about 3½ pounds of ground sorghum stover, 0.3 to 0.4 pound of protein supplement, plus about 1/5 ounce of limestone would provide satisfactory gains for wintering ewe lambs and would be a more economical ration than alfalfa hay when that roughage is comparatively high in price and poor in quality. A ration of sorghum silage, prairie hay, protein supplement, and limestone probably will give satisfactory results for wintering ewe lambs, but these tests indicate that gains will be lower and more expensive than rations containing ground stover.

**Project 236: The Relationship of Physical Balance and Energy Value in Sheep Rations**

1951 Trials with Wether Feeding Lambs

by T. Donald Bell, Rufus F. Cox, J. S. Hughes

Lamb fattening rations varying in physical nature but virtually alike chemically have been studied at the Kansas Agricultural Experiment Station for a number of years. Previous tests have been demonstrated that the rate of gains and the efficiency of feed utilization by fattening lambs are associated closely with the physical balance or the concentration and bulkiness of the ration.

Objects of the 1951 trials:
1. To test the relative efficiency of rations which vary in the amount and in the nature or condition of the crude fiber consumed by fattening lambs.
2. To investigate the value of bicarbonate of soda in controlling digestive disorders in lambs consuming rations which are highly concentrated or which have had the roughage portion of the ration reduced by grinding and pelletling.

**Plan of Feeding**

Lot 1—corn and alfalfa hay—medium concentration (Crude Fiber: total digestible nutrients—CF:TDN 1:4).
Lot 2—corn and alfalfa hay—highly concentrated (CF:TDN ratio of 1:5.1).
Lot 3—corn and alfalfa hay, plus bicarbonate of soda (CF:TDN ratio of 1:5:1).
Lot 4—corn and pelleted alfalfa (CF:TDN ratio 1:4).
Lot 5—corn and pelleted alfalfa (CF:TDN ratio 1:5.1).
Lot 6—corn and pelleted alfalfa, plus bicarbonate of soda (CF:TDN ratio 1:5:1).

**Summary**

Results of the test are summarized in the accompanying table and indicate:
1. Gains were just as large with a ration of medium concentration as with those highly concentrated when chopped alfalfa hay was fed with corn. When pelleted alfalfa was fed, a ration of medium concentration produced significantly larger gains than those produced by concentrated rations.
2. Digestive disturbances were frequent in the lots receiving pelleted alfalfa and higher levels of concentrates.
3. Sodium bicarbonate was ineffective in controlling digestive disturbances in those lots receiving the more highly concentrated rations.
4. The rumen content of the lambs receiving the chopped hay was slightly more alkaline than that from lambs receiving the pelleted
5. The feed cost per hundredweight of gain was lowest for those lots in which a higher proportion of the ration was made up of roughage. The feeds used in the 1951 tests were purchased at the following prices:

<table>
<thead>
<tr>
<th>Feed</th>
<th>Unit</th>
<th>Price</th>
</tr>
</thead>
<tbody>
<tr>
<td>Corn</td>
<td>bushel</td>
<td>$1.50</td>
</tr>
<tr>
<td>Alfalfa hay</td>
<td>ton</td>
<td>$20.00</td>
</tr>
<tr>
<td>Alfalfa pellets</td>
<td>ton</td>
<td>$24.00</td>
</tr>
</tbody>
</table>

Chemical Analysis of Feeds Used in 1951 Tests:

<table>
<thead>
<tr>
<th>Feed</th>
<th>Protein</th>
<th>Ether extract</th>
<th>Moisture</th>
<th>Ash</th>
<th>Carbohydrate</th>
</tr>
</thead>
<tbody>
<tr>
<td>Corn</td>
<td>7.81</td>
<td>4.06</td>
<td>2.06</td>
<td>12.06</td>
<td>1.43</td>
</tr>
<tr>
<td>Alfalfa hay</td>
<td>15.81</td>
<td>1.48</td>
<td>30.00</td>
<td>8.51</td>
<td>8.43</td>
</tr>
<tr>
<td>Alfalfa pellets</td>
<td>16.13</td>
<td>1.36</td>
<td>28.19</td>
<td>9.48</td>
<td>8.25</td>
</tr>
</tbody>
</table>

Project 111 GC: Lamb Feeding Experiments

Feedlot and Milo Stubble Fattening Tests with Feeder Lambs.

Studies Carried on by the Department of Animal Husbandry and the Garden City Branch Experiment Station.

T. Donald Hall and A. B. Erhart

The lamb feeding tests at the Garden City Branch Agricultural Experiment Station during the fall and winter feeding season of 1951-52 included the following studies:

1. A comparison of alfalfa hay and cottonseed cake as supplements for lambs running in harvested milo fields.
2. A comparison of ground milo grain and whole milo grain for fattening lambs.
3. A comparison of a ration including ground sorghum stover as the only roughage, and a ration including both stover and sorghum silage as sources of roughages.
4. Comparative performance of lambs that have received salt, with lambs that have not received salt during the entire feeding period.
5. A test of the effectiveness of vaccination against enterotoxemia and of bicarbonate of soda in the diet, in controlling "overeating" disease.
7. Tests of the value of drenching for worm control.

Experimental Procedure

The lambs in the review's experiments were secured directly from the mountain range in Southern Utah, and included Columbia-Rambouillet crosses as well as lambs of Suffolk-Rambouillet breeding. They averaged 78 pounds at the range point and 68 pounds off the cars at Garden City; after a period of 50 days of pasture and roughage feeding they were started on the experimental feeding weighing 78 pounds.

The lambs were allotted into eight groups of 50 lambs each and given standard western rations of sorghum stover, sorghum grain, protein supplement, and limestone. After two lots of lambs reached an average daily gain ration of 1 pound per head, they were turned in to milo stubble. One lot was given alfalfa hay as a supplement and the other lot was given soybean pellets.

11. Feed cost per cwt. of gain $17.24 $15.41 $18.29 $19.24
12. Feed cost per lamb $4.80 $4.92 $5.97 $4.74
14. Number of lambs lost 0 0 0 0