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Mississippi Agricultural Experiment Station

BULLETIN NO. 111.

JANUARY, 1908.

EXPERIMENTS IN FEEDING DAIRY COWS

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BY J. S. MOORE.

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In this Bulletin the results of the following experiments and conclusions in regard to them are reported:

1. The effect of feeding grain to cows getting soiling crops.
2. Feeding soiling crops vs. cottonseed meal.
3. Feeding large, medium, and small grain rations to dairy cows.
4. Value of corn silage as a feed for dairy cows.
5. Protecting cows from hot sun in summer.
6. The influence of shelter for dairy cows.

In order that the dairyman may easily get the results obtained from feeding the above feeds, all details are omitted. These may be found in the annual reports of the Station.

**1. Effect of feeding grain to cows getting soiling crops.**—In order to determine the practical value of feeding both soiling crops and grain feeds to cows at the same time, we made two experiments, one lasting 16 weeks and the other 10 weeks. In both all of the cows were given all the green feed, consisting of alfalfa, sorghum, and Johnson grass, that they would eat. In addition to the above, one-half of the cows in the first experiment were given two pounds each of cottonseed meal daily and in the second experiment one-half of the cows received three and four-tenths pounds of cottonseed meal each. In the first trial, the cows getting cottonseed meal gave 5% better returns in milk than did those receiving no meal; but this was not sufficient to pay for the feed consumed. Allowing the market prices for the feed at the time that this work was done, we find that the milk from the cows getting no meal cost 29.8 cents per 100 pounds, and that from those

receiving meal cost 40.3 cents per hundred pounds. In the second trial there was no apparent increase due to the meal fed. So far as the results of these two tests are concerned, they would indicate that where the cows are being liberally fed on good soiling crops it will not pay to give them any grain feed.

**2. Feeding soiling crops vs. cottonseed meal.**—The question is often asked, "Can I afford to feed grain feed in summer when pasture is not available?, or would it be better to grow some crop that can be fed green?" In order to answer this question, the following test was made: All of the cows were put in pasture at night, but kept up during the day. Half of the cows received an average each of 41 pounds of a mixture of green alfalfa, sorghum, and Johnson grass; the other half received each 3.4 pounds of cottonseed meal daily. The test lasted ten weeks. The cows getting the green feed gave an average daily yield of 14.9 pounds of milk; those getting the 3.4 pounds of cottonseed meal gave 14.2 pounds. This would indicate that the 41 pounds of green feed was a little more valuable than the 3.4 pounds of cottonseed meal. It will be noted that all of these cows were turned into a comparatively good pasture at night, and it is probable that the cows getting the cottonseed meal ate more than did those that had already eaten all the green feed wanted. The difference in favor of the soiling crop would, perhaps, have been much greater had the cows been kept off the pasture altogether.

**3. Feeding large, medium, and small rations to dairy cows.**—While it is probably true that most of the cows in this State suffer from a lack of sufficient food, it is also true that in some cases, at least, the cow is given more feed than she can make profitable use of. When this is the case the cost of the feed is not only larger than it should be, but the amount of milk may be decreased. To determine the best amount of grain feed to use, two tests were made. In the first test there were twenty-one cows, divided into three lots of seven cows each. The yield of milk from the cows varied from two to three gallons each per day. Lot 1 received 13 pounds of grain feed for each cow, consisting of a mixture of two parts of wheat bran and one part of cotton seed meal by weight; lot 2, 10 pounds; and lot 3, 6 pounds. The test lasted four weeks and the average weekly yield from lot 1 was 833 lbs. of milk; from lot 2, 873 pounds; and from lot 3, 743 pounds. Each of these lots were giving about equal amounts of milk before the test started. Where the cows received 10 pounds of grain feed they gave

as good results as where they were given a larger grain ration. Where only 6 pounds of the grain feed were given the cows decreased in the flow of milk and also lost some in body weight, showing that this amount was too small to meet the demands.

A second test was made with three lots of nine cows each. The experiment lasted four weeks. The grain mixture was the same as that given in the first test; that is, two parts of wheat bran and one part of cottonseed meal by weight. The cows in lot 1 received 11 pounds of grain daily; and lot 2, 9 pounds; and in lot 3, 7 pounds. All of the cows received in addition to the above, 8 pounds of Johnson grass hay and 14 pounds of cottonseed hulls. In this test, the cows in lot 2 gave a little better yield than did those in lot 1. The yield of milk from the cows in lot 3, as in the first test, was much smaller than in either of the other lots. From the results of these two experiments we may conclude that where cows are giving from two to three gallons of milk daily, 8 to 10 pounds of grain feed are as much as they can make profitable use of. We have found in practice that too much concentrated feed at or just after calving is more harmful to the cow than too little feed. Where the feed is increased too rapidly there is danger of the cow using it to put on fat, and when such is the case, as a rule, the amount of milk will decrease.

Every dairyman and farmer should observe carefully the effect of the feed on the yield of milk and learn to feed each individual cow the amount of feed that will give the greatest yield of milk at the least cost.

**4. Value of corn silage as a feed for dairy cows.**—In order to determine the value of corn silage as a feed for dairy cows, 30 cows were selected and fed for four periods of four weeks each.

During the first and fourth periods very little silage was fed, but during the second and third periods the cows were given all that they could eat up clean.

The results of this work are so important to the feeder at this time when the price of all feed stuffs are so high, that we give the following table showing the value of this feed:

## VALUE OF CORN SILAGE AS A FEED FOR DAIRY COWS.

| Number of Cows | Periods      | TOTAL FEED EATEN |            |                   |                  |             | Total Value of Feed | Total Yield of Milk | Value of Milk at 16 $\frac{3}{4}$ c per Gallon | Profit over Cost of Feed |
|----------------|--------------|------------------|------------|-------------------|------------------|-------------|---------------------|---------------------|------------------------------------------------|--------------------------|
|                |              | Cottonseed Meal  | Wheat Bran | Johnson Grass Hay | Cottonseed Hulls | Corn Silage |                     |                     |                                                |                          |
|                | EIGHT WEEKS. | Lbs.             | Lbs.       | Lbs.              | Lbs.             | Lbs.        | Dols.               | Lbs.                | Dols.                                          | Dols.                    |
| 30             | 1 and 4      | 5744             | 7818       | 8510              | 16570            | 9674        | 259.58              | 25046               | 485.33                                         | 225.75                   |
| 30             | 2 and 3      | 5962             | 2273       | 1390              | 2080             | 64200       | 161.76              | 25098               | 486.45                                         | 324.69                   |

In comparing the results we find that the yield of milk was about the same for both periods. It is then a question of the relative economy of the feeds used. The silage was used largely to replace the wheat bran, the cottonseed hulls, and the hay. Valuing the silage at \$2.00 per ton and the other feeds at the market value when fed, the cost of the feed for the first and fourth periods was \$259.58, and for the second and third periods it was \$161.76, or a difference of \$97.82 in favor of the periods when silage was fed liberally to replace other feeds.

The above would indicate that in less than two months the use of a silo with thirty cows would increase the profits about \$100.00.

Silage should be fed at least three months in each year and at this rate it would mean a saving of about \$150.00 for the above sized herd. On account of the original cost of the silo and the difficulties of keeping the silage where only a small quantity is needed daily, it is doubtful if a silo will pay with less than fifteen to twenty cows.

**5. Protecting cows from hot sun in summer.**—Our long summers and extreme heat of the sun no doubt is very trying on the cow that is giving a large quantity of milk. It must be remembered that such a cow is doing hard work. In order to determine whether or not it would be profitable to keep the cows in the barn during the day while it was hot, three experiments have been made. The first lasting 16 weeks; the second, 6 weeks; and the third, 10 weeks.

In the first trial, one-half of the cows were kept in the barn both night and day and given an average of about 44 pounds of soiling

crops daily. Half of the cows were allowed to run in the pasture both night and day, and in addition were given four pounds of cottonseed meal each day. The cows running on pasture gave about three pounds of milk each per day more than those that were kept in the barn. The cost of 100 pounds of milk was the same for both lots, or 29.8 cents.

In the second trial, the cows were divided into two equal lots. Both lots received three pounds of cottonseed meal per day for each cow, and one lot received in addition 48 pounds of green sorghum daily. The cows in the first lot ran in the pasture both night and day, while those in the second lot were turned in the pasture only at night. The cows that were turned in pasture both night and day, again gave the best results. They averaged nearly one-half a pound each more milk than did those that were kept in the barn during the day. The cost of 100 pounds of milk from the cows kept in the barn was 86.8 cents, while from those that were put on the pasture the cost was only 44 cents per 100 pounds.

In the third trial, all of the cows were given the same feed, consisting of a daily ration of 3.4 pounds of cottonseed meal. One-half of the cows were turned into the pasture only at night, while the others were put in pasture both day and night. The cows in lot 2, where they ran in pasture both day and night, produced nearly one pound more milk daily than when they were kept confined in the barn during the day. The cost of 100 pounds of milk where the cows were kept in the barn, was 38.4 cents; and in the lot running on pasture 34.6 cents.

Summing up the results of these three tests, we find that in no case was it advantageous to keep the cows in the barn during the day. There are probably two reasons for this: (1) there was a considerable amount of shade in the pasture, and (2) these cows that were kept in the barn had been used to going to pasture both night and day for the greater portion of the year and it was impossible to make them contented in the barn. Some of them refused to lie down at all during the day. It is probable that if they had become accustomed to staying in the barn that much better results could have been obtained by such protection. It is evident that so far as this experiment is concerned, it did not pay to keep the cows confined in the barn.

**6. Influence of shelter for dairy cows.**—The practice of allowing the cows to run out in the pasture both night and day during the winter months and in all kinds of weather is strongly condemned by most

dairy authorities. In order to determine the extent of the injury by such a practice, we conducted an experiment during the month of February, 1906, with two lots of four cows each. Lot 1 was kept in the barn at night and during bad weather, while the cows in lot 2 were turned out both night and day except while being fed and milked. The average daily yield per cow for three weeks before the test began was 18 pounds of milk for each lot. The yield of milk from lot 1 during the test was 16.9 pounds daily and from lot 2, 18.4 pounds. The cows that were kept in the barn lost an average of 14 pounds each in live weight during the four weeks and those that were exposed gained an average of 3.5 pounds each. This test in itself would seem to indicate that shelter for cows is unnecessary in this State. A study of weather conditions, however, for the time that this test was carried on will show that February was extremely mild, with but little rain, and that it did not represent the average winter weather conditions. This test only shows that we often have weather conditions during the winter months when the cattle will do as well outside as when kept in the barn. It will be noted that the cows that were allowed to run in pasture both day and night gave more milk per day during the test than for the three weeks before the test began, although the feed was the same. This is probably due to the fact that the weather was more favorable during this time than it was before the test started.