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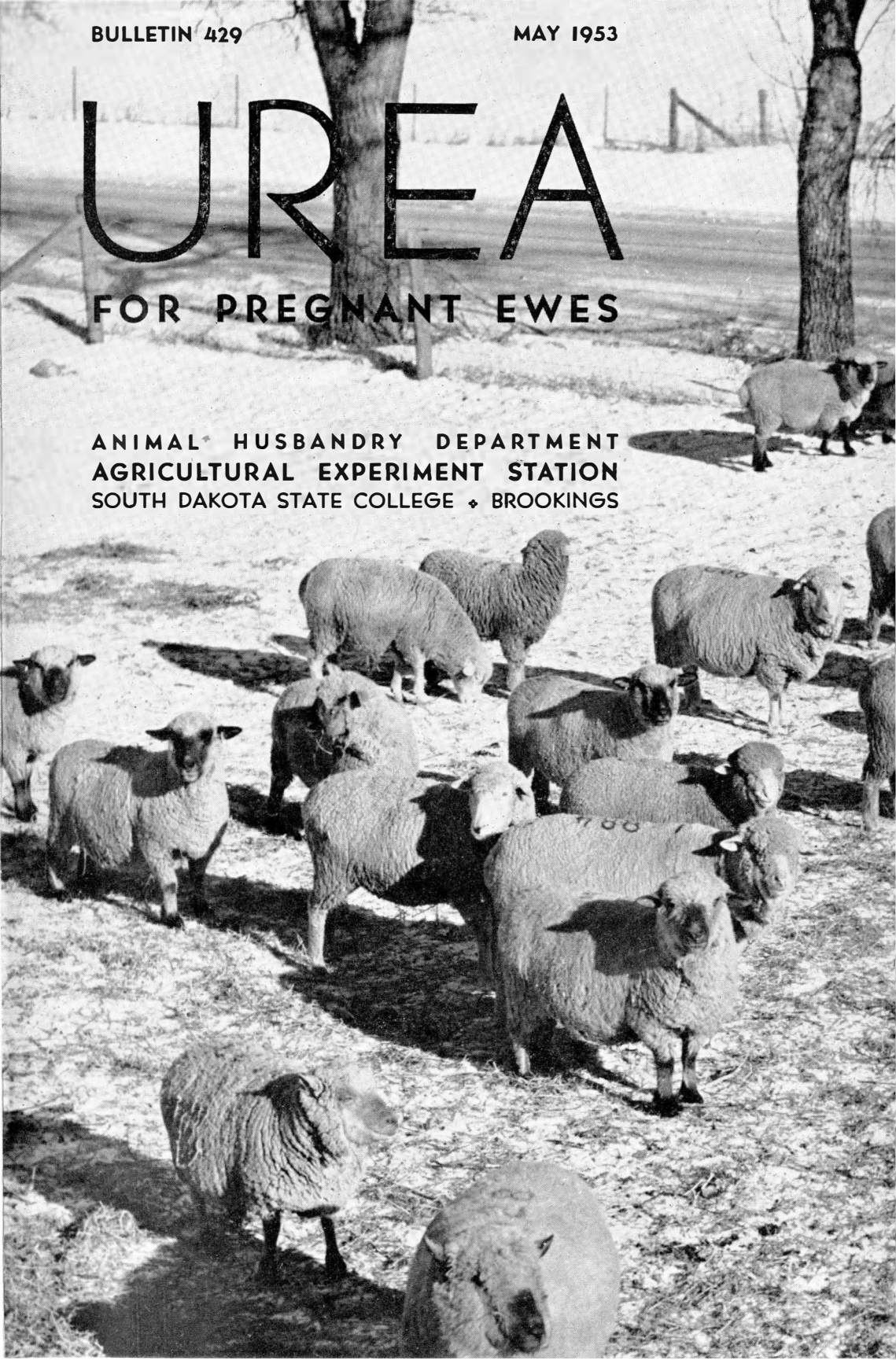
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UREA

FOR PREGNANT EWES

ANIMAL HUSBANDRY DEPARTMENT
AGRICULTURAL EXPERIMENT STATION
SOUTH DAKOTA STATE COLLEGE ♦ BROOKINGS



Urea for Pregnant Ewes

R. M. JORDAN¹

Pregnant ewes usually require protein supplements during the winter. Since these supplements are generally the most expensive part of the ration, investigations are underway to find less expensive substitutes. Experimental work at a number of stations has shown that urea can be used as a partial substitute for common high protein feeds in the fattening rations fed to ruminants. Less information is available regarding the relative value of urea in rations fed to pregnant animals.

Urea is a synthetic compound high in nitrogen, but it furnishes no energy-producing nutrients, carbohydrates and fats, as do the common protein supplements. Each pound of urea has the protein equivalent of about 6.5 pounds of a 40 percent protein supplement. When high protein feeds are replaced with urea on an equivalent protein basis, the energy value of the ration is lowered unless carbohydrate-rich feeds are increased to make up for the lower energy value. Readily available carbohydrates furnished by grain or molasses are needed for efficient utilization of urea by microorganisms in the rumen. These microorganisms convert the urea into proteins which can be used by the animal.

Urea as part of the protein supplement may lower the cost of protein feeds for ruminants, depending upon the price relationship of high protein ingredients, grain and urea. The basis usually used to determine

the economy of using urea is 1 pound of urea and 6 pounds of grain should cost no more than 7 pounds of a 40 percent protein supplement. In addition, urea may be used advantageously to augment the protein supply during times of shortages.

The objectives of this experiment were to determine the relative value of:

1. Protein supplements containing urea compared to soybean meal for pregnant ewes

2. Urea at the 5 and 10 percent levels in protein supplements

3. Wheat midds and dehydrated alfalfa meal in protein supplements containing urea at the 5 and 10 percent level.

The results of three wintering trials with pregnant ewes are reported here as an aid to stockmen in evaluating production rations suitable to South Dakota conditions.

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How the Feeding Trial Was Conducted

During the 3-year test, bred ewes were divided into equal groups and fed the test rations for about 100 days. (January 1 to April 15 of each year.) The ewes were allotted into five uniform lots based on such factors as the weight of the ewe and the ram to which they were bred. The experimental feeding was discontinued each year about one week prior to lambing, and thereafter all of the ewes were run as one band. Adequate feed was provided during the lambing season, and the ewes were placed on alfalfa-brome pasture about May 10 of each year.

Sufficient brome hay was harvested during 1949 to provide the roughage for all lots during these three trials. The hay contained 5.8 percent protein and was of poor color. In addition to the brome hay, the ewes were fed a protein supplement in pellet form as follows:

1949

Lot I—Soybean meal.

Lot II—Equal parts of soybean meal and dehydrated alfalfa meal and 5 percent urea.

Lot III—3 parts dehydrated alfalfa meal, 1 part soybean meal and 5 percent urea.

Lot IV—Equal parts soybean meal and dehydrated alfalfa meal, 10 percent urea.

Lot V—3 parts dehydrated alfalfa meal, 1 part soybean meal and 10 percent urea.

1950 and 1951

Lot I—95 parts soybean meal and 5 parts molasses.

Lot II—Equal parts soybean meal and dehydrated alfalfa meal, 5 percent molasses and 5 percent urea.

Lot III—Equal parts soybean meal and wheat midds, 5 percent molasses and 5 percent urea.

Lot IV—Equal parts soybean meal and dehydrated alfalfa meal, 5 percent molasses and 10 percent urea.

Lot V—Equal parts soybean meal and wheat midds, 5 percent molasses and 10 percent urea.

Salt and a mixture of salt and bonemeal, and fresh water were offered free-choice. Rations fed daily provided approximately equal intake of protein to all the ewes during the 3-year test. The amount of TDN (total digestible nutrients) fed each year to the ewes in Lot I (soybean meal) was slightly greater than the TDN received in Lots II and III and greater still than the TDN received by the ewes in Lots IV and V. Each lot received one-half pound daily of shelled corn per ewe during the last two to four weeks of the gestation period.

The value of the various rations fed was measured by ewe gains, fleece weights, lambing percentage, weaning percentage, birth weight of lambs, and weight of lambs at eight weeks.

Results

Table 1 shows the results of the feeding trial conducted in 1949-50. A comparison of the gain in weight made during the feeding period by the ewes receiving soybean meal as

a protein supplement, with the gain in weight made by the ewes receiving various supplements containing urea, shows that the greatest gain was made by the ewes receiving 3

Table 1. Effect of Supplements Containing Urea on Pregnant Ewes 1949-50

Fed 103 Days	Soybean Meal I	Soybean Alfalfa Equal Parts Plus 5% Urea II	1 Part Soybean 3 Parts Alfalfa Plus 5% Urea III	Soybean Alfalfa Equal Parts Plus 10% Urea IV	1 Part Soybean 3 Parts Alfalfa Plus 10% Urea V
Number of ewes	12	12	12	12	12
Average weight per ewe (lbs.)					
Initial weight	141.2	141.7	141.1	141.9	141.7
Final weight	149.3	149.4	153.3	148.7	153.7
Gain per ewe (lbs.)	8.1	7.7	12.2	6.8	12.0
Fleece weight (lbs.)	7.9	8.9	7.8	8.0	8.1
Number lambs born	10	12	13	12	11
Number dry ewes	2	3	1	1	2
Average birth weight (lbs.)	10.9	9.8	9.9	9.9	10.6
Number lambs weaned	10	12	12	12	11
Average pasture weight first 55 days (lbs.)	45.9	35.8	40.1	40.0	44.2
Average daily ration (lbs.)					
Brome hay	3.5	3.5	3.5	3.5	3.5
Protein supplement	0.18	0.2	0.2	0.15	0.15
Corn*	0.5	0.5	0.5	0.5	0.5
Total feed per ewe (lbs.)					
Brome hay	360	360	360	360	360
Protein supplement	18.5	20.0	20.0	15.0	15.0
Corn*	13.5	13.5	13.5	13.5	13.5
Percent of hay weigh back	18	17	16	15	15

*Corn fed at the rate of 0.5 lb. per ewe daily the last 27 days of feeding period.

parts of dehydrated alfalfa meal and 1 part soybean meal plus either 5 or 10 percent urea.

There was little difference in fleece weight between lots with the exception of Lot II. Fleece weights in this lot were approximately 1 pound greater than in any of the other lots. However, since the weight gains of the ewes in Lot II were less than in other lots, it is likely that the greater fleece weights were due to chance selection rather than the effect of the ration.

The number of lambs born ranged from 10 lambs in Lot I to 13 lambs in Lot III. The number of dry ewes varied from a low of one ewe failing to lamb in both Lots III and

IV to a high of three ewes not lambing in Lot II. The number of ewes involved is too small to conclude that these differences were due to the rations fed and probably are the result of chance.

There was little difference in birth weight of the lambs born regardless of the ration fed.

The average weight per lamb on pasture at 55 days of age was the greatest in Lot I (fed plain soybean meal) and Lot V (fed 3 parts dehydrated alfalfa meal, 1 part soybean meal and 10 percent urea). These two lots also had fewer twin lambs which may account for part of the difference.

1950-51 and 1951-52 Trials

The rations fed the various lots were the same during the years 1950-51 and 1951-52, therefore the results of these two years are combined and presented in summary form in Table 2.

During the two-year period, 25 ewes were fed in each lot. The rate of gain of the pregnant ewes while on experimental feeding shows very little difference between the first four groups. However, the ewes which received equal parts of soybean meal and wheat midds plus 10 percent urea, made smaller gains than the ewes in the other lots dur-

ing both years. During one year (1950), the ewes in this lot actually lost weight.

The difference in the number of lambs born between Lots I and II is due to more twin lambs and slightly fewer dry ewes in Lot I. The fact that the ewes in Lot III, which received the same amount of urea as the ewes in Lot II, had almost as many lambs as the ewes in Lot I suggests that the difference in the number of lambs born between Lots I and II was not due to the urea fed in Lot II but to other factors.

There was little difference in fleece weights, average lamb

**Table 2. Effect of Supplements Containing Urea on Pregnant Ewes
Summary 1950-51 and 1951-52**

Fed 101.5 Days	Soybean Meal I*	Soybean Alfalfa Equal Parts Plus 5% Urea II	Soybean Mids Equal Parts Plus 5% Urea III	Soybean Alfalfa Equal Parts Plus 10% Urea IV	Soybean Mids Equal Parts Plus 10% Urea V
Number of ewes	25	25	25	25	25
Average weight per ewe (lbs.)					
Initial weight	146.0	143.8	143.1	143.4	143.2
Final weight	152.4	149.5	149.7	149.4	146.1
Gain per ewe (lbs.)	6.4	5.7	6.6	6.0	2.9
Fleece weight (lbs.)	7.5	7.9	7.7	8.0	7.5
Number lambs born	31	25	30	27	25
Number dry ewes	4	5	3	3	3
Average birth weight (lbs.) †	8.1	8.2	8.0	8.9	8.3
Number lambs weaned	21	17	21	22	17
Average pasture weight first 55 days (lbs.)	30.6	28.9	32.3	29.7	29.5
Average daily ration (lbs.)					
Brome hay	3.0	3.0	3.0	3.0	3.0
Protein supplement	0.2	0.2	0.2	0.15	0.15
Corn ‡	0.5	0.5	0.5	0.5	0.5
Total feed per ewe (lbs.)					
Brome hay	304	304	304	304	304
Protein supplement	20.3	20.3	20.3	15.2	15.2
Corn ‡	10.1	10.1	10.1	10.1	10.1
Percent of hay weigh back	2.3	4.0	6.7	5.6	3.0

*Five percent molasses was added to each supplement to facilitate the manufacture of the pellets as well as add palatability to the pellets.

†Lamb weights for year of 1951 only.

‡Corn fed at the rate of 0.5 lb. per ewe daily during last 2 to 4 weeks of gestation.

Table 3. Effect of 5 or 10 Percent Urea Supplements on Pregnant Ewes
Summary 1949, '50, and '51

Fed 102 Days	Soybean Meal I*	Soybean Alfalfa Equal Parts Plus 5% Urea II	Soybean Alfalfa Equal Parts Plus 10% Urea III
Number of ewes	37	37	37
Average weight per ewe (lbs.)			
Initial weight	144.0	143.0	143.0
Final weight	151.0	150.0	149.0
Gain per ewe (lbs.)	7.0	7.0	6.0
Fleece weight (lbs.)	7.7	8.2	8.0
Number lambs born	41	37	39
Number dry ewes	6	8	4
Average birth weight (lbs.)	9.5	9.0	9.4
Number lambs weaned	31	29	34
Average pasture weight first 55 days (lbs.)	35.7	31.2	34.1
Average daily ration (lbs.)			
Brome hay	3.2	3.2	3.2
Protein supplement	0.19	0.2	0.15
Corn†	0.5	0.5	0.5
Total feed per ewe (lbs.)			
Brome hay	323	323	323
Protein supplement	19.7	20.4	15.3
Corn†	11.3	11.3	11.3
Percent of hay weigh back	7.5	8.3	8.8

*Five percent molasses was added to each supplement to facilitate the manufacture of the pellets as well as add palatability to the pellets.

†Corn fed at the rate of 0.5 lb. per ewe daily during last 2 to 4 weeks of gestation.

weights at birth, or weight of lambs at approximately 55 days of age. The variation that is evident shows no pattern or trend. For example, a comparison of Lots II and IV, fed 5 and 10 percent urea respectively, shows that Lot IV excels Lot II slightly in weight gained, fleece weight, number of lambs born, number of ewes lambing, lamb birth weight, number of lambs weaned and pasture gain of the lambs during the first 55 days. By contrast, a comparison of Lots III and V, fed 5 and 10 percent urea respectively, shows that of the production factors studied, the ewes in Lot III excelled or were equal in all factors except lamb birth weight.

Comparison of a protein supplement containing dehydrated alfalfa meal with one containing wheat midds is shown in Table 2. These data suggest that either feed may be used in making up protein supplements containing 5 percent urea with almost comparable results. However, when 10 percent urea was used in the supplement, slightly greater gains in weight of the ewes were obtained with dehydrated alfalfa meal than with wheat midds.

5 or 10 Percent Urea

The results of three years' feeding are summarized in Table 3. A comparison was made of the effect of feeding supplement containing urea

with plain soybean meal, and also of the effect of different levels of urea in the supplement. The supplement to which either 5 or 10 percent urea was added consisted of equal parts soybean meal and alfalfa meal. A total of 37 ewes received each type of protein supplement during this experiment. The average feeding period was 102 days.

An analysis of the results obtained in the individual years showed some variation between lots in the factors studied, but the differences were not great and were not consistent from year to year. The gain in weight of the ewes, fleece weights, lamb birth weights, and average weight of lambs on pasture at approximately 55 days of age show little difference between lots. The slightly heavier lamb weights at 55 days of age in Lots I and III are due to rather large

differences in weight during one particular year which were not evident in other years.

The number of lambs, born and weaned, and the number of dry ewes show some variation between lots. The high lambing percentage for Lot I is largely due to the high lambing percentage in 1949 and 1950. Management is likely to have played a greater part in the number of lambs born and weaned than the ration fed the ewes during their gestation period.

It was concluded on the basis of these data that including urea at levels of 5 or 10 percent of the protein supplement causes no adverse effects on the production of pregnant ewes. Sheepmen will find it profitable to use protein supplements containing urea if they cost less than non-urea supplements.

Summary

The value of urea as a part of the protein supplement for pregnant ewes was studied during 1949, '50 and '51. The factors studied were (1) ewe gains, (2) fleece weight, (3) lambing percentage, (4) birth weight, (5) weaning percentage, (6) gain of lambs, and (7) relative value of wheat midds and dehydrated alfalfa meal in the supplement.

The following conclusions were drawn from the experiment:

1. Protein supplements containing as much as 10 percent urea caused no undesirable effects on the ewes and did not prove unpalatable.

2. Total gain made by the ewes, fleece weights, lambing percentage,

weaning percentage, birth weight of the lambs and weight of lambs at 55 days of age were not affected apparently by the type of protein supplement fed (soybean meal or protein supplement plus urea) or level of urea in the supplement.

3. Ewes fed urea in protein supplements containing 75 percent alfalfa meal gained more than when lower levels of alfalfa or wheat midds were fed. This was particularly true when 10 percent urea was added.

4. Provided sufficient quantities of carbohydrates are fed, either 5 or 10 percent urea may be added to a protein supplement without adversely affecting productivity.