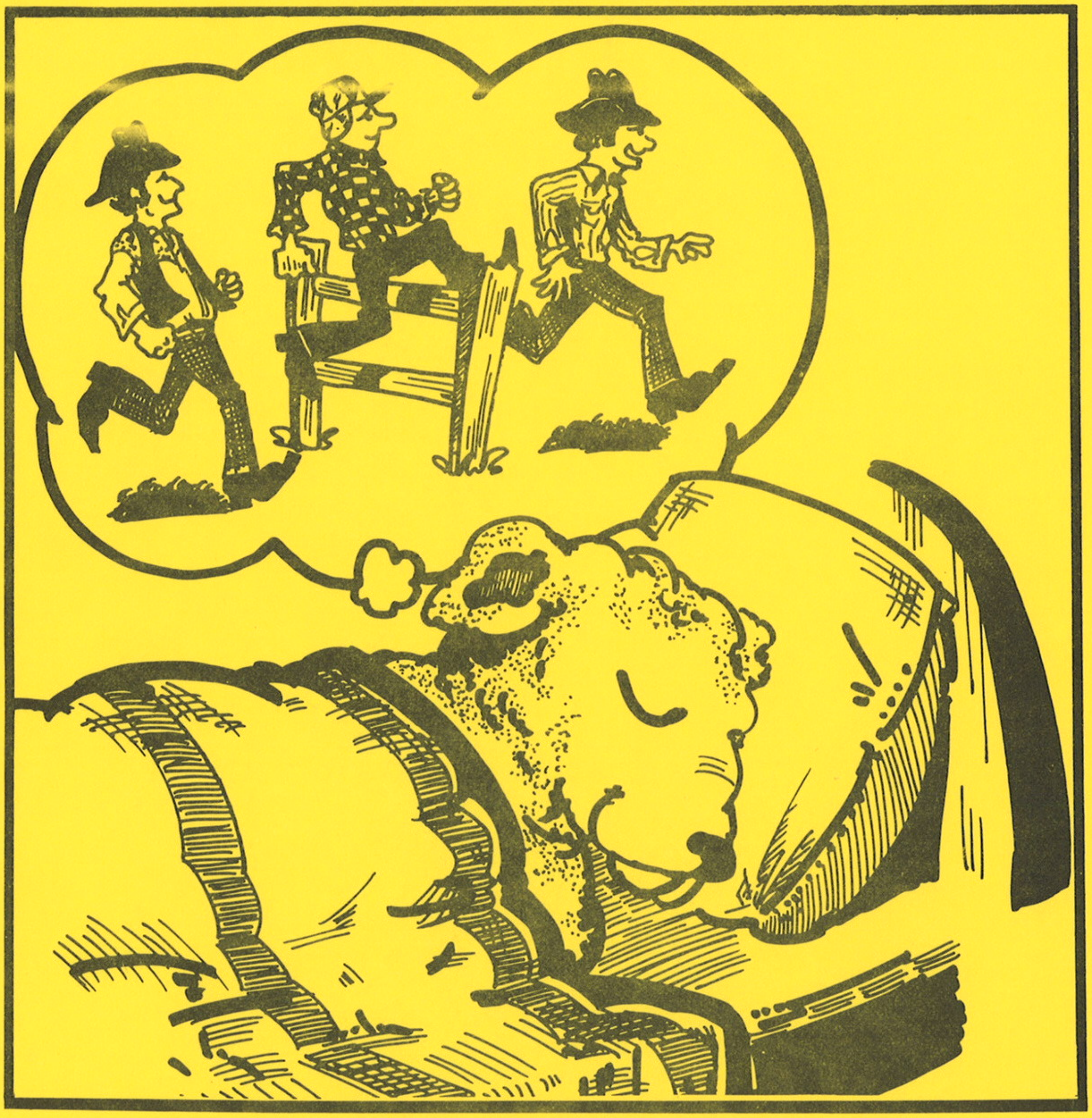
24th Annual

Western Dakota

SHEEP DAY



Hettinger Armory

February 9, 1983

Timothy C. Faller, Supt.
Hettinger Branch Experiment Station
North Dakota State University

PROGRAM

10:15 a.m.	Coffee
10:30 a.m.	HETTINGER & FARGO STATION REPORTS Timothy C. Faller, Superintendent Professor Merle Light Dr. I. A. Schipper Dr. Duane Erickson "NATIONAL WOOL GROWERS NEED YOU!" Marvin Cronberg, President National Wool Growers
12 Noon	LUNCH: Roast American Lamb Dinner
1:15 p.m.	WELCOME Dr. H.R. Lund, Director Agriculture Experiment Station North Dakota State University
1:30 p.m.	MAKING THOSE NEW AND OLD SHEEP BARNS WORK FOR YOU Dexter Johnson Extension Ag. Engineer North Dakota State University
2:00 p.m.	THE STORY OF A SUCCESSFUL FAMILY SHEEP OPERATION Gerhard Reichenbach Fairview, Montana
2:30 p.m.	NEW INNOVATIONS IN SHEEP RESEARCH FROM ILLINOIS Dr. Dave Thomas University of Illinois Urbana, Illinois
3:20 p.m.	CLOSING REMARKS Richard Pfliger, President North Dakota Lamb and Wool Producers Bismarck, North Dakota

* There will be a program for the ladies in the afternoon featuring "Wellness at Home".

SHEEP DAY DIGEST
by
Timothy C. Faller, Supt.
Hettinger Experiment Station

SECTION I

Reports of

Research in Progress

at the

Hettinger Experiment Station

Presented by

Timothy C. Faller
Superintendent

Dr. Paul Berg
Animal Science Department
North Dakota State University

Dr. Duane Erickson
Animal Science Department
North Dakota State University

Professor Merle Light
Animal Science Department
North Dakota State University

at the

24th Annual Sheep Day

Hettinger Experiment Station
Hettinger, North Dakota

February 9, 1983

WHEAT STRAW FOR SELF-FEEDING CONFINED EWES
Project 3729

M.R. Light, T.C. Faller and D.O. Erickson

Summary

Results of the 1981-82 lamb production were inconclusive and disappointing. Death losses of lambs on all treatments were high ranging from 23 to 37 percent. The lambing rate varied from 1.29 to 1.43 per ewe bred.

Procedure

Two hundred and four yearling grade Columbia crossbred ewes were allotted into four treatment groups. Each treatment group was subdivided into three groups and was placed in pens 12'x24' on July 7, 1982. Treatment groups were as follows:

1. 100 percent ground alfalfa
2. 80 percent ground alfalfa + 20 percent ground straw
3. 60 percent ground alfalfa + 40 percent ground straw
4. 40 percent ground alfalfa + 60 percent ground straw

The ground roughage was mixed with water to alleviate dust and was fed with a mixer-feeder wagon three times weekly according to appetite. A salt mineral mixture was self fed.

All ewes were scored for body condition when the project was initiated and at intervals during the production year. Body scores of 5 = fat, 4 = good, 3 = medium, 2 = thin and 1 = emaciated. All ewes were fed common rations during the flushing, breeding, pre-lambing and lactation period.

Discussion and Results

Chemical analyses of the roughage components fed showed considerable variation during the trial. Alfalfa hay varied from 12.4 to 18.0 percent protein or in other words, from poor to excellent quality. Wheat straw varied from 4.4 to 12.7 percent protein during the 1981-82 experiment. This is reflected in the lack of uniformity of response to rations by ewes. The variation in the analyses of the various rations is unexplainable. The chemical analyses of the ration were accurate. Sampling errors or inadequate feed mixing probably occurred. Average protein analyses for rations fed during 1981-82 are shown in table 1.

TABLE 1.

Ration Composition			Percent Protein
Alfalfa	Straw	Grain	
100			15.7
80	20		15.4
60	40		14.64
40	60		16.0
60	20	20	15.3
60	20	25	17.2

Body weight and body condition scores are given in tables 2 and 3. All groups lost weight from lotting to mid-gestation. Body scores for condition indicate that losses of condition would be as expected for the type of ration fed, however, the weight changes recorded from lotting to mid-gestation or in the reverse order to body scores.

Information concerning the productivity of ewes on the straw project is given in table 4.

TABLE 2. RATION WEIGHT CHANGES

Percent Alfalfa	Initial	Mid-Gestation	Weaning Weight	Maintenance
	7/7/81	11/5/81	6/2/82	6/17/82
100 +	145	138	151	154
80 + 20	147	139	149	150
60	148	141	136	143
40	145	144	151	153

TABLE 3. BODY CONDITION SCORES

Ration	Initial	Mid-Gestation	Weaning Weight	Maintenance
Percent Alfalfa	7/7/81	11/5/80	6/2/82	
100	4.0	3.82	2.96	3.06
80	4.0	3.84	3.02	2.88
60	4.0	3.02	2.76	2.86
40	4.0	2.88	2.76	3.0

TABLE 4. EWE PRODUCTION

Ration	% Ewes Lambing	% Lambs/ Ewe Lambing	% Lambs/ Ewe Bred	Death Loss %	Lbs. Lamb Weaned
100% Alfalfa	92	136	125	31.0	49
80% alfalfa + 20% straw	98	146	143	37.0	46
60% alfalfa + 40% straw	90	148	133	28.0	51
40% alfalfa + 60% straw	92	145	129	23.0	61

The numbers of ewes lambing of ewes mated are in line with what we would expect for first lambing Columbia type crossbred ewes. Death losses of lambs were higher than expected, especially for ewes in an insulated barn. It was noted that there were many problems arising from pneumonic type diseases. The reason for this is unknown. These pneumonic problems should be overcome in the coming years.

THE EFFECTS OF MANAGEMENT SYSTEMS ON GROWTH AND PRODUCTION OF EWES

Project 3729

M.R. Light, T.C. Faller and D. O. Erickson

Summary

Three groups of yearling ewes having the same genetic makeup and averaging approximately 112 pounds were randomly assigned to an insulated sheep barn or to a traditional sheep rearing system. Prelminary results indicate that sheep under the confinement feeding regime of this experiment weighed less and produced less than sheep maintained in the traditional manner.

Procedure

The objectives of this experiment are to determine the effects of confinement on ewe productivity and longevity. The suitability of three different cross-bred ewe groups for confinement or for a traditional sheep rearing system are being determined.

The genetic groups being compared are 1) ½ Suffolk + ½ Rambouillet, 2) ¼ Finn + ¼ Border Leicester + ½ Rambouillet and 3) ½ Finn + ½ Rambouillet. Crosses to obtain these ewes were made at the Hettinger Station utilizing a group of Wyoming range ewes and Finn, Suffolk or ½ Finn + ½ Border Leicester rams.

The inside or confined sheep were placed on trial July 27, 1981. All confined groups were fed three times per week with a mixture of chopped alfalfa hay plus chopped straw in bunks. The ration fed per group was calculated to contain 75 percent of the recommended NRC levels for TDN. Traditional or "outside" sheep were placed on native or tame grass pastures July 27, 1981 until being placed in dry lot for breeding. Outside groups were fed the same ration as confined groups during the breeding period and throughout the post-breeding, maintenance, pre-partum and post-partum periods. All groups were allowed free access to a mineral mixture containing 1/3 TM salt plus 1/3 dicalcium phosphate + 1/3 white iodized salt.

Results and Discussion

The results of the initial year's experiment are given in table 1. There is a marked difference in average ewe weights and ewe productivity as measured by pounds of lamb weaned per ewe. Post-mating weights of ewes in confinement averaged 77.7 percent of the weight of comparable ewes under traditional methods. They also weaned 80.7 percent of the amount of lamb produced by "outside" ewes. It is evident that feed requirements for young, lightweight yearling ewes should not be reduced during their yearling year.

Death losses of young lambs were not different between groups raised under different environments. The loss of young lambs approximates losses sustained by sheepmen in general, however, the losses are greater than expected and may reflect problems encountered with poor feed supplies due to drought and an extremely cold winter.

TABLE 1. WEIGHTS AND PRODUCTION

Genetic Group	Lotting Weight	Post Breeding Weight	Mid Maintenance Weight	% Ewes Lambing	% Lambs / Ewe Lambing	% Lamb / Ewe Bred	% Death Loss	Lbs. Lambs Weaned
Confined Ewe Groups								
	7/27/81	11/1/81	11/17/82					
½ Suff + ½ Ramb	116.8	123.9	149.5	91	131	119	18	65
¼ Finn + ¼ B.L. + ½ Ramb	110.2	107.8	134.6	92	146	134	22	66
½ Finn + ½ Ramb	107.2	113.9	125.6	93	161	149	15	77
Outside Ewes								
	114.9	146.5	149.7	91	170	155	18	83
	113.1	139.5	143.9	85	191	163	20	80
	111.6	137.7	137.8	95	208	197	19	93

WARM BARN HOUSING
Project 3729

M.R. Light, T.C. Faller and D.O. Erickson

Summary

Data for labor expenditures have been accumulated for 1982. These data are shown along with data that were collected in the previous year.

Procedure

A log was kept of all work performed with sheep in the confinement barn. A comparison with data collected in 1981 is shown in table 1. There were 432 ewes in place in 1981-82 as compared to 374.5 in 1980-81.

TABLE 1. LABOR EXPENDITURES

	Hours 1980-81	HR/Ewe	Hours 1981-82	HR/Ewe
Barn Cleaning	95.6	.25	69.0	.15
Feeding	143.0	.38	155.66	.36
Bedding	74.8	.19	87.75	.20
Vaccination & Castration	19.1	.05	29.0	.06
Laboring	221.8	.59	280.0	.64
Shearing	69.4	.18	76.0	.17
		1.64		1.58

Total labor costs for maintaining and caring for 432 ewes and their lambs until weaned amounted to 691.41 hours or 1.58 hours per ewe. Labor expenditures have very closely followed the distribution patterns reported for the previous year.

The sheep unit utilized 15,645 kilowatts of energy to provide lighting and heat for the office building. This amounted to 36.2 KWH per ewe which is slightly greater than the previous year (33.7 KWH) and reflects the more severe winter of 1981-82.

Water consumption was 1.21 gallons per day per ewe and included water for lambs until weaning and rams used during the breeding season.

Salt and mineral consumption was 5.7 lbs. per head or .24 oz. per day. This amount was lower than the .8 oz. per day recorded for the previous year.

Sheep bedding (straw) for 432 ewes and their lambs amounted to 2208 bales (5.1 bales per ewe). If straw is evaluated at .35 per bale the total cost for bedding was $772.80.

Confinement Management Update:

- Feeding 3 times per week continues to work well.
- 432 shorn ewes will heat facility, however, they may be over maximum for effective ventilation.
- The gravity water system had to be discontinued due to sedimentation in supply lines due to the low line pressure and back flushing did happen.
- Total confinement will require at least 1 hoof trimming annually and more often on white hoof Columbia type ewes.
- Clean wool production continues to be equal or superior to traditional systems, however, extreme caution must be exercised at shearing time to insure that the wool is of a proper moisture content (13% is maximum). We sheared ewes in the barn with no indication of high moisture content that when cored showed 19% moisture.
- Standby heat may be necessary prior to shearing time to maintain adequate temperature in facility.
- A standby generator is a necessity.
- A ventilation system failure is of major consequence and a warning system is needed.
- Rodent control in the attic is important to maintain uniform insulation distribution.
- Poorer quality roughages do become more useable.
- Lambing date or dates may be very influential in lamb survival.

THE EFFECT OF VARIOUS CALCIUM TO PHOSPHORUS RATIOS ON THE INCIDENCE OF URINARY CALCULI IN FINISHING LAMBS

D.O. Erickson, M.R. Light, T.C. Faller and L. Insley

Hettinger, Summer 1982

Summary

In several of the recent lamb feeding experiments urinary calculi has been observed in some of the lambs. Ammonium chloride has been added at 0.5% of the ration to prevent this problem. The National Research Council recommends Ca and P levels of 0.32 and .22%, respectively, for growing finishing early weaned lambs. Those levels result in a Ca:P ratio of 1.45:1. The occurrence of urinary calculi is more probable when phosphorus levels are high and/or when ratios are narrow. One hundred and sixty lambs were allotted by weight, breed and sex into 8 lots. The Ca:P ratios tested were 1:1 and 2:1 using barley as the basal feed and 2.5:1 and 3:1 using corn as the basal feed. Alfalfa was offered as the roughage and soybean meal utilized as the protein source. Rations contained 69% TDN and 14% protein on the as fed basis. The lambs averaged 60 pounds at the start of the experiment. Gains and feed efficiencies were lower than what would be expected for these rations and breeding of lambs. There was no incidence of urinary calculi in the entire experiment even in the lots fed rations containing a Ca:P ratio of 1:1.

Introduction

An experiment was designed to determine the effects of varying calcium to phosphorus ratios (low of 1:1 to high of 3:1) on the incidence of urinary calculi. In addition, corn and barley were compared as the major energy sources.

Procedure

Design: 2 x 2 x 2 factorial with 2 energy sources, 2 levels of calcium and duplicated.

1) Allotment to treatment based on weight, breeding and sex of lamb.
2) Rations were sampled 6 times during the experiment.
3) Lamb weights and feed intake recorded bi-weekly.
4) Each lot taken off experiment when lambs averaged 105 to 110 pounds.
5) Rations fed in ground form.

TABLE 1. COMPOSITION OF FEED STUFFS*

Feedstuff	% "as is" Protein	TDN	Ca	P
Alfalfa	16	52	1.800	.157
Corn	9	80	.012	.285
Barley	12.5	75	.071	.461
Soybean Meal	44.0	78	.250	.600

*Samples taken July 1982.
TDN and SBM are book values.

RATIONS AND NUTRIENT COMPOSITION

Ration I Corn - Low Calcium

	%	Protein	TDN	Ca	P
Alfalfa	35.0	5.60	18.2	.630	.055
Corn	56.0	5.04	44.8	.007	.160
SBM	8.0	3.52	6.2	.020	.048
Limestone	-	-	-	-	-
TOTALS	99.0	14.16	69.2	.657	.263

(Ca:P ratio 2.5:1)

Ration II Barley - Low Calcium

	%	Protein	TDN	Ca	P
Alfalfa	22.0	3.52	11.4	.396	.035
Barley	74.0	9.25	55.5	.005	.341
SBM	3.0	1.32	2.4	.008	.018
Limestone	-	-	-	-	-
TOTALS	99.0	14.09	69.3	.409	.394

(Ca:P ratio 1:1)

Ration III - Same as Ration I with .5% limestone added resulting in .832% Calcium and .263% P (3:1 ratio).

Ration IV - Same as Ration II with 1.2% limestone added resulting in .829% Calcium and .394% P (2:1 ratio).

Ingredients common to all rations:

0.5% TM salt or 10#/Ton
0.05% Vit. A, D, E or 1#/Ton
25 g/1000 # Terramycin or 50 g/Ton

Results and Discussion

There was no incidence of urinary calculi in this experiment. It was expected that some of the lambs on ration 2 (Ca:P ratio of 1:1) would have problems with urinary calculi. It has been demonstrated that the incidence of urinary calculi is increased when phosphorus levels are high or nearly the same as calcium levels. The recommended Ca:P ratio is from 1.45:1 to 2:1. Lamb performance in terms of daily gain and feed efficiency was much below expected levels. Lambs on treatment became unthrifty in appearance, indicating some health problems. The cause of this condition was not diagnosed and remains unknown. Rainfall was above normal, resulting in very wet lots during part of the trial. Lambs on ration 3 containing a 3:1 Ca:P ratio gained faster ($P<.01$) and were more ($P<.01$) efficient in feed conversion than lambs on other treatments. These lambs gained 0.42 pounds per day which is much lower than the .75 pounds per day expected on these types of rations and breeding of feeder lambs. It is planned to repeat this experiment.

THE PERFORMANCE OF FEEDLOT LAMBS AS AFFECTED BY PROTEIN LEVEL VARIATION DURING THE FEEDING PERIOD

L. Insley, D.O. Erickson, M.R. Light, W. Limesand and W.D. Slanger

Summary

Two experiments with 5 replicates and 4 treatments on two rations for fast growing feeder lambs have been completed. Overall average initial weight was 51 pounds with the trial terminating when the overall average weight per lamb was 105 pounds. The two rations contained 70% calculated TDN with one ration containing 11% protein and the other 17% protein. The four treatments were: 1) 11% throughout the trial, 2) 17% throughout the trial, 3) 11% to 17% midway through the trial and 4) 17% to 11% midway through the trial. Lambs on the 11% ration gained less ($P<.05$) than those on the 17% rations. Similar gains resulted from the 17% ration, the 11% to 17% and the 17% to 11%. Feed efficiencies for the four treatments were similar at 0.230 for the 17% ration, 0.225 for the 11%-17% treatment, 0.220 for the 11% ration and 0.220 for the 17%-11% treatment.

Introduction

Information is needed on the effect of varying the protein levels for different stages of growth and the level of protein required. Feedlot trials conducted at the Research Center and at the Sheep Barn (Fargo) were designed to aid in answering these questions.

Experimental Procedure

Two trials involving 280 lambs (both purebred and crossbred) were utilized in this experiment. One hundred and ninety-two lambs averaging 49 pounds initial weight were utilized at the Sheep Barn and 88 lambs (all purebreds) averaging 56 pounds initial weight made up the Research Center trial group. The lambs were uniformly allotted by breed, sex and initial weight to 12 pens (3 reps.) at the Sheep Barn and to 8 pens (2 reps.) at the Research Center. Four treatments were implemented. The rations were pelleted and contained corn, soybean meal and alfalfa as the major ingredients (table 1). All rations contained 70% calculated TDN (90% dry basis) and were fed until the average pen weight was 105 pounds.

The four experimental treatments involved 2 rations with calculated protein levels of 11% and 17% (table 1). One treatment group received the 11% protein ration throughout the feeding trial. A second group received the 17% protein ration throughout the trial. The third group received the 11% ration for the first half of the feeding period and the 17% ration for the latter half. The fourth group received just the opposite of the third group - the 17% ration during the first half of the feeding period and the 11% ration during the last half.

The Research Center lambs were on feed for 70 days and the Sheep Barn lambs were fed for 84 days. The overall average individual lamb final weight was 105 pounds.

Results and Discussion

The average daily gains and the feed efficiencies by treatment are given in table 2.

Gains were similar for the lambs on the 17% ration fed throughout the feeding period, the treatment switching from 11% to 17% and that switching from 17% to 11%. Gains on the 17% ration throughout and the 11% switched to 17% were higher ($P<.05$) than for the 11% ration fed throughout the treatment period.

Overall feed efficiencies for the four treatment groups were similar ranging from .232 for the 17% ration fed throughout the trial to .220 for the 11% ration through the trial and the 11% to 17% switch as indicated in table 2.

These data indicate that fast-growing lambs need higher than the NRC recommended 11% protein rations for maximizing gains. Lambs on the 11% ration throughout gained significantly less. However, gains for the 11% ration throughout must be considered acceptable (over 0.8 pound per day). Future experimental trials will involve a repeat of this experiment with lambs lighter in initial weight. Protein management experiments will also be conducted using other grains and a combination of grains as well as other protein sources.

TABLE 1. Ration Composition with Calculated Protein and TDN Used for Finishing Fargo Experimental Lambs - 1982

Feedstuff	Ration 1	Ration 2
Corn (shelled)	69.0	51.0
Alfalfa (pellets)	28.0	28.0
Soybean Meal (41%)	0.7	18.0
Calculated TDN (%)	70.0	70.0
Calculated Protein (%)	11.0 [11.8]	17.0 [18.0]

[] - Actual laboratory analysis. Ingredient levels common to all rations (%): ammonium chloride .5, TM salt .5, limestone .3, Vitamin A,D,& E premix .05, and terramycin.

TABLE 2. Average Daily Gains and Overall Efficiencies of Lambs Fed Two Protein Levels with Four Feeding Management Schedules - 1982

Management[1]	Gain (pounds per day)	Efficiency
11% throughout	.805[b]	.220[a]
17% throughout	.905[a]	.232[a]
11%-17%	.885[a]	.225[a]
17%-11%	.845[ab]	.220[a]

[1]70 lambs/treatment

[a,b]Means with different superscript letters within a column are different ($P<.05$).

NIACIN SUPPLEMENTATION IN RATIONS FOR FINISHING LAMBS

T. Flakoll, D.O. Erickson, M.R. Light and T.C. Faller

Summary

Niacin additions of 0, 100, 200 and 300 PPM were incorporated into a standard 13% protein and 72% TDN corn, alfalfa, and soybean meal ration and fed to lambs averaging 54 pounds in a 2 x 4 factorial design. Two hundred and sixty-five lambs of mixed breeding were allotted by weight, sex and breed. Lamb weights and feed intake were recorded on a bi-weekly basis. The experiment was terminated when the pen averaged 105 pounds per lamb. Niacin had no effect on lamb gains with all treatments averaging about .7 pounds per day. The lambs on 300 PPM niacin were more efficient ($P<.05$) in feed conversion. Ram and wether lambs gained faster ($P<.05$) than the ewe lambs.

Introduction

The gain and feed efficiency of feedlot lambs has steadily improved due to breeding and nutrition. Nutrient requirements continually have to be assessed for their adequacy in meeting the needs of high performing ruminants. The past 3 years our work and the work of others has shown that rapid gaining lambs require higher levels of protein and energy than the NRC recommendations. Some workers have shown that lamb gains, feed efficiency and protein digestibilities are improved with niacin addition to growing and finishing rations. Other workers have reported no improvement in lamb performance with additional niacin. The major purpose of this experiment was to determine the effects of niacin additions to high energy finishing lamb rations on gain and feed efficiency.

Experimental Procedure

Niacin was added to a standard high energy corn, alfalfa and soybean meal ration (table 1) at one of 4 levels: 0, 100, 200 and 300 parts per million (PPM). A premix was formulated and subsequently was mixed with the protein, vitamin, mineral and antibiotic supplements to insure uniform incorporation of these small amounts. These mixing procedures were accomplished at the feed processing center at the Fargo Station. The supplement mixtures were mixed with ground corn and alfalfa to make a complete ration. Rations were fed ad libitum. Lambs (285) averaging 54 pounds were allotted by weight, sex and breed in a 2 x 4 factorial design. The lambs were weighed and feed intake was recorded on a bi-weekly basis. The experiment was terminated when the lambs averaged 105 pounds.

Results and Discussion

Lamb performance data are shown in tables 2 and 3. Lamb gains, being .75, .71, .70 and .72 pounds per day, respectively, were unaffected by niacin additions for the niacin levels of 0, 100, 200 and 300 PPM. The ram and wether lambs gained faster ($P<.05$) than the ewe lambs in most treatment comparisions. There was no apparent relation of niacin levels and response due to sex. The gains for ram, wether and ewe lambs averaged .78, .76 and .69 pounds per day, respectively. These data are in accord with those reported by Jordan (1982) at the Morris, Minnesota Sheep and Lamb Feeder's Day. The rations they used were similar to those reported here based on alfalfa, corn and soybean meal. They also used feeder lambs of similar weights. Some research has shown that additional niacin improves protein digestibility and utilization. The protein content of the NDSU rations were over 13%, which probably is higher than required. No improvement in protein digestibility was expected with these rations. There was an increase ($P<.05$) in feed efficiency with the 300 PPM niacin ration (table 3) over the 0 and 100 PPM rations. This supports the work of Shields and Perry (1981) at Purdue who reported a 24% increase in efficiency. It is felt that more critical experiments are required in order to make recommendations concerning the supplementation of rations with additional niacin. Digestion studies are planned on these same rations using individual metabolism crates.

TABLE 1. RATION COMPOSITION[a] AND CALCULATED NUTRIENT LEVELS[b] (HETTINGER, 1982)

Ingredient	%
Corn	69.0
Alfalfa	20.0
Soybean Meal	8.5
Pellets (supplement)	1.25
TM Salt	0.5
Ammonium Chloride	0.5
Limestone	0.3
Vitamins A, D & E	0.05
Terramycin	2.5g/100 pounds

[a]0, 100, 200 and 300 PPM niacin were for the 4 treatments.

[b]TDN 72.2%, Protein 13.2%, Ca .494% and P 279% (90% dry basis).

TABLE 2. AVERAGE DAILY GAINS IN POUNDS BY TREATMENT REPLICATIONS AND SEX

	Niacin in PPM 0	100	200	300
Replicate 1	.748	.703	.705	.724
Replicate 2	.760	.717	.687	.717
average	.754	.710	.696	.721
		Sex		
Replicate 1				
ewe	.749	.673	.653	.710
ram	.669	.816	.809	.832
whether	.762	.728	.781	.727
Replicate 2				
ewe	.720	.676	.644	.663
ram	.967	.762	.682	.683
wether	.786	.773	.747	.791
Average for treatments by sex				
ewe	.735	.674	.648	.687
ram	.818	.789	.746	.758
wether	.774	.751	.764	.759

Average by sex
ewe lambs - .686[a], ram lambs - .778[b], wether lambs - .762[b]

[a,b]Different superscripts differ at P<.05.

TABLE 3. FEED EFFICIENCY BY TREATMENT AND REPLICATES

	Niacin in PPM 0	100	200	300
Replicate 1	.187	.185	.204	.242
Replicate 2	.200	.182	.217	.221
Average	.193[a]	.184[a]	.210[ab]	.231[b]

[a,b]Different superscripts differ at P<.05.

THE RELATIVE RESPONSE TO SINGLE TRAIT SELECTION PRESSURE APPLIED TO COLUMBIA EWES

Project 6260

P.T. Berg, M.R. Light, W.D. Slanger, T.C. Faller and C.L. Johnson

Summary

Columbia breed selection has continued on the three criteria: Lamb production, visual selection and fleece production. Production data for the three groups are: Percent ewes lambing 100, 86, 79; percent lambs per ewe exposed 200, 172, 148; percent lambs weaned per ewe exposed 133, 100, 117; pounds of lamb per ewe exposed 78, 58, 66; adjusted 90-day lamb weight 59, 60, 57; and fleece weight 12.2, 13.6 and 15.2 pounds.

The percentage of lambs weaned per ewe exposed was up slightly from 1981 averages for all groups. The adjusted 90 day weights for each group was materially lower than 1981 levels, however fleece production of the ewes was up considerably. The ranking of the groups is very similar to 1981 with the lamb production group the most fertile and the visual group least fertile. The fleece group has produced the most wool for the past 11 years (except for 1975). The margin of superiority was wider in 1982 than previously, suggesting that selection on grease fleece weight can be successful.

Introduction

Data on single trait selection applied only to ewes has been gathered for 14 lambing seasons. A summary of the first 12 years of the experiment was presented in the 21st Annual Western Sheep Day Report (1980). The project was redirected based on the results of that summary. Minor changes in selection criteria were made. Specificially, ewes no longer were culled automatically on age; but would be kept if in the opinion of the experiment station personnel were physically sound at six years of age and still in the upper 75% of production. Ewes lower in production were to be culled. Ewe lambs were to be selected for replacement based on their adjusted weaning weight rather than selecting replacements based on total yearly productivity of the dam from the lamb production group. These changes were made because it was felt that the major emphasis for culling a ewe was age, and since all ewes eventually became old (6 years was maximum age and an automatic cull factor) the only selection pressure was directed toward ewe lambs. Once the ewe lamb was selected as a replacement she stayed in the flock until she died, became unsound, or reached six years of age. This essentially allowed for no "mistakes" in selection of ewe lambs and actually decreased selection intensity as it didn't allow for culling of ewes who proved low in production. The second change in selection procedure called for selection of the heaviest ewe lamb regardless of birth type. Previous criteria called for selection of a pair of twin ewe lambs with a combined adjusted weight of, for example, 100 pounds in preference to a single lamb with a weight of about 70 pounds. This type of selection definitely favored multiple births but over the course of the 11 years, no increase in lambing percent could be demonstrated and no increase relative to the first year yearling or mature weight has been documented. It is hoped to determine if lambing percent changes and/or weaning weight will respond more favorably to selection pressure by making the changes in selection procedures.

Discussion

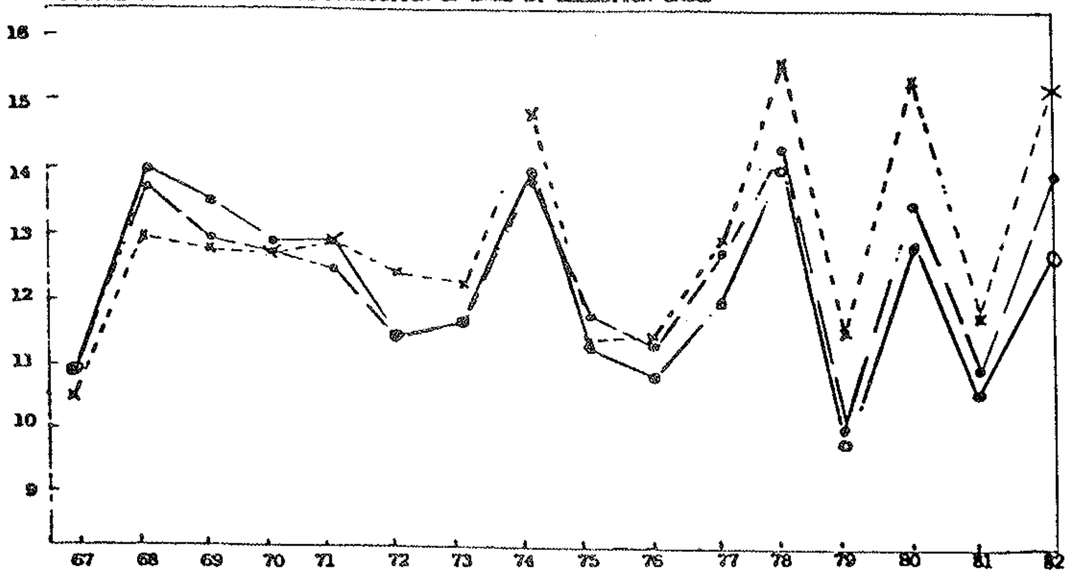
We have completed the second year of production since the change in procedure. Lamb survival was up slightly in 1982 from that reported in 1981. It is too early to adequately summarize the data relative to the changes which were made and to evaluate the effects of the poor lambing percent of 1981. A summary of only weaning weight of the 1982 lambs and ewe fleece production will be presented in this report.

Percent lamb crop weaned was 133, 100 and 117 percent for the lamb production, visual selection and wool production groups, respectively. (These percentages are based on the number of ewes exposed to a ram and may not be 30 as expected by experimental design.) Figures 1 and 2 show a plot of grease fleece weights and lamb production over the entire selection period. Fleece weight averages were up considerably from 1981. The relationship between the groups has remained the same for the last seven years (wool production group [15.2#] superior to visual group [13.6#] which in turn is superior to the lamb production group [12.2#]). This relationship between the groups may suggest that selection for wool is effective even though there may be a fluctuation in phenotypic (weight) values from year to year.

Although lamb numbers were up slightly from 1981, a slight decrease in adjusted weaning weight is apparent. The analysis of the data has been accomplished through the North Dakota Sheep Production Testing Program (NDSU Extension Service Bulletin AS753, Dec. 1981). The entire set of data is to be transferred to this system, but as yet no comparison of the results of the former computer analysis and the new program is available. The 1982 data may not be exactly comparable to past years because of minor computing differences.

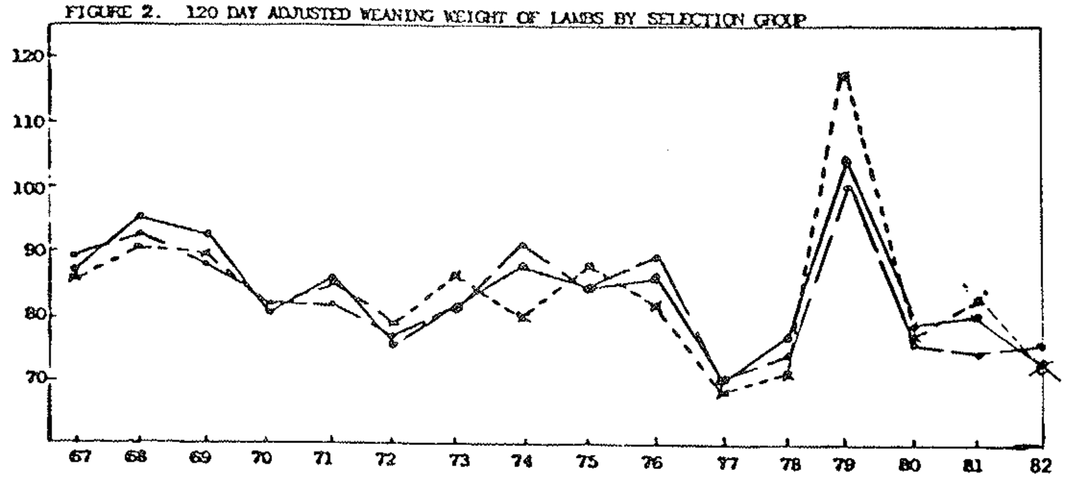
This year will see the final selection for this study. By 1984 some final analysis of the study should be available.

FIGURE 1. GREASE FLEECE PRODUCTION OF EWES BY SELECTION GROUP



O = Lamb Production Group
- = Visual Selection Group
X = Wool Production Group

FIGURE 2. 120 DAY ADJUSTED WEANING WEIGHT OF LAMBS BY SELECTION GROUP



O = Lamb Production Group
- = Visual Selection Group
X = Wool Production Group

SECTION II

Reports of

Sheep Research in Progress

At The

Main Station, Fargo, N. D.

Presented by

Merle R. Light
Animal Science Department

Dr. I. A. Schipper
Veterinary Department

at the

24th Annual Sheep Day

Hettinger Experiment Station
Hettinger, North Dakota

February 9, 1983

OVINE PROGRESSIVE PNEUMONIA

Project 1771

M.R. Light, T.C. Faller and D.O. Erickson

Summary

Testing of blood sera from college sheep flocks has shown that isolated flocks have remained free of OPP. Infection rates in NDSU control flocks average 50 percent with the greatest incidence in older ewes.

Fifteen cooperating flocks have been tested and infection rates have varied from 1 to 71 percent. Flocks of "clean" sheep have been established through a procedure of "testing and elimination".

It has been established that OPP can be transmitted to clean sheep by feeding newborn lambs with infected cow's colostrum milk or through aerosol transmission.

We have been unable to demonstrate the presence of the virus causing ovine progressive pneumonia in semen from infected rams.

Introduction

Ovine progressive pneumonia (OPP) is a chronic debilitating disease of adult sheep that causes serious economic losses in affected flocks. The causative agent of OPP is progressive pneumonia virus (PPV), an enveloped, spherical, single-strand RNA virus (Kennedy et al., 1968) classified in the family Retroviridae (Fenner, 1977).

The clinical symptoms of OPP include slow progressive loss of weight accompanied by physical weakness, the absence of fever, increasingly severe respiratory distress with a chronic cough and labored breathing and finally, death (Sigurdsson et al., 1952; Ressang et al., 1968). Differential diagnosis requires consideration of pulmonary tumors, lung worm infestation, pulmonary abscesses and Mycoplasma spp. pneumonia. Diagnosis of OPP is based on a number of diagnostic criteria including clinical signs, histopathological lesions, isolation of PPV, and presence of precipitating antibodies against PPV (Cutlip et al., 1976). The agar-gel immunodiffusion has proved to be an uncomplicated and inexpensive technique for the detection of precipitating anitbodies in sheep sera (Cutlip et al., 1977; Molitor, 1978).

The presence of precipitating antibodies in an animal indicates exposure to PPV but does not necessarily indicate prior, current or impending diseases. Many sheep apparently carry the virus and antibody for life without developing lesions (Cutlip et al., 1976).

Marsh (1923) first described OPP in Montana range sheep and found that one to two percent of sheep in affected flocks contracted the disease. Since that time, affected individuals have been reported throughout world sheep producing areas including South Africa, Britain, France, Germany, India and America (Palsson, 1976). Cutlip et al. (1977) surveyed cull slaughter ewes from Western and Midwestern United States and reported up to 68% of old ewes were infected with OPP. Gates et al. (1978), after serologically surveying Idaho range sheep, reported an incidence ranging from 58% in all ages to 90% in cull ewes. Epidemiological studies in Iceland with Maedi, the Icelandic equivalent of OPP, indicated certain strains within Icelandic breeds were more resistant than others to the disease (Palsson, 1976). Specifically, crosses between Icelandic sheep and Border Leicester rams appeared to be particularly resistant. The use of selected breeds in Iceland along with elimination of affected sheep helped eradicate Maedi from most of Iceland (Palsson, 1976).

Experimental Procedure

The objectives of this experiment are:

1) To determine methods of transmission of ovine progressive pneumonia and 2) to propagate and maintain an OPP-free flock.

To accomplish these objectives, the following procedures have been initiated:

I. Vertical transmission

1. Milk; colostrum will be collected from infected ewes and the following aliquots will be cultured for PPV in an established ovine tracheal cell line or ultracentrifuged and observed under the electron microscope.

   a. Unaltered
   b. Sonicated to break leukocytes
   c. Diluted with warm buffered saline and centrifuged to obtain leukocytes
   d. Ultracentrifugation and electron microscopy

2. Direct

   Lambs removed from PPV-free ewes prior to nursing will be fed colostrum from PPV-infected ewes by stomach tube.

3. Indirect

   Isolated negative sheep will be watered from water that positive ewes have partially consumed to determine whether OPP may be transferred by this method.

II. The establishment of OPP-free flocks:

   a. Infected adult sheep will be identified by serologic methods and removed from the flock when facilities become available.

   b. Lambs removed immediately postpartum and formula fed will be housed in a separate facility located approximately one mile from the other sheep.

Results and Discussion

Flocks of Columbia, Suffolk, Hampshire and Border Leicester sheep were established by separation of lambs from dams immediately following birth. All lambs were isolated and reared artificially. These flocks have remained free of ovine progressive pneumonia as determined by the agar-gel immunodiffusion test (AGID) since 1974. It appears that OPP-free flocks could be established by this method.

In testing complete flocks in North Dakota, Minnesota, Montana, South Dakota and Michigan, we have found all flocks tested to be positive with infection rates of 3-71%. Compilation of flock records indicate that there are breed differences in susceptibility as well as by age, with older animals having the highest incidence of infection.

Investigations using newborn, unnursed lambs, that were removed from the mother and treated as orphans demonstrated a 20% infection by the oral route. The OPP virus was administered to the lambs through bovine colostrum within four hours of birth.

Studies to evaluate the possible significance of spread of infection by aerosol indicates that infection is frequently spready by this manner when ventilation is poor. Susceptible sheep were placed in an air tight room that had only one inlet for air and one outlet. Incoming air was from an adjacent room that contained OPP infected sheep. There was no other possible contact except by air between the two groups. Infection was demonstrated within three months of initiation of this approach.

Additional studies involving 11 flocks have provided information that demonstrates that OPP infected flocks can become OPP free by testing and elimination of infected sheep. Most flocks have been free of OPP within one year, with all flocks free within 18 months, if infected sheep are removed and retesting is done at six month intervals. Infected animals may be removed by sale or by placement on a different premise. Separating flocks on the same premise has been less successful.

Future work plans include the aspects of OPP transmission by insects and determination if there is more than one strain of the OPP virus. Present studies to determine if the OPP virus is present in sheep colostrum and/or the placenta will continue during the next lambing season.

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SECTION III

MANAGEMENT SECTION

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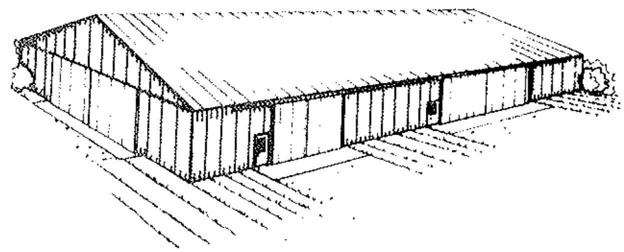
24th Annual Sheep Day

Hettinger Experiment Station
Hettinger, North Dakota

February 9, 1983

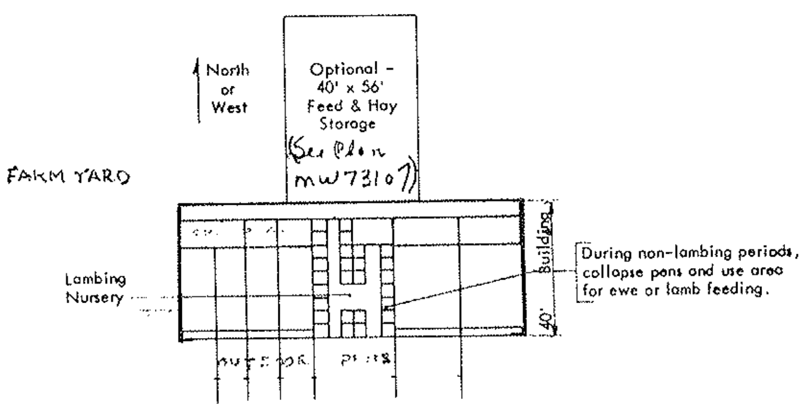
SHEEP BARN CONSTRUCTION & VENTILATION

Dexter W. Johnson, Ext. Ag. Engineer, NDSU
For Presentation at 24th Annual Sheep Day
Hettinger, ND February 9, 1983



The barn and other facilities are a part of any sheep operation. These can range from a pole-frame shed to several large confinement facilities. What kind of set up is best to use depends on; size of operation, available capital, labor, kind of feed and operator preferences.

Successful use of any barn depends on its (1) location, (2) building type, (3) construction, and (4) ventilation. These points will be briefly discussed here. In any case, a plan on paper needs to be developed before beginning any construction. A plan helps decide on barn features ahead of time, compare costs and operation limitations such as animal handling, cleaning, feeding and pen arrangement.



Sheep Barn Layout

1. Location of Sheep Barn

   A. <u>Access</u> to facilities is needed by sheep, people and equipment. Gravelled or surfaced parking-loading areas save tempers and equipment. Management, veterinary, loading chute, electricity, waterlines, etc. can be from the yard side of the set up. The sheep corrals, manure storage, feeding, drainage away can be in the other three directions.

B. Drainage slope of approximately 5 feet drop per 100 feet away from barns and feeding areas is recommended. Equipment available today simplifies earth moving, mound construction, etc. Roof drainage can cause problems unless directed away from driveways and feedyard areas.

C. Expansion space is needed for future barns, feedyards and feed storage. Locate barns where extra space is available.

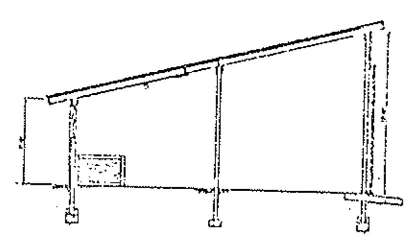
D. Wind and snow protection is essential from the northwest and southeast in North Dakota. Use tree shelterbelts, hills, slotted-board windbreak fences, haystacks and other buildings to change the wind direction.

E. Orientation north-south for long roofs minimizes shading around the barn (for melting and drying) and exposes the most barn surface to sunlight. An east-west ridgeline provides one larger wall surface for intensive sunshine exposure into an open-sided barn.

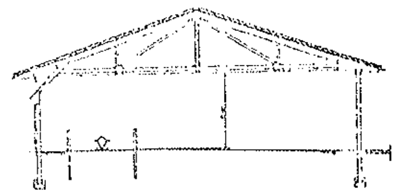
2. Types of Barns

The size of barn needed affects the type to use. Appearance is another factor. See MWPS-3, Sheep Housing and Equipment Handbook, for planning data. A long, narrow building has more exposed surface than a round or square shape. A general rule is length up to 3 times the width. Interior posts can support pen partitions and overhead hay or bedding storage. This also provides overhead insulation for lambing areas, office space, etc.

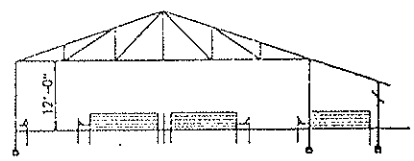
A. Shed roof is usually simple rafters supported by girders on posts spaced about 8' to 16' apart. The barn width is usually about 16' or 32'. Shed roofs are useful for open-sided barns.



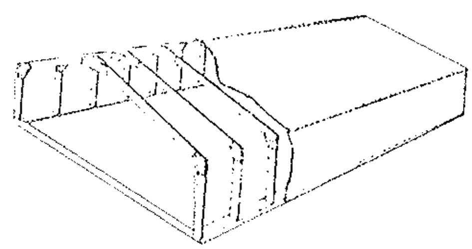
B. Gable roof, clearspan truss is most popular for barns where an insulated ceiling is used as the truss also provides the ceiling framework. Spans from 24' to 60' wide are practical. Post-beam roof support with or without a haymow floor is also used with a gable roof.



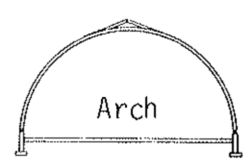
C. Offset gable or combination is a practical combination where a high and a low ceiling is needed in the same barn. An example is hay storage-feeding area with a lambing area.



D. Rigid frame buildings offer completely open interiors where the extra headroom can be used. Extra insulation and interior sheathing is more difficult to install with the wide spaces between framework. Clearspans to 100 ft. are common. For steel framed buildings.



E. Arch roof buildings have characteristics similar to rigid frame buildings. Clearspans to 50 ft. are common. Usually doors are only in the endwalls.



3. Barn Construction

A list follows here of plans available for pole-frame and other sheep barns. Also for clearspan truss rafters and other barn details. These or other plans help get durable construction.

Use pressure-preservative treated wood or reinforced concrete up 1 to 3 ft. high where manure is in contact with walls. Insulate foundations that are next to lambing pens. Compacted clay floors (bedded) are suitable in pens. Use 4 to 5 in. thick concrete for paved areas like drive alleys. To prevent cracking and settling, place concrete over compacted gravel that has been wetted down before placement. Cure concrete by keeping it wet and covering with plastic for at least a week. Provide a wood float or roughened finish to prevent slipping on concrete. Slope floors 1/8" to 1/2" per foot to drainage out doorways. Overflow from waterers is a problem.

There are less leak problems with windows in walls rather than skylights. Snow also blocks roof lighting. Provide about one, 100 watt incandescent light with reflector per 400 sq. ft. of barn floor space. Also, install outdoor overhead lights near doors. Flourescent lights are affected by below-freezing temperatures and the bulb size cannot be changed.

Tight, durable construction is needed to keep out birds. An on-going bait control problem is needed for control of mice and rats.

4. Insulation and Ventilation

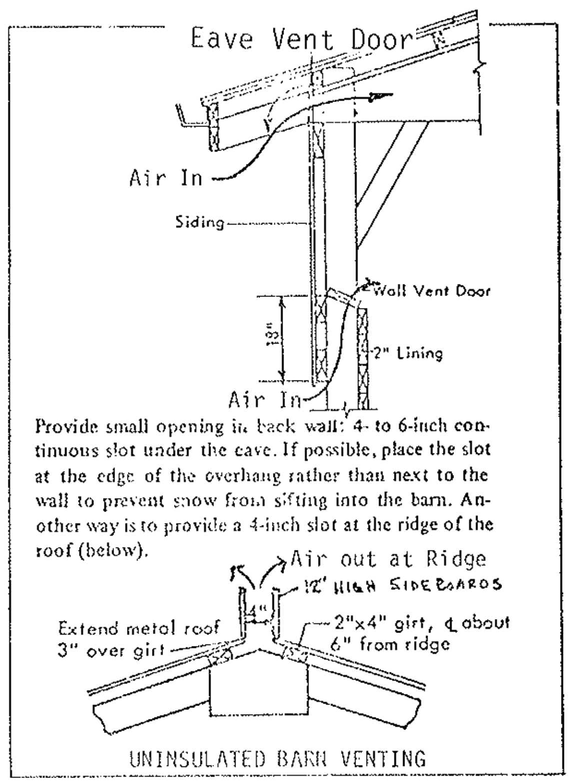
Insulation and ventilation need to be used together. Barn temperatures above freezing are usually needed to prevent waterline problems. Drafts at floors and condensation on roofs are problems. Bum-lamb areas, office space, etc. are kept warm. Barn temperatures above $50^{o}F$ can have ammonia and humidity problems. Heat lamps and other radiant type heaters warm manure too and increase these problems.

Use enough insulation. Installation is a big cost and runs about the same for 1 inch as for 6 inch thickness. Protect any insulation from water vapor, fire hazards, bird damage, rodents, pressure washers and machinery. Trying to get by with "once-over" type insulation products usually leads to failure problems.

The insulation value or R-value of most insulation materials is about the same if correctly installed. Urethane board tyne insulation has a higher R-value per inch thickness, but its capability is often over-rated considering the abuse received during its installation and use. The correct installation of insulation is as important as the kind and amount used. Reputable manufacturers will supply installation recommendations.

Ventilation is often done by opening barn doors and windows. This method will work if carefully done and used with small groups of sheep. Moving animals outdoors during the day helps move the moisture source out of the barn.

For enclosed, uninsulated barns, provide ridge ventilation for air outlet and openings all along the roof overhand or walls for fresh air inlet. Closing off or opening up inlet openings with baffleboards helps adjust the airflow for different weather conditions.



Provide small opening in back wall: 4- to 6-inch continuous slot under the eave. If possible, place the slot at the edge of the overhang rather than next to the wall to prevent snow from sifting into the barn. Another way is to provide a 4-inch slot at the ridge of the roof (below).

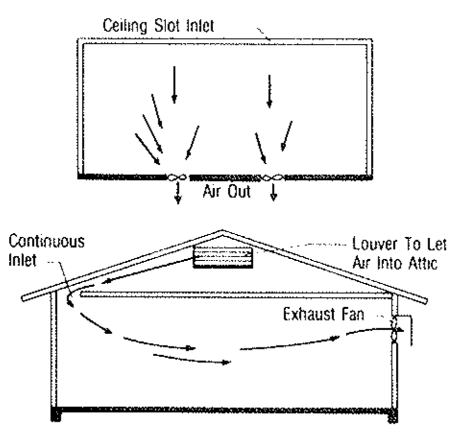
UNINSULATED BARN VENTING

A well-insulated barn is needed for warm sheep housing such as lambing barns. Mechanical ventilation with fans and a fresh air intake or distribution system is needed for forced air circulation to remove moisture, heat and foul air. Even in subzero weather it is important to continue some ventilation as animals continue to breathe out moisture. It mav be necessary to add some heated air to maintain barn temperature above freezing or help keep the air dry.

For fan venting, install at least one exhaust fan rated at about 25 cubic feet per minute for each 1000 lbs. of animal weight in the barn. Use a duct over this fan to draw air from about 2 ft. above floor level. This amount of air movement is needed for the sheep regardless of weather conditions. Install additional fans to provide 75 CFM per 1000 lbs. of animal weight. This additional capacity will move the extra amount of air needed for moderate weather. Open large doors or provide extra fans for hot weather. Fans need to be sized to the size and number of animals. Twice as large fans do not do twice the ventilation!

Use a 1" wide ceiling slot inlet system or commercial type ceiling inlets for bringing in fresh air for exhaust ventilation systems!

EXHAUST FAN LOCATIONS



Plastic tube ventilation systems "push" fresh air into the barn. Other similar commercial systems use other types of ducting to distribute air throughout the barn. The size of fan system to install is figured on the same basis as explained for the exhaust type venting system. Locate the tubes or ducts according to manufacturer recommendations. Drafts can be a problem. Such "pressure type" venting systems usually use exhaust fans to exhaust air from the barn space.

Important items with any ventilation system include:

a. Locate fan and heater control thermostats near the center of barns (less than 100 ft. long) to sense average conditions. A light bulb, sunlight or nearby water tank can affect sensitive thermostat operation.

b. Adjust fan and heater thermostat settings to meet changing conditions. Cooler settings will be needed for colder weather. Use indoor and outdoor thermometers at different locations around the barn to check floor and ceiling temperatures at those locations.

c. Locate hot air heaters to warm the fresh air as it enters the barn. This permits the warmed air to do its maximum drying before exhausted outside.

d. Adjust fresh air inlets daily for weather conditions. Close down inlet baffles in subzero weather and open more for higher airflows in warm weather. Cold air is "heavy" and "falls" fast.

e. Install exhaust fans in the center of south or east walls. This lets them blow more "with" the wind. Hoods over the fans help reduce wind pressure effects.

f. Locate fans and inlets to provide the maximum air mixing and circulation throughout the barn space. Solid pen partitions will block some air circulation.

LIST OF PLANS

Dexter W. Johnson
Extension Agricultural Engineer
North Dakota State University

NOTE: These and other plans are available through county agents or from Extension Agricultural Engineering, NDSU, Fargo, ND. The drawings show construction details and include a materials list for estimating. Due to changes in lumber sizes, lumber grades, plywood quality and other developments in building materials, some adjustments are required for older plans. (Present charge is shown or $1.00 per sheet.)

SHEEP BARNS & CORRALS

Plan No.	Plan Title	Sheets
MW 72050	Pole Utility Buildings	$1.50
MW 72505	Slatted Floor 40'x72' Feeder Lamb Barn	$2.50
MW 72506	240-Ewe and Lambing Barn, 40'x104'	$2.50
MW 72507	500-Ewe and Lamb Feeding Barn, 74'x256'	$2.50
MW 72508	12'x16' Portable Lamb Feeding Shed	$1.50
MW 72509	40-Ewe and Lambing Barn, 24'x32'	$1.50
Reprint No. 759	Practical Sheep Housing for North Dkaota	No Charge
USDA 6096	Shearing Shed & Corral Arrangement	1
USDA 6236	Portable Handling Corral for Sheep (Metal or Wood)	1
AED-19	Slip Resistant Concrete Floors	No Charge
MWPS-9	Designs for Glued Trusses	$4.00
MWPS-3	Sheep Housing & Equipment Handbook (This 116 page booklet was revised in 1982. It includes barn and layout planning plus plans for fences and sheep equipment.)	$5.00

FEED HANDLING & FEEDERS

USDA 5917	Fencing, Feeding and Creep Panels	1
Reprint No 409	Chopped Hay Feeder for Sheep	No Charge
Reprint	16 ft. Collapsible Fenceline Feedbunk for Sheep	No Charge
ND 872-1-1	Stationary Roughage Self Feeder for 70 Ewes or 160 Lambs	No Charge
ND 872-1-2	Portable Roughage Self Feeder for 40 Ewes or 80 Lambs	No Charge

Plan No.	Plan Title	Sheets
MW 73110	24 Ft. Wide Clearspan Pole Frame Hay Shed	$2.50
MW 73111	36 Ft. Wide Glearspan Pole Frame Hay Shed	$2.50
MW 73112	48 Ft. Wide Clearspan Pole Frame Hay Shed	$2.50
MW 73113	32 Ft. and 48 Ft. Wide Pole Frame Hay Shed (Interior Poles)	$1.50
MW 73217	20, 45, 170, and 340 Bu Hoppered Grain Bins	$2.50
MW 73220	48 Ft. Wide Pole Frame Grain Storage	$1.50
MW 73250	Grain Storage Buidlings, 600, 1000, 1200, 1500, or 2000 Bu.	$1.50
MW 73293	Grain-Feed Handling Center, Work Tower Across Drive	$3.50
MW 73294	Grain-Feed Handling Center, Work Tower Beside Drive	$3.50
Amer. Plywood Assn.	10 Ton Hoppered Feed Bin	No Charge
Amer. Plywood Assn.	4 Compartment Bin for Feed Mill	No Charge
USDA 6090	5500 Bu. Wooden Grain Bin	2
MWPS-13	Planning Grain-Feed Handling Handbook	$4.00

HETTINGER BRANCH EXPERIMENT STATION

FLOCK CALENDAR - OUTLINE

PRIOR TO BREEDING

1. Bag and mouth ewes and cull those that don't meet requirements.

2. Replace culled ewes with top-end yearlings saved for replacement.

3. Drench ewes (Phenothiazine).

4. Evaluate Sires:

   a. Be sure they are vigorous, healthy and in good breeding conditions (possibly production tested).

   b. Allow 3 rams to 100 ewes under range conditions and 2 when pen breeding, as in small lots or pastures.

5. Crutch ewes.

6. Flush ewes (if in thin condition)

   a. 1# grain 2 weeks to 5 weeks (usually 17 days)

   b. Moving ewes to a better quality pasture prior to breeding will serve as an effective flush.

      * if ewes are overconditioned the effect of flushing will be lessened.

BREEDING

1. Test rams with marking harness or water color paint on brisket to see if they are getting the job done (change colors at the end of first 17 days).

2. Leave rams in NO LONGER than 57 days (38-40 days more desirable).

3. Remove rams (don't winter rams with ewes).

PRIOR TO LAMBING (First 15 weeks)
Early Pregnancy

1. Watch general health of ewes, if possible sort off thin ewes and give extra feed so they can catch up.

2. Feed the poor quality roughage you have on hand during this period saving the better for lambing.

LAST SIX WEEKS BEFORE LAMBING

1. Drench ewes (Thiabendazole).

2. Six-four weeks before feed 1/4 - 1/3# oats per ewe per day.

3. Shear ewes, trim hoofs, and vaccinate ewes for example: Enterotoxemia, Vibriosis, Soremouth.

4. Four weeks before lambing increase grain by 1/2 - 3/4# per head per day. (Usually done immediately after shearing).

5. Check facilities and equipment to be sure everything is in order.

6. Two weeks before lambing increase grain to 1# per head per day.

LAMBING

1. Watch ewes closely as extra effort will be repaid with more lambs at weaning time.

2. Put ewe and lambs in lambing pen (jug) after lambing (not before).

3. Be available to provide assistance if ewe has troubles.

4. Disinfect lambs navel with iodine as soon after birth as possible.

5. Use heat lamps in cold weather.

6. Be sure both teats are functioning and lambs nurse as soon as possible.

7. Brand ewes and lambs with identical numbers on same side.

8. Turn ewes and lambs out of pen as soon as all are doing well. (24 hrs. - 6 days).

9. Bunch up ewes and lambs in small groups 4-8 ewes and then combine groups until they are in a workable size unit.

10. Castrate and dock lambs 1-2 weeks after birth.

SUPPLIES THAT MAY BE NEEDED DURING SEASON

1. Good disinfectant.

2. Forceps or Balling gun.

3. Syringe and needles.

4. Hoof trimmer.

5. Sulfa urea Boluses for ewes that were assisted in lambing.
6. Iodine for disinfecting navels.
7. Soap and mineral oil.
8. Tri-sulfa pills for treatment of early pneumonia symptoms.
9. Mastitis ointment.
10. Branding paint and irons.
11. Heat lamps for severe weather.
12. Docking and castrating tools.
13. Surgical scissors.
14. Needle and thread in case a suture is needed.
15. Crate for mothering-up lambs and adopting.

END OF LAMBING TO WEANING

1. Feeding practices will vary depending on the time that lambs were born.

   A. Dec. 15 - March 1 - Lambs are usually creep fed and not allowed to go on pasture before market.

   B. Lambs born after March 1 are usually not creep fed and allowed to go on pasture during summer.

2. Drench ewes before turning them on pasture (Phenathiazine).

   * try and drench according to a program that works for you, (don't wait until signs of worminess appear, it is too late then).

3. Rotate pastures if possible, this also is helpful in internal parasite control.

WEANING TO PRE-BREEDING

1. Time of rest for ewes.
2. Time for shepherd to adjust ewes conditions so they can be effectively flushed, for next breeding season.

ORPHAN LAMBS - MANAGEMENT IDEAS

1. Buy a good milk replacer, should be 30% fat. Good replacer available from:
   A. K & K Mfg., Rogers, Minnesota
   B. Land O'Lakes
   C. G T A

   It will cost approximately 50¢ per pound and each lamb will require from 15 to 20 pounds.

2. Use good equipment. NDSU has had good success with the LAMB Bar, K & K Mfg., sells a self priming nipple and tube assembly that we have found to be excellent for starting orphans.

3. Start on nurser quickly. Young lambs start easier. Check ewes udder right after she lambs and make decision. Lambs from ewes that are questionable in any manner should be put on artificial milk. Lambs will take to nurser best at young age.

4. Self feed cold milk replacer after lambs are started. Milk replacers should be mixed with warm water for best results and then cooled down. Lambs fed cold milk grow well with less problems from scours and other digestive disturbance. Cold milk keeps better too.

5. There is a Formaldahyde solution commercially available that retards bacterial growth in milk (1 cc/gallon milk).

6. Vaccinate to protect against overeating. For immediate protection use antitoxin. For long term protection use bacteria (cl. per fringens type C & D).

7. Vaccinate to protect against "white muscle" disease. Use 1 SE or Bo Se.

8. Best results have been obtained when lambs are fed in groups of 3 or 4. This would be advisable when lambs are just being started. After lambs are successfully trained, they can be handled in groups of 25.

9. Orphan lamb pens should be heated. A plastic tent can easily be devised and heated. Extra heat will save extra lambs.

10. Provide colostrum milk for all orphans. Colostrum should be provided as quickly as possible. Colostrum milk is rich in fats, vitamins and anti-body globulins to protect against disease organisms. Cow colostrum milk can be substituted for ewe colostrum milk. It can be kept frozen in 1-4 oz. containers.

11. Provide supplemented feed immediately. Use high energy, highly palatable feed. Where few lambs are being fed it may be advisable to purchase a good commercial lamb creep feed.

12. Provide clean, fresh water.

13. Wean lambs abruptly at 21-30 days of age. When to wean depends upon whether lambs are eating creep feed and drinking water. Newly weaned lambs will go backwards for several days. Don't worry - lambs will make compensating gains later on.