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Cotton Seed Meal as a Feed For Laying Hens

J. K. MORRISON

AGRICULTURAL COLLEGE, MISSISSIPPI
SEPTEMBER, 1913
INTRODUCTION

The hen is destined to play a very important part in the increase of farm revenue. She is at present poorly fed on the majority of farms. She needs better attention in order that she may produce her share of farm profits.

Marketing feed stuff through the dairy cow, the horse, the sheep, or the hog will not show as large margin of profit on feed as the hen. But to carry hens and get profit the feed must be grown on the farm.

To get the maximum returns the fowls must be fed with the same regularity as the dairy cows. It is not economical to give just enough feed for the maintenance of the body. By the utilization of waste materials around the barn the cost of up-keep is lowered, but far too many farmers allow the fowls to depend altogether upon their ability as foragers to make their own way. The average farm flock will not starve if left to pick up waste material around the barn where the stock are fed, but the hens will produce few eggs and what they do lay will come at the season when the prices are low. The random throwing of corn from the barn to the hens while the stock are being fed will not get good results either. They need a variety, which this method does not furnish.

Protein a Necessity.

It matters not how good the breed or strain of fowls you keep, if they are fed exclusively grain, they will not yield proper returns. The farm fowls of the South get throughout the winter, for the most part, corn, which will produce fat, but which, if fed alone, will not produce eggs.

We doubt if there are five per cent of the farmers in the State who make any attempt whatever to give their hens a well balanced ration. The balanced ration is certainly the underlying principle of profitable poultry raising.

Hens lay in the spring because they can find bugs and grass which balance the grain ration. In the winter nature lies dormant and the protein part of the ration must be supplied by the forethought and energy of man.

Cotton Seed Meal.

Beef scrap is a by-product of the northern packing house. All poultry journals and bulletins that the farmer reads advocate meat protein for the production of eggs. The Southern farmer knows little about beef scrap, and even if he should desire to use it, he would be compelled to order the product, as few of the merchants handle com-
commercial beef scrap. Cotton seed meal is something that he is acquainted with, and it is also available. Availability increases the prospect of its use many times.

In the work that we have conducted a comparison has been made in the animal protein and the vegetable. In the former test beef scrap was used to furnish the principal part of the protein, and in the latter cotton seed meal was the principal source. We have also compared the eggs as to fertility, the vitality of the little chicks, and the effect on the vitality of the hen.

This bulletin is a preliminary report. The work will be continued to get the cumulative results. We do not regard the report as final, as six months is insufficient time to determine fully the merits of cotton seed meal in egg production.

The Housing.

The open-front house has been used in the work. The six houses used front toward the north. They were built several years ago, when there was not the agitation for fresh air that there is today. At that time they used curtains, which were let down during cold weather.
They were not used in this test, but had the winter been very cold, there is no doubt but that the egg yield would have been influenced. The hens should be sheltered from the cold north winds by having the house to face the south.

**The Estimated Price of the Eggs.**

The value of eggs is given at thirty cents a dozen. This is the price at which we have been selling eggs on a year-round contract. Eggs that are gathered fresh, graded, and sold to a market that will discriminate, should bring this price. Farmers cannot get this price as long as they follow the poor methods that are now used. These eggs were gathered regularly and reached the customer in first class condition.

**The Varieties Used.**

In Pens A and B, Rhode Island Red pullets of about the same age were used. Pen A was fed cotton seed meal mash, and Pen B was used as a check pen, being fed a mash that contained beef scrap as the principal protein element.

Pen K was made up of hens that were unfit for breeding purposes, as many were off color and of mixed breeds. In this pen I used the
maximum amount of cotton seed meal that could be fed with corn meal to maintain the ratio. I wished to see if this amount would affect vitality. It was not a fair comparison with Pen D, as this flock was made up of White Leghorn pullets of good breeding.

Pen E was composed of White Leghorns found on the plant, none of them less than two years old. In Pen F, used as the check pen, were Rhode Island Red hens that had laid one season. As two year old hens they laid well during the winter months, as not so much is expected from hens of that age during the winter.

The Droppings.

The analysis of the cotton seed meal and the beef scrap used in the experiment was as follows:

**Beef Scrap.**

- Moisture .................. 6.25%
- Ash ..................... 11.75%
- Fat .................... 8.83%
- Protein ................ 69.96%

**Cotton Seed Meal.**

- Moisture .................. 7.17%
- Ash ..................... 6.46%
- Fat .................... 6.37%
- Protein ................ 32.50%
- Carbohydrates .......... 33.38%
- Fibre .................. 14.12%
The Rations.

Pen A:—
Corn meal 50lbs.; wheat bran 10lbs.; cotton seed meal 10lbs.; oats 30lbs.

Pen B:—
Corn meal 50lbs.; beef scrap 5lbs.; oats 30lbs.; wheat bran 10lbs.

Pen K:—
Corn meal 73lbs.; cotton seed meal 22lbs.; wheat bran 5lbs.

Pen D:—
Corn meal 73lbs.; beef scrap 11lbs.; wheat bran 5lbs.

Pen E:—
Corn meal 60lbs.; cotton seed meal 15lbs.; wheat bran 5lbs.; oats 20lbs.

Pen F:—
Corn meal 60lbs.; beef scrap 7½lbs.; wheat bran 5lbs.; oats 20lbs.

All these rations were brought to the same nutritive ratio. The one most generally used, is 1 to 4.5; that is, one part of protein to 4.5 parts of carbohydrates. This ratio is used in these rations.

The rations for Pens K and D are as simple as could be made to maintain a proper balance. The others contain greater variety, but the food value in the simpler ones was just as great as that of the rations containing the greatest variety.

Manner of Feeding.

The dry mash ration was fed in hoppers and kept before the hens all the time. The grain ration used throughout the winter was composed of equal amounts of oats, wheat screenings, and corn. The grain was fed in the straw with which the floor was covered and the hens were forced to scratch for it. The oats used in the mash were crushed at a mill used for grinding corn.

Grit, charcoal, and oyster shell were kept before them all the time, as these materials are essential for hens kept in confinement.

The yards were partitioned, oats were sown in them in the early spring, and as soon as the stand was large enough, the hens were allowed to graze on it. The green food during the winter was rape. A small patch was sown in the early part of the season, and this was thrown to them each day.
Egg Production by Months.

<table>
<thead>
<tr>
<th>Pen A</th>
<th>Pen B</th>
<th>Pen K</th>
<th>Pen E</th>
<th>Pen F</th>
<th>Pen D</th>
</tr>
</thead>
<tbody>
<tr>
<td>January</td>
<td>233</td>
<td>172</td>
<td>222</td>
<td>162</td>
<td>162</td>
</tr>
<tr>
<td>February</td>
<td>221</td>
<td>226</td>
<td>259</td>
<td>174</td>
<td>174</td>
</tr>
<tr>
<td>March</td>
<td>238</td>
<td>188</td>
<td>242</td>
<td>284</td>
<td>284</td>
</tr>
<tr>
<td>April</td>
<td>266</td>
<td>208</td>
<td>254</td>
<td>311</td>
<td>311</td>
</tr>
<tr>
<td>May</td>
<td>236</td>
<td>183</td>
<td>208</td>
<td>313</td>
<td>313</td>
</tr>
<tr>
<td>June</td>
<td>173</td>
<td>110</td>
<td>157</td>
<td>214</td>
<td>214</td>
</tr>
</tbody>
</table>

Total pounds of feed consumed: Pen A, 785.21bs.; Pen B, 748.11bs.; Pen K, 652.75lbs.; Pen D, 712.5lbs.; Pen E, 663lbs.; Pen F, 701lbs.

The left-hand bars represent a comparison of egg production by pens. The right-hand bars represent a comparison of the amount of feed consumed.

It has been the general idea that chickens would not eat with relish a ration containing cotton seed meal. Pen A, in which was fed a cotton seed meal ration, consumed more than their check pen. Pen K did not eat so much as Pen D, but Pen D laid a good many more eggs, the production of which called for more feed. Pen K ate their feed well and never seemed off feed at any time. At the close of the test they
were in good health. Pen E did not eat as much feed as their check Pen F, but still they laid 274 more eggs than their check pen. They were Leghorns, which do not require as much feed as the heavier varieties.

The cotton seed meal used was brought to the proper balance by the addition of what is known as hull bran, manufactured by a Memphis firm. It was entirely free from linters, and this must be of some advantage. However, it is not always practical to order meal, as this would again bring in the question of availability.

The beef scrap contained about seventy per cent protein. This percentage is more than that usually found in beef scrap on the market, and twice the amount contained in the cotton seed meal.

Ration Pen A.

<table>
<thead>
<tr>
<th>Ingredient</th>
<th>Quantity</th>
</tr>
</thead>
<tbody>
<tr>
<td>Corn Meal</td>
<td>50 lbs.</td>
</tr>
<tr>
<td>Wheat Bran</td>
<td>10 lbs.</td>
</tr>
<tr>
<td>Cotton Seed Meal</td>
<td>10 lbs.</td>
</tr>
<tr>
<td>Oats</td>
<td>30 lbs.</td>
</tr>
</tbody>
</table>

Ration Pen B.

<table>
<thead>
<tr>
<th>Ingredient</th>
<th>Quantity</th>
</tr>
</thead>
<tbody>
<tr>
<td>Corn Meal</td>
<td>50 lbs.</td>
</tr>
<tr>
<td>Beef Scrap</td>
<td>5 lbs.</td>
</tr>
<tr>
<td>Oats</td>
<td>30 lbs.</td>
</tr>
<tr>
<td>Wheat Bran</td>
<td>10 lbs.</td>
</tr>
</tbody>
</table>

The bars represent a comparison of egg production for Pen A and Pen B for six months.

Weights of Fowls.

Pen A:—
Average weight at the beginning of Experiment 5 lbs., at close 4.62 lbs.

Pen B:—
Average weight at the beginning of Experiment 5.61 lbs., at close 4.85 lbs.
Pen K:—
Average weight at the beginning of Experiment 4.31 lbs., at close 3.62 lbs.

Pen D:—
Average weight at the beginning of Experiment 3.61 lbs., at close 3.15 lbs.

Pen E:—
Average weight at the beginning of Experiment 3.86 lbs., at close 3.50 lbs.

Pen F:—
Average weight at the beginning of Experiment 5.48 lbs., at close 4.46 lbs.

In comparing A and B, we see that the cotton seed meal pen lost less in weight than the check pen. In comparing Pens K and D, there is less loss in the beef scrap fed fowls. Pen F, fed a ration containing beef scrap, lost 1.08 lbs., while the check pen, E, lost .36 lbs.

Regardless of the fact that the fowls were allowed access to the dry mash all the time, the tendency was to lose flesh rather than gain. Pen D, which received sixty-seven pounds of corn meal to the hundred pounds of feed, was no exception to this rule.

**Ration Pen K.**
- Corn Meal 73 lbs.
- Cotton Seed Meal 22 lbs.
- Wheat Bran 5 lbs.

**Pen D.**
- Corn Meal 73 lbs.
- Beef Scrap 11 lbs.
- Wheat Bran 5 lbs.

The bars represent a comparison of egg production for Pen K and for Pen D for six months.
The bars represent a comparison of egg production for Pen E and Pen F for six months.

Summary.

The experiment has tended to show:

That cotton seed meal used as the chief source of protein is palatable to fowls, and that when fed judiciously on it they will produce eggs;

That hens fed on cotton seed meal will produce eggs when eggs are highest in price;

That as far as can be determined the general condition of the cotton seed meal fed fowls seems just as good as the condition of those fed on beef scrap;

That the tendency was to lose flesh and not get over-fat, although the fowls were allowed access to the feed at all times;

That there is a good margin of profit from hens when given a properly balanced ration.

We wish to call your attention to the fact this work is not complete, and results covering a much longer period will be given in order to get the cumulative effects.
<table>
<thead>
<tr>
<th>Pen</th>
<th>A</th>
<th>B</th>
<th>K</th>
<th>D</th>
<th>E</th>
<th>F</th>
</tr>
</thead>
<tbody>
<tr>
<td>Profit</td>
<td>$22.09</td>
<td>$12.08</td>
<td>15.33</td>
<td>23.66</td>
<td>38.12</td>
<td>26.36</td>
</tr>
<tr>
<td>Feed Cost</td>
<td>$1059</td>
<td>11.84</td>
<td>9.89</td>
<td>12.05</td>
<td>10.09</td>
<td>11.31</td>
</tr>
<tr>
<td>Cost per Dozen</td>
<td>56.5</td>
<td>55.75</td>
<td>54.25</td>
<td>50.57</td>
<td>36.45</td>
<td>29.60</td>
</tr>
<tr>
<td>Value</td>
<td>$34.17</td>
<td>27.17</td>
<td>33.55</td>
<td>50.57</td>
<td>36.45</td>
<td>29.60</td>
</tr>
<tr>
<td>No. of Dozen</td>
<td>114</td>
<td>60</td>
<td>111</td>
<td>121</td>
<td>121</td>
<td>98</td>
</tr>
<tr>
<td>Whole Wheat Screenings</td>
<td>151</td>
<td>151</td>
<td>151</td>
<td>151</td>
<td>151</td>
<td>151</td>
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<tr>
<td>Corn</td>
<td>128.6</td>
<td>120</td>
<td>90</td>
<td>7.12</td>
<td>188</td>
<td>7.12</td>
</tr>
<tr>
<td>Crushed Oats</td>
<td>43.2</td>
<td>63.4</td>
<td>44.5</td>
<td>44</td>
<td>27.4</td>
<td>73.3</td>
</tr>
<tr>
<td>Beet Scrap</td>
<td>208.2</td>
<td>206</td>
<td>212</td>
<td>296</td>
<td>176</td>
<td>220</td>
</tr>
<tr>
<td>C.S. Bran</td>
<td>43.2</td>
<td>87</td>
<td>154</td>
<td>10</td>
<td>12</td>
<td>183</td>
</tr>
<tr>
<td>Wheat Meal</td>
<td>208.2</td>
<td>43.2</td>
<td>63.4</td>
<td>44</td>
<td>27.4</td>
<td>73.3</td>
</tr>
<tr>
<td>Corn Meal</td>
<td>208.2</td>
<td>206</td>
<td>212</td>
<td>296</td>
<td>176</td>
<td>220</td>
</tr>
<tr>
<td>Total Profit</td>
<td>$143.85</td>
<td></td>
<td></td>
<td></td>
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</table>