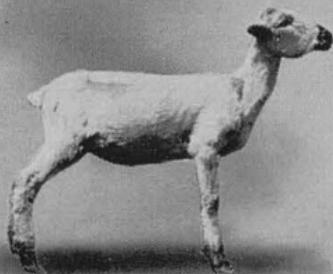


HOW TO USE PRAIRIE HAY FOR LAMBS

D. W. JOHNSON and L. S. PALMER

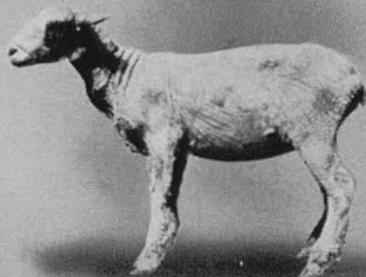
THIS LAMB FED

Prairie Hay and Salt
ONLY



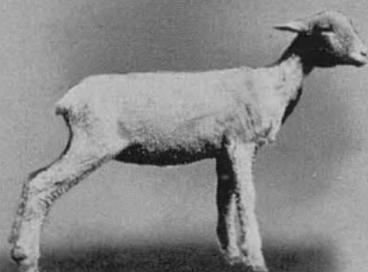
THIS LAMB FED

Prairie Hay and Salt
PLUS PROTEIN



THIS LAMB FED

Prairie Hay and Salt
PLUS PHOSPHORUS



THIS LAMB FED

Prairie Hay and Salt
**PLUS PROTEIN
and PHOSPHORUS**



New sheep feeding experiments at the Minnesota Agricultural Experiment Station show clearly why sheep in northwestern Minnesota commonly fail to grow or gain satisfactorily on prairie hay. These experiments prove that prairie hay is too poor in both protein and phosphorus to give growth and vigor. Supplementing the prairie hay with some such feed as linseed oil meal, cottonseed meal or soybean meal will remedy the difficulty and pay big returns. Bonemeal does not correct the trouble.

**AGRICULTURAL EXTENSION DIVISION
UNIVERSITY OF MINNESOTA**

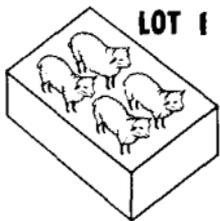
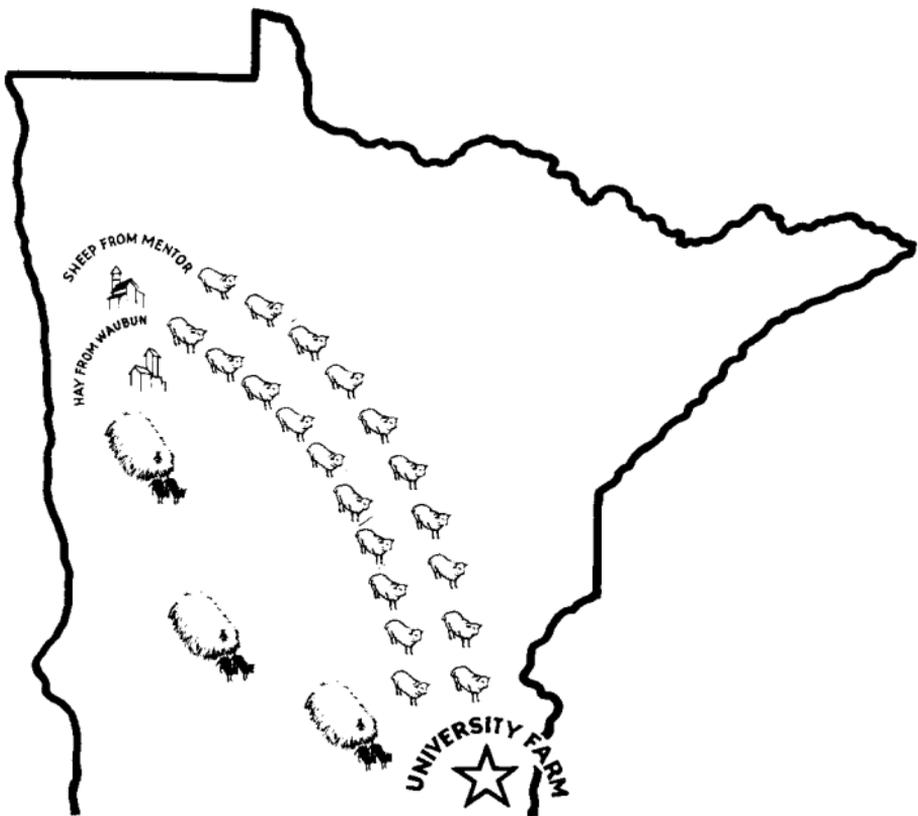
The Problem

SHEEP in northwestern Minnesota commonly are unthrifty in winter and often become ill and die during the late winter and early spring. The difficulty is much more serious some years than others. Unusually severe trouble during the winter of 1936-37 led the Divisions of Animal Husbandry and Agricultural Biochemistry of the Minnesota Agricultural Experiment Station to investigate. In the spring of 1937, 11 farms were visited and on 10 of these the sheep showed symptoms of a dietary deficiency. Ewe lambs kept over for breeding ordinarily weigh but little more and sometimes less in the spring than in the fall. Bred ewes not only lose considerable weight, but many of the older ones die. Nine of the farms had lost from 10 to 30 per cent of their ewes during the winter of 1936-37. Affected ewes also give less milk.

Feeding methods on these farms appeared to explain the difficulties. Usually sheep are wintered entirely on roughage, mostly prairie hay with possibly some bluegrass and quack grass hay. Farms having any legume hay or grain available for sheep usually keep it for lambing time. Owing to the drouth of 1936 there was no grain and but little legume hay available during the winter of 1936-37, and the wild hays were of extremely poor quality. These circumstances apparently explain the unusually high death rate among sheep that winter.

These lambs from Lot 1 gained only 5 pounds apiece in 13 weeks owing to shortage of protein in their ration of prairie hay and salt.

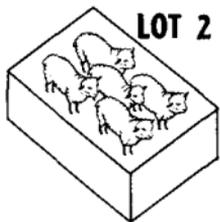




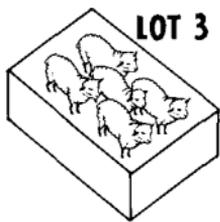
13 WEEK'S GAIN

Each symbol 2½ pounds live weight

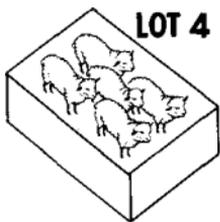
Protein. low
Phosphorus. . . . low



PROTEIN. HIGH
Phosphorus. . . . low



Protein. low
PHOSPHORUS HIGH



PROTEIN. HIGH
PHOSPHORUS HIGH



Only four lambs are shown in Lot 1 because one of the 20 purchased died from an accident shortly after arriving at University Farm.

The Experiment

SINCE cattle in this area frequently suffer from a shortage of phosphorus in the roughage grown on the low-phosphorus soils, it has been assumed that the trouble with sheep arose from the same cause.

Chemical analyses of prairie hay from the affected farms showed that sheep on these farms were not getting enough of either protein or phosphorus. Accordingly, a feeding experiment was set up.

Twenty yearling ewe lambs averaging 64 pounds were purchased from a farm near Mentor, Polk County, brought to University Farm, and placed in trials using prairie hay shipped from Waubun, Mahanomen County. This hay was typical upland prairie hay of the region, being deficient in both protein and phosphorus.

The lambs in Lot 1 were fed all the prairie hay they would eat. On the average, these sheep ate about 2½ pounds per head per day. The plan for the other three lots was to give the same amount of feed as eaten by Lot 1, but to vary the proportions of protein and phosphorus.

For Lot 2 part of the prairie hay was replaced by beet pulp and gluten meal. This gave them twice as much protein per head as Lot 1 without materially increasing their phosphorus.

Lot 3 received enough bonemeal to furnish them three times as much phosphorus as Lot 1 without increasing the protein.

Lot 4 received enough beet pulp, gluten meal, and bonemeal to provide them with the same amount of protein as Lot 2 and as much phosphorus as Lot 3.

All lots were fed salt.

These lambs from Lot 4 gained 22 pounds apiece in 13 weeks. A protein concentrate made the difference.



The Findings

IN 13 weeks, Lot 1 gained about 5 pounds per head. Lot 2, which got more protein, gained about 20 pounds per head. Lot 3, receiving bone-meal to provide more phosphorus, did no better than Lot 1; in fact, gained only 2½ pounds per head. Lot 4, receiving additional amounts of both protein and phosphorus, gained about 22 pounds a head.

Prairie Hay Is Too Low in Protein and Phosphorus

The fact indicated by the chemical analyses that the prairie hay used was deficient in both protein and phosphorus was clearly borne out by the feeding trials. However, adding bonemeal did not help.

More Protein Is Needed for Growth

The spectacular gains of Lots 2 and 4 show that protein was the primary deficiency of the prairie hay fed these lambs. Blood analyses showed that the sheep were not suffering from a lack of phosphorus when purchased. The blood phosphate of Lot 1 remained normal throughout the experiment.

That the sheep needed a protein supplement with this prairie hay was further demonstrated in a special 4-week continuation trial during which Lots 1 and 3 were given one-third pound of linseed meal per sheep per day. During these 4 weeks, Lot 1 gained 6¼ pounds per head and Lot 3 gained 7 pounds. This was more than they had gained during the preceding 13 weeks. Prairie hay consumption also increased during this time. To check further the effect of the protein supplement upon the consumption of prairie hay, the sheep in Lot 4 were allowed to eat what hay they wanted during the extra trial period, but the same quantity of supplement was given as in the earlier trial. During the 4 weeks, Lot 4 ate 60 per cent more hay and gained 12 pounds per sheep.

As Sheep Grow, More Phosphorus Is Needed

Sheep need more phosphorus as well as more protein than is supplied by the type of prairie hay used in these trials. Once enough protein is supplied to produce growth, then more phosphorus will be needed to maintain health. Blood studies on Lot 2 showed that as these sheep grew they developed a

phosphorus deficiency. Lots 3 and 4 which were fed bonemeal remained normal in blood phosphate.

Bonemeal Does Not Correct the Trouble

Bonemeal does not provide protein, so it does not correct the dietary troubles that sheep have in northern Minnesota when fed on native prairie hay alone. Moreover, phosphorus-deficient sheep will not eat bonemeal as phosphorus-deficient cattle do, and, if fed, it must be mixed with salt or some feed. This experiment shows that owing to stunted growth, sheep on northern Minnesota farms ordinarily do not suffer from phosphorus deficiency. It was not surprising therefore that Lot 3 did not eat any of the bonemeal offered until it was mixed with salt. However, after the sheep in Lot 2 had grown enough to bring on a phosphorus deficiency as shown by blood analyses, they still failed to eat bonemeal and later refused two other mineral phosphorus supplements.

Use a Feed Rich in Both Protein and Phosphorus

Lambs or sheep on low-phosphorus prairie hay should be fed a protein concentrate that will provide both protein and phosphorus. One-fourth pound per sheep per day of linseed meal, soybean meal, or cottonseed meal will result in good growth and at the same time supply enough phosphorus. One pound per sheep per day of a legume hay or of grain will likewise be helpful in overcoming such a deficiency. Even when grown on phosphorus-deficient soil, legume hay will be about twice as rich in phosphorus as prairie hay, and grain four times as rich.

Extra Wool Pays for Extra Feed

This experiment indicates that the cost for these protein feeds will be paid for by the increase in wool alone. All the lambs in this feeding trial were shorn on June 8 and again on August 4. On June 8 the average weight of the fleeces was approximately the same from all lots, averaging 6.5 pounds. With better winter rations, these sheep probably would have weighed 100 pounds and yielded fleeces one-third heavier. On August 4, the fleeces from Lots 2 and 4 averaged exactly double those from Lots 1 and 3.

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