard, Director Louis E. Hawkins, Vice Director

Bulletin No. B-370 May 1951

The Value of

Mungbeans For Fattening Calves

By O. B. ROSS, A. E. DARLOW, R. W. MacVICAR, and DWIGHT F. STEPHENS*

Mungbeans are well adapted to Oklahoma, especially as a summer catch crop following small grains. The green-seeded type was grown on a fairly large acreage during the latter years of World War II, because of a good market for seed to be used in producing bean sprouts for food. Cracked beans, and others unsuitable for sprouting, appeared a promising source of protein feed; and there was some indication that the beans might also be grown primarily for feed.

Oklahoma annually imports a considerable quantity of protein to balance its relative surplus of forage and energy feeds. Earlier research at this Station showed that mungbeans contain around 23 to 25 percent protein, and that they can satisfactorily provide a good share of the protein in rations for poultry and dairy cattle and at least some of the protein in rations of fattening lambs and swine.**

This bulletin reports three trials in which ground mungbeans replaced all of the cottonseed meal or cake in a fattening ration for steer calves. The beans used were of the green-seeded type.†

RESULTS OF THESE TRIALS SHOW that when the price of ground mungbean seed is equal to that of cottonseed cake or meal, mungbeans can be an economical protein supplement for fattening beef calves.

---

* Respectively: Animal Husbandman, Nutrition (formerly with the Department of Animal Husbandry); Head, Department of Animal Husbandry; Head, Department of Agricultural Chemistry Research; and formerly Assistant Animal Husbandman (now Superintendent, Ft. Reno Experiment Station).

** See List of other Oklahoma Station publications on mungbeans on page 7.

† The green-seeded type, of which there are several strains, make considerably better yields of seed than does the Golden variety which has seed of a gold or light bronze color. See Okla. Agri. Exp. Sta. Bul. 284, Table I.

How the Tests Were Made*

Choice Hereford weanling calves for use in the feeding trials were purchased each year from the Mullendore Trust Company ranches. The calves were allotted uniformly according to standard experimental procedure, with 10 head to each lot. The trials were begun each year about October 15 and terminated about April 15.

The steers of each lot were confined to concrete-paved pens approximately 50 by 30 feet in size, and had access to an open shed for shelter. The feedbunks in each lot were placed under the open shed. The feed for each lot was weighed at each feeding, and all lots of steers were hand fed. The alfalfa hay was fed separately each morning, but all the other feed ingredients were fed twice daily. The grain and protein supplements for each lot were mixed with the silage. All feed refused was weighed back. All lots were allowed free access to salt and a mineral mixture consisting of equal parts salt, bone meal, and ground limestone.

The steers were weighed every 28 days. The initial and final weights were determined by averaging the weights obtained on three consecutive days.

The initial cost price in each instance was the price actually paid for the steers. The value per hundredweight at the conclusion of each trial was determined by a committee from the Oklahoma City Livestock Market composed of packer and commission company representatives. This value is referred to as the appraised value. The following daily rations were fed:

	Lot 1	Lot 2
Ground yellow corn	Full fed	Full fed
Cottonseed meal or cake	1.5 pound	None
Ground green mungbeans	None	About 2.5 pounds
Atlas sorgo silage	Limited	Limited
Alfalfa hay	1.0 pound	1.0 pound
Salt	Ad lib.	Ad lib.
Mineral mixture	Ad lib.	Ad lib.

* Annual progress reports, giving further details on the methods and results in these trials, may be found in the following Oklahoma Station publications: Miscl. Pub. MP-11, pp. 34-44 (1947); Miscl. Pub. MP-13, pp. 48-52 (1948); and MP-15, pp. 67-71 (1949).

The ground mungbeans were fed at a level to provide approximately the same crude protein intake daily as that provided by 1.5 pounds of cottonseed meal or cake. (Cottonseed meal was fed during the first two years, and cottonseed cake was fed the third year.)

Average chemical analyses of the feeds are presented in Table I.

Results and Discussion

Table II presents average results for the three-year period. The first two years, average daily gain per head was exactly the same in both lots, 2.13 pounds the first year and 2.14 pounds the second. In 1948-49, the steers on the mungbean ration had a slight advantage (0.05 pounds).

The steers of Lot 2 were fed 2.54 pounds of mungbeans per head daily. Although the corn was full fed to the steers of both lots, the mungbean-fed steers ate 1.53 pounds less corn daily than the steers of Lot 1. Less feed was required per pound of gain for the steers of Lot 2; and the higher appraised value indicates they were slightly fatter than the Lot 1 steers.

In these trials, 100 pounds of ground mungbeans replaced 59.7 pounds of cottonseed meal or cake, 64 pounds of corn, and 13 pounds of silage. On the basis of the average prices of feed fed in these trials, 100 pounds of mungbeans fed as a protein supplement was equal in value to 109 pounds of cottonseed meal or cake. As a partial replacement for corn in the ration, 100 pounds of mungbeans were equal in value to 144 pounds of corn.

Taking into consideration the difference between lots in total gain selling price and feed per 100 pounds gain, in these experiments, it would have been necessary to buy cottonseed meal at only 83 percent of the price of mungbeans to make an equal net profit per head.

Summary

Ground mungbean seed when fed as a part of a steer calf fattening ration satisfactorily replaced all of the cottonseed meal or cake and part of the corn. The mungbeans were quite palatable, and no trouble was encountered in keeping the steers on full feed. When the price of

TABLE I.—Chemical Composition of Feeds.

	Percent dry matter	Percentage composition of dry matter						
		Ash	Protein	Fat	Fiber	N.F.E.	Ca	P
Green mungbeans	89.8	4.0	25.3	1.6	4.0	65.1	.14	.38
Yellow corn	87.4	1.5	9.5	5.0	2.2	81.8	.05	.30
Cottonseed meal	92.4	6.3	42.6	6.1	12.0	33.0	.22	1.12
Atlas sorgo silage	49.7	7.7	4.5	2.1	23.7	62.0	.28	.32
Alfalfa hay	92.5	8.7	15.9	2.8	34.3	38.3	1.55	.25

TABLE II.—Comparison of Mungbeans and Cottonseed Meal; Average of Three Years, 1946, 1947, and 1948.
(Average number of days fed, 171).

	Lot 1 Cottonseed meal	Lot 2 Ground mungbeans
No. steers per lot	30	30
Average wt. per steer (lbs.)		
Initial	512	511
Final	873	876
Gain	361	365
Average daily gain	2.11	2.13
Average daily ration (lbs.)		
Ground corn	11.43	9.90
Cottonseed meal	1.50	---
Ground mungbeans	---	2.54
Alfalfa hay	1.00	1.00
Silage	8.53	8.27
Salt	.02	.02
1-1-1 mineral mixture	.02	.02
Feed per cwt. gain (lbs.)		
Ground corn	541	465
Cottonseed meal	71	---
Ground mungbeans	---	119
Alfalfa hay	47	47
Silage	403	388
Salt	1.0	0.9
1-1-1 mineral mixture	1.0	0.8
Feed cost per cwt. gain (dollars)	22.19	21.26
Financial results (dollars)		
Appraised value per cwt.	26.25	26.42
Total value per steer (3% shrink)	222.34	224.57
Initial cost @ $23.17 per cwt.	118.63	118.39
Feed cost*	80.10	77.60
Total steer and feed cost	198.73	195.99
Profit per steer	23.61	28.58

* The prices of feed were: Ground corn, $3.41 per cwt.; cottonseed meal, $90.50 per ton; ground green mungbeans, $81.67 per ton; alfalfa hay, $22.00 per ton; silage, $5.67 per ton; salt, $0.83 per cwt.; and mineral mixture, $2.13 per cwt.

mungbean seed is equal to that of cottonseed cake or meal, mungbeans can be an economical protein supplement for fattening beef calves. This offers a potential source of a home-grown protein supplement of considerable promise for Oklahoma livestock producers.

Other Oklahoma Station Publications on Mungbeans

Briggs, H. M.: *Wheat, Mungbeans, and Prairie Hay in Lamb Fattening Rations.* Mimeo. Cir. M-90 (April, 1943).

Heller, V. G.: "Nutritive Properties of the Mungbean." *J. Biol. Chem.* 75:435-442 (1927).

*Kuhlman, A. H., W. D. Gallup and H. W. Cave: "Ground Mungbeans as a Protein Supplement in Rations for Dairy Cows." (Abstract). *J. Dairy Sci.* 29:537-538 (1946).

Ligon, L. L.: *Mungbeans; A Legume for Seed and Forage.* Bul. 284 (1945).

Thayer, R. H., and V. G. Heller: *Mungbeans as a Poultry Feed.* Bul. B-336 (1949).

Thompson, C. P., and J. C. Hillier: *Mungbeans as a Protein Supplement for Growing and Fattening Swine.* Mimeo. Cir. M-81 (April, 1942).

* Additional data are available in unnumbered mimeographed material.