Cows Are Good Bean Market

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Dairy cows will produce more butterfat on a ration in which whole (cracked) soybeans provide the protein supplement than on an ordinary ration of mixed grains which uses such a protein supplement as soybean oilmeal.

This has been our experience here at the Iowa Station in 3 different years in which we were studying the use of whole soybeans for dairy cows.

As long as the price for whole soybeans hovers around $1.25 to $1.75 a bushel or more, no farmer is likely to worry much about getting rid of beans. During recent months, a man could sell the soybeans and buy back soybean oilmeal, linseed oilmeal or some similar protein supplement and make the exchange on a profitable basis.

But if and when we produce so many beans that the price drops too low, or if it drops for any other reason, such as it may at the termination of the war, the man with dairy cows has a ready and profitable “market.”

The results we obtained are very different from those obtained in other tests (some of them at other stations) when soybeans have been fed to hogs and fattening cattle. When fed in large quantities to hogs, they produce soft pork, as tests at the Iowa Station and elsewhere have shown; when fed to fattening cattle, they have a tendency to cause the cattle to go off feed if more than 2 or 3 pounds per steer are fed daily.

But in our tests with dairy cows, we were able to feed 8.5 pounds of beans to some cows daily without the cows going off feed, or with no other apparently serious results.

In general our results with the feeding of whole soybeans to dairy cows were:

1. The cows produced more total butterfat than on the comparative rations which did not include whole soybeans.
2. The butterfat test of the milk was increased in the rations containing whole soybeans.
3. The yield of milk dropped slightly with the feeding of soybeans.
4. Cows on a soybean ration maintained their body weight about the same as those on the usual ration.
5. The color of the butterfat
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decreased on a soybean ration—it was whiter than that produced on the ordinary rations.

6. Silage seemed to have more influence on milk flavor than soybeans in the ration.

7. It took longer to churn butter from cows fed large amounts of soybeans or soybean oilmeal to which soybean oil had been added.

Our conclusion is: Feed whole (cracked or ground) soybeans whenever they provide a lower cost of protein supplement than one will have if he goes to the cost of selling and delivering the beans and buying and hauling back soybean oilmeal or some other high protein supplement.

One needs to keep in mind that in our tests we were working only with dairy cows. While the general results with feeding them to cows were good, they might not be equally good with other classes of livestock.

The foregoing conclusions are based on tests over a period of 3 years. The tests in the different years were not set up exactly alike. In the first tests—in the winter of 1935-36—we took 8 cows and divided them as nearly equal in number and quality as possible. The cows of one group were fed a grain mixture of 4 parts cracked corn, 4 parts ground oats, 1 part soybean oilmeal, 1 percent salt and 1 percent bone meal; silage and alfalfa hay daily for each 100 pounds weight of each cow.

The four cows which made up the other group—the “soybean” group—were fed corn silage and cracked soybeans, 1 pound for each 5 pounds of milk produced. Soybeans were their only grain. They got no hay, but had access to a mixture of equal parts of salt and bone meal.

The cows getting the silage-soybean ration consumed large quantities of this feed. The average amount of silage eaten ranged from 50 pounds for the Jerseys to 75 pounds for the larger Holsteins. The consumption of soybeans ranged from $5$ to $8\frac{1}{2}$ pounds per cow daily.

While on this soybean-silage ration the cows maintained their weights about as well as the similar cows that were on the mixed grain-silage-hay ration. Those on the soybean-silage ration produced a little more total

Above (opposite page): These cows on experiment at the Iowa State College Dairy Farm are being fed their “heavy” ration of soybeans.

Right: Here the beans are being cracked, ready for use in the experiment. There was no difficulty in keeping the cows on feed even when they consumed as much as eight pounds of beans daily. Fat tests were highest with the cows which were fed whole beans.
butterfat, but slightly less milk. The fat percentage in the milk of the soybean-silage ration was enough higher so that their total butterfat production was above that of the other lots of cows.

The surprising thing in this test was the ability of the cows to eat so much cracked soybeans without going off feed. Other tests had indicated that when steers were fed more than 2 to 3 pounds of cracked beans a day, they would go off feed. Our theory of this difference is this: Steers being fattened are laying the fat from their feed on their bodies. If the fat comes to them faster than they can store it, they go off feed. With dairy cows, fat is being removed from their bodies with their milk. So a cow probably can consume as much fat as she is putting into her milk and not go off feed.

We wanted to check further on certain aspects of our test of 1935-1936, so another test was conducted the following winter. In this test we had two experimental lots of cows and a third check lot. All got silage and timothy hay and the same grain mixture except that for one of the lots ground soybeans were used as the protein supplement and some additional soybean oil was added to make the mixture very high in fat content. In the other experimental lot the fat content of the grain was about half as much, with enough starch added so that the two grain mixtures contained the same energy value.

In this test, “the double reverse method” was used. That is, both groups were fed each ration at different periods. The check lot got the regular college herd grain mixture throughout the test. The feeding schedule was arranged so that when the cows were fed the grain containing the larger amount of fat, they were fed approximately as much fat as that yielded in their milk. The cows getting the smaller fat ration obtained only half the amount of fat they produced in their milk.

The medium fat ration in this test produced more milk but a lower fat percentage and a lower total fat percentage than the high-fat ration. Without exception every cow when she was shifted from the low-fat ration to the high-fat ration produced milk with a higher percentage of fat.

In the third year of our tests (1937-38) the ration consisted of alfalfa, hay, corn silage or sorghum silage and a grain mixture consisting of 1 part each of corn and cob meal, rolled oats and 2 parts of cracked soybeans, or an equal amount of soybean oilmeal and soybean oil - the oil having been extracted at a very low temperature so as to affect the protein as little as possible. The grain was fed at the rate of 1 pound daily for each pound of butterfat produced during the preceding week. Thus each cow received about 80 percent as much fat in her grain as the fat secreted in her milk.

Without exception the cows produced more butterfat when they were on the “soybean” ration than when they were on the “soybean oil-soybean meal” ration. Again in this test, the butterfat test came up and the yield of milk went down when soybeans were fed.

And so from our 3 years of tests, we must conclude that the feeding of whole soybeans is likely to increase the percentage of butterfat in the milk and the total yield of butterfat, but it may decrease the yield of milk. It seems good business to crack the soybeans and feed them to your dairy cows unless the difference in price is great enough to pay for hauling the beans to market, hauling oilmeal home and to offset a slightly lower fat production from your cows.

These tests clearly indicate that Iowa farmers who can grow soybeans are situated to take care of the protein needs of their dairy cows without buying a dollar's worth of commercial feed.

Flax needs to be sown on land that is free from weeds and fairly fertile - it doesn't do well on thin land. It should be sown as early in the spring as the ground will permit.

**Soybean Growing Pointers**

The main factors of successful soybean production are:

1. **Prepare a good seedbed.** One needs to plow, except possibly where the land was in soybeans the previous year. Plow in the fall or early spring. Work the land with a disc and harrow to kill as many weeds as possible before planting.

2. **Inoculate the seed.** The Iowa Station has obtained marked increases in yields by inoculating the soybean seed. The bacteria which enable soybeans to take free nitrogen from the air are not commonly found in Iowa soils. Some Iowa farmers who have grown soybeans on their farms many years inoculate their seed every few years.

3. **Choose a suitable variety.** The commonly grown varieties —Mukden, Manchu, Dunfield and Illini—are still the best “bets.” Avoid so-called “new” varieties under such names as McClave, Prolific, Bell, New Bush and other names. These are indistinguishable from an inferior discarded variety called the Midwest. Manchu and Dunfield may be grown in any part of Iowa. Mukden is suitable especially for the northern half of the state; Illini is later and is best suited for central Iowa south.

4. **Seed Thickly.** In rows, the best yields are obtained by planting the seed about an inch apart, regardless of whether the rows are as close as 21 inches or as far as 42 inches apart. When drilled solid with a grain drill, 2 bushels of Manchu an acre has given the best yield. Manchu beans are rather large, so the rate for other varieties might need to be varied accordingly.

5. **Control the weeds.** Soybeans and weeds don't get along well together. If you can't control the weeds, you won't get many soybeans. Planting in rows is usually best in Iowa so that weeds can be controlled by cultivation.