32nd Annual Western Dakota

SHEEP DAY

February 13th, 1991
Hettinger Armory

Timothy Faller, Superintendant
Hettinger Research & Extension Center
North Dakota State University

PROGRAM

9:00 AM (MST)	Tours at the Station
10:00 AM	Coffee and sheep equipment display
10:20 AM	HETTINGER & FARGO STATION REPORTS Dr. Duane Erickson Mr. Roger Haugen Dr. Kris Ringwall Mr. Timothy Faller
12:00 NOON	LUNCH: ROAST AMERICAN LAMB
1:00 PM	WELCOME -- NORTH DAKOTA - AGRICULTURE Dr. H.R. Lund, Director Agriculture Experiment Station North Dakota State University
1:20 PM	TERMINAL SIRE CHOICES AVAILABLE TO THE SHEEP INDUSTRY Dr. Kreg Leymaster U.S. Meat Animal Research Center Clay Center, Nebraska
2:00 PM	ADOPT-A-BURRO Bill Crockford and Lyle Chase Bureau of Land Management Vale, SD
2:20 PM	MULTISPECIES GRAZING Dr. Bok Sowell SDSU Range Specialist Brookings, South Dakota
3:00 PM	CLOSING REMARKS Paul Rodgers A.S.I. Director of Producer Services Denver, Colorado

*There will be a spouse program in the afternoon beginning at 1:00 PM including presentations on "Sheep to Shawl", "Environmentally Safe Cleaners" and "Family Appreciation".

SHEEP DAY DIGEST
by
Timothy C. Faller, Superintendent
Hettinger Research and Extension Center
North Dakota State University

SECTION I
REPORTS OF RESEARCH IN PROGRESS
AT THE
HETTINGER RESEARCH AND EXTENSION CENTER
AND MAIN STATION

PRESENTED BY

DR. DUANE ERICKSON
ANIMAL & RANGE SCIENCE DEPT.
NORTH DAKOTA STATE UNIVERSITY

MR. ROGER HAUGEN
EXTENSION LIVESTOCK SPECIALIST
NORTH DAKOTA STATE UNIVERSITY

DR. KRIS RINGWALL
EXTENSION LIVESTOCK SPECIALIST
NORTH DAKOTA STATE UNIVERSITY

TIMOTHY C. FALLER
SUPERINTENDENT
HETTINGER RESEARCH EXTENSION CENTER

AT THE
32ND ANNUAL SHEEP DAY
HETTINGER RESEARCH AND EXTENSION CENTER
HETTINGER, NORTH DAKOTA
FEBRUARY 13, 1991

BARLEY FED WITH VARYING LEVELS OF ALFALFA TO LAMBS

D.O. Erickson, T.C. Faller, K.A. Ringwall,
P.T. Berg and S. Uriyapongson

NDSU Experiment Station, Hettinger 1990

Summary

Six hundred and sixty-four lambs were utilized to determine the feedlot performance and carcass characteristics as affected by feeding barley diets with four levels of alfalfa replicated four times. The diets ranged in % TDN from 72.2 (10% alfalfa) to 64.7 (40% alfalfa) and % protein from 13.8 to 14.4 respectively. Calcium and phosphorus levels were .6% and .4% respectively except for the 40% alfalfa diet contained .7% without any added limestone. The diets were whole grain complete mixed with coarse ground (roughage) and fed free choice. Carcass measurements were conducted on the representative lambs in each treatment selected for slaughter. Lambs were allotted by weight, breed and sex and were randomly assigned to one of the four treatments. Lambs averaged 63 pounds in each treatment and were taken off trial from 103 (40% alfalfa) to 108 pounds for the 10 and 30% alfalfa fed lambs with the lambs on 20% alfalfa going off at 106 pounds. The variation in final weights was not different ($P>.05$). The daily gains were also similar ($P>.05$) among diets being .538, .515, 523 and .485 pounds per day with increasing levels of alfalfa. The lambs on the diets with 30 and 40% alfalfa consumed more feed ($P<.05$) than the lambs on the 10% alfalfa diet which would be expected. The feed efficiencies were 5.79, 6.11, 6.65 and 6.95 respectfully with increasing alfalfa in the diet. The lambs on 10% alfalfa were more efficient ($P<.05$) than those on 30 and 40% alfalfa. The carcass characteristics of dressing %, leg score, kidney %, conformation score and USDA grade were all similar ($P>.05$) among dietary treatments. These preliminary data indicates that 20% alfalfa can be incorporated into a barley diet without affecting any feedlot performance and carcass measurements. Satisfactory gains and feed efficiencies were obtained even with the diets containing 40% alfalfa. There were no differences ($P>.05$) carcass characteristics with any level of alfalfa up to 40%. More research should be conducted on varying combinations of roughage to grains for feeder lambs because in many situations it may be of economic importance.

Introduction and Justification

Most of the research on the various grains in feeder lamb diets has been conducted on high grain and low roughage diets. There has also been work with beef cattle diets which indicate that combinations of alfalfa and barley may be conducive to bloat, especially ranges in between 70:30 or 30:70 barley to alfalfa. The level of roughage in feeder lambs diets is in part determined by the type and condition of the feeder lambs. Economic considerations are also very important because cost of grains and roughages are variable. It is important for the producer's to have a data base to use in making decisions in diet formulations for feeder lambs in terms of the feedlot performance and resulting carcass characteristics with varying levels of roughage in the diets.

Objective

- To compare barley in whole mixed complete diets with 10, 20, 30 and 40% alfalfa utilizing early weaned lambs. Lamb performance and carcass characteristics will be used to measure dietary treatment differences.

Procedure

Barley diets containing 10, 20, 30 and 40% alfalfa were formulated based on feed stuff analysis. The additional alfalfa replaced barley which results in decreasing TDN with additional alfalfa. There was no protein supplement used in any of the diets resulting in the 10% alfalfa diet containing 13.8% protein and the 40% alfalfa diet containing 14.4% protein. All of the diets contained required levels (NRC) for lambs gaining .6 pound/day. Lambs (664) were allotted by weight, breed and sex and were randomly assigned to one of the four dietary treatments with four replications per treatment. Lambs were self fed complete mixed diets. Selected lambs in each pen were slaughtered for carcass measures. Statistical measures were applied to the data to assist in the interpretation of the results.

Results and Discussion

The diets were formulated based on the nutritional values shown in Table 1. The barley was of good quality weighing 47 lb/bu. The four diets are shown in Table 2 along with selected nutritional composition. No protein supplement added to any of the diets resulting in higher protein levels as the amount of alfalfa increased. All of the diets contained NRC recommended levels or above. The energy levels decreased with added levels of alfalfa ranging from 72 to 65% TDN. Feedlot performance information is shown in Table 3. Lambs average 63 pounds in each treatment at the start of the experiment with the final weights ranging from 103 (40 alf) to 108 pounds (10 and 30 alf). There were no differences ($P>.05$) in final weights. The daily gains respectively for the (10, 20, 30 and 40 alf) were .538, 515, 523 and .485 pounds but were not different at the 5% level. Lambs on the diets with 30 and 40% alfalfa consumed more ($P<.05$) than the lambs on the 10% alfalfa. The lamb apparently attempt to consume more of the low energy diets. The lambs on the 10% alfalfa diet were more efficient ($P<.05$) 5.79 compared to the lambs on the 30 and 40% alfalfa diets 6.65 and 6.95 pounds of feed per pound of gain. The carcass measures of dressing %, leg score, kidney %, conformation score and USDA grade were similar ($P>.05$) among treatments (Table 4). This information should be useful to producers in making decisions concerning diet formulation in the use of alfalfa and barley. Efficiency is not as good with the higher alfalfa level but economics could dictate the combinations of barley to alfalfa to use.

Acknowledgement

The North Dakota Barley Councils partial support of this research is very much needed and appreciated.

TABLE 1. COMPOSITION OF FEEDSTUFFS USED TO FORMULATE DIETS FOR LAMBS (HETTINGER 1990)

Feedstuff	Bu. Wt.	Protein	TDN	DE/lb	ADF[a]	Ca	P
Alfalfa	-	16	52	1040	34	1.25	.17
Barley	47	12	77	1540	6.2	.05	.34
Limestone	-	-	-	-	-	36	-
DiCal Phos	-	-	-	-	-	22	18

[a]Acid detergent fiber.

TABLE 2. DIETARY TREATMENTS[a] AND SELECTED NUTRITIONAL COMPOSITION (HETTINGER 1990)

Feedstuff	10% alf	20% alf	30% alf	40% alf
		%		
Alfalfa	10	20	30	40
Barley	87	77	67	57
DiCal Phos	.5	.6	.7	.8
Limestone	.9	.5	.1	-
TDN	72.2	69.7	67.2	64.7
DKcal/lb	1444	1393	1344	1294
Protein	13.8	14.0	14.2	14.4
Ca	.60	.60	.60	.70
P	.40	.40	.40	.41

[a]Each diet had .5% TM salt and ammonium chloride, .05% vit ADE, 2.5 g antibiotic/100 lb mix and 1.25% ionophore supp.

TABLE 3. FEEDLOT PERFORMANCE OF LAMBS FED VARYING LEVELS OF ALFALFA IN BARLEY DIETS (HETTINGER 1990)

	Alfalfa %				
	10	20	30	40	SE
Int. wt.	63	63	63	63	.63
Fin. wt.	108	106	108	103	.93
Daily gain	.538	.515	.523	.485	.01
Daily feed	3.19[a]	3.27[ab]	3.57[c]	3.49[bc]	.05
Feed/gain	5.79[a]	6.11[ab]	6.65[bc]	6.95[c]	.14

[a,b,c]P<.05

TABLE 4. CARCASS CHARACTERISTICS OF LAMBS FED VARYING LEVELS OF ALFALFA IN BARLEY DIETS (HETTINGER 1990)

	Alfalfa %				
	10	20	30	40	SE
Dress %	51	50	48	49	.34
Leg score	11.6	12.2	12.1	12.0	.116
Kidney %	2.43	2.83	2.28	2.76	.091
Conf. score	11.7	12.0	12.0	12.1	.102
USDA grd	11.1	11.7	11.6	11.5	.088

No differences (P>.05)

LEVELS OF BEET PULP FED WITH BARLEY TO EARLY WEANED LAMBS

D.O. Erickson, S.L. Moore, W. Limesand,
P.T. Berg and S. Uriyapongson

Animal and Range Sciences Department, Fargo Station 1990

Summary

One hundred and twenty-eight lambs weaned at an average of 56 days were allotted by weight, breed and sex into 16 lots. The experimental design was 4x4 with four dietary treatments (barley/alfalfa diets with levels of beet pulp ranging from zero to 45% of the diet) and four replicates. Dietary treatments were randomly assigned and were fed complete mixed diets free choice. Diets were balanced to be iso-caloric (1420 Dkcal/lb - 71% TDN) and iso-nitrogenous (15% protein). Calcium and phosphorus levels were about .6 and .4% respectively. Lambs averaged 65 pounds at the initiation of the experiment and ranged from 113 (barley) to 117 pounds (barley/15% beet pulp) with no difference (P>.05) in final weights among the treatments. Lambs on 15% beet pulp gained faster (P<.05) than on barley alone (1.08 vs. 98 lb/d) however there were no differences (P>.05) in daily gains among the three diets with beet pulp. Feed intakes were similar (P>.05) among diets and feed efficiency was the best (P<.05) for the 15% compared to the 30% beet pulp diet. Digestibilities of the diets were similar (P>.05) among diets. The digestion of protein was the highest (P<.05) in the diet without beet pulp (73) compared to two of the diets with beet pulp. The fibrous fractions of NDF and ADF increased (P<.05) as beet pulp was added up to 30% of the diet. The seven carcass measurements were unaffected (P>.05) by dietary treatment. Economics should be considered as to the extent of beet pulp added because only 3% soybean meal is needed for the barley diet and this amount increased to nearly 11% in the diet with 45% beet pulp.

Introduction and Justification

Beet pulp has been shown in research conducted by the NDSU Agricultural Experiment Station to be a feedstuff that has fiber components that are highly digested by ruminants. This may be partially due to the low lignin content. Beet pulp serves as a needed physical fiber source in high energy diets and ferments more slowly than barley which is beneficial in maintaining a more constant feed intake. The ruminant environment would likely be maintained more constant in pH, concentrations of volatile fatty acids, rumen volume and possibly other factors favorable to rumen microbial activity when some beet pulp is included in a high barley diet. Research conducted in 1989 (Western Dakota Sheep Day) which showed that lambs on the barley diets with 20% beet pulp tended to gain faster (.87 vs .80) and were more efficient (5.10 vs 5.53) respectively for barley beet pulp and barley. These improvements were not different (P>.05).

Objective

To determine the effects of adding varying levels of beet pulp on lamb performance and carcass characteristics of lambs fed high energy barley diets.

Procedures

Feedstuffs were analyzed for nutritional composition (Table 1) and diets were balanced to contain equal levels of protein (15%), energy (1420 Dcal/lb) (71% TDN) and .65 and .41% calcium and phosphorus respectfully. All diets contained 12% alfalfa, 2.2% bovatec supp., .5% TM salt and ammonium chloride, vitamins and minerals at levels above NRC requirements for rapid gaining lambs and antibiotics (Table 2). Diets were coarse ground, complete mixed and were fed free choice. One hundred and twenty lambs averaging 65 pounds were allotted by weight, breed and sex and randomly assigned to one of four dietary treatments (4 replications of barley and barley with 15, 30 and 45% molasses beet pulp). Lambs weights and feed consumption was recorded on the bi-weekly basis. To determine diet and nutrient digestibilities random grab fecal samples were through the experiment and AIA (acid insoluble ash) was used as an internal indicator (Table 4). Diet samples were taken from each batch (1000 lbs) of diet processed and analyzed for selected nutritional composition (Table 3). Lambs were taken off experiment when the average of all lambs was about 115 pounds. A representative group of lambs were slaughtered for measuring several carcass characteristics to determine the effect of diet (Table 6). Statistical analysis were applied to the data to improve the reliability of the interpretation of the results.

Results and Discussion

As beet pulp levels in the diet increased it was necessary to increase amount of soybean meal from 3 to 10.8% (Table 2) which could be of concern for economic considerations in diet formulations. If the price of beet pulp is lower than the grains the additional protein supplement may not be of concern. Beet pulp has 25% ADF compared to barley (6.2%) (Table 1) which results in increased fiber levels (ADF and NDF) in the diets as beet pulp levels are increased (Table 2). Even as the fiber levels increased diet digestibilities were unaffected as shown in Table 4 which may be explained by the increasing fiber component (ADF and NDF) digestibilities ($P<.05$) with added levels of beet pulp. Previous research at NDSU indicates that the fiber in beet pulp is highly digested because of the low lignin content. Protein digestibility averaged about 70% with protein in the barley diet being 73% vs 67 and 69% for 15 and 45% beet pulp diets ($P<.05$). Feedlot performance of the lambs on the four diets are shown in Table 5. There were no differences ($P>.05$) in final weights or daily feed consumption however the lambs on barley consumed the least which supports results from previous research. Lambs gained faster ($P<.05$) with 15% beetpulp compared to none but gains were similar among the 3 levels of added beet pulp. Feed efficiency was the most desirable (4.29) for the 15% beetpulp diet over the 30% diet (4.73) with no differences among the other comparisons in efficiency. The carcass characteristics are shown in Table 6. Carcass weight (average 57 lb), dressing % (51.5), conformation grade and leg score (average 11), loin area, kidney fat and back fat were all similar ($P>.05$) among treatments. It is interesting to observe that the increased fiber levels of the diet (with added beet pulp) did not effect any of the carcass measurements. These data indicate that beet pulp can be added to high barley diets up to 45% without appreciably altering the feedlot performance or carcass value.

Acknowledgement

The North Dakota Barley Councils partial support of this research is very much needed and appreciated.

TABLE 1. FEEDSTUFF COMPOSITION[a] USED FOR THE DIET FORMULATION (FARGO 1990)

Feedstuff	lb/bu	% Protein	TDN	DE/lb	ADF	Ca	P
Alfalfa	-	16	52	1040	34	1.25	.17
Barley	48	14	77	1540	6.2	.05	.34
Beet pulp[b]	-	9	77	1540	25	.70	.10
Soy BM	-	44	78	1560	10	.25	.60
Bovatec	-	32	72	1440	16	.20	1.50
Limestone	-	-	-	-	-	36	-
Dicalphos	-	-	-	-	-	22	18

[a]90% dry
[b]with molasses

TABLE 2. DIETS[a] AND SELECTED NUTRIENT COMPOSITION (FARGO 1990)

Feedstuff	% Barley	Bly/BP15	Bly/BP30	Bly/BP45
Barley	79	61.4	43.8	26.2
Beet pulp	-	15	30	45
Soy BM	3.0	5.6	8.2	10.8
Limestone	1.0	.6	.2	-
Dicalphos	.35	.55	.70	.82

Diets contained approximately 15% protein, 71% TDN, Ca .65% and P .41%

[a]All diets contained (%) alf 12, Bovatec 2.2, TM salt and ammonium chloride .5 sun oil .7, antibiotics .205 and .025 vit A, D and E.

TABLE 3. NUTRITIONAL COMPOSITION[a] OF DIETS BASED ON LABORATORY ANALYSIS (FARGO 1990)

	Barley	Bly/BP15	Bly/BP30	Bly/BP45	SE
DM	89.6	89.5	89.7	89.7	.25
Ash	5.16	5.70	5.60	6.04	.294
Protein	16.4	16.7	16.9	17.0	.29
NDF[b]	20.0	26.6	29.2	32.4	.53
ADF[c]	6.88	11.2	13.9	17.9	.61

[a]As is basis
[b]Neutral detergent fiber
[c]ADF acid detergent fiber

TABLE 4. DIGESTIBILITIES OF THE DIETS AND SELECTED NUTRIENT FRACTIONS (FARGO 1990)

	Barley	Bly/BP15	Bly/BP30	Bly/BP45	SE
Diet	73	69	73	72	2.3
Protein	73[a]	67[b]	70[ab]	69[b]	1.2
NDF	42[a]	48[b]	60[c]	62[c]	1.8
ADF	14[a]	35[b]	54[c]	60[c]	2.9

Digestion Coe, determined by AIA as internal indicator
[a,b,c,d]$P<.05$

TABLE 5. LAMB PERFORMANCE OF LAMBS FED BARLEY WITH VARYING LEVELS OF BEET PULP (FARGO 1990)

	Barley	Bly/BP15	Bly/BP30	Bly/BP45	SE
Initial wt (lb)	65	65	65	65	-
Final wt (lb)	113	117	115	116	-
Daily gain (lb)	.98[b]	1.08[a]	1.04[ab]	1.04[ab]	.021
Daily feed (lb)	4.37	4.63	4.74	4.68	.095
Feed/gain	4.46[ab]	4.29[b]	4.73[a]	4.50[ab]	.105

[a,b]P<.05

TABLE 6. SELECTED CARCASS CHARACTERISTICS OF LAMBS FED BARLEY AND VARYING LEVELS OF BEET PULP (FARGO 1990)

	Barley	Bly/BP15	Bly/BP30	Bly/BP45	SE
Carc wt.	57	57	58	57	4.5
Dress %	52	51	51	52	1.1
Back fat	.16	.23	.11	.13	.12
Kid. fat %	1.25	.90	.89	1.00	.110
Loin area	2.84	2.49	2.64	2.39	.229
Conf. grd	11.0	10.8	11.0	11.0	.33
Leg score	11.5	10.8	11.3	11.0	.49

No differences due to treatments P>.05

"Sharpening the Pencil with 'Ewe' in Mind"

Roger G. Haugen
NDSU Extension Sheep Specialist
February 13,1991

Basic sheep management is the key to any successful sheep enterprise. Genetics, nutrition, and health all play an important part but the economic component in today's industry is critical. The pivotal ingredient in this economic component is the ewe. Sharpening the pencil when considering the following four points concerning the ewe may be beneficial.

Purchasing ewes! Decisions on breeding stock investments especially ewes are always an important consideration when starting or expanding an operation. Compare annual costs and depreciation of different aged ewes as they relate to price. The table below gives you some comparisons. Seldom are aged ewes worth more than half the value of yearlings.

Comparison of Interest and Depreciation Costs of Purchased Ewes

	EWE LAMBS	YRLG EWES	2-YR EWES	3-4 EWES	5-7 EWES	
Cost/Head	$50	$80	$70	$60	$40	$50
Productive Years	7	6	5	4	2	2
Interest/ Ewe/Year	3.43	5.60	5.04	4.50	3.60	4.50
Depreciation Mortality/Ewe	3.70	9.23	8.96	9.12	7.68	12.68
Total Annual Capital/Ewe	7.13	14.83	14.00	13.62	11.28	17.18

Assumptions- Interest @ 12%
- Mortality @2% for ewe lambs, yrlgs & 2 yr olds; 4% for 3-4 yr olds; 6% for mature ewes
- Slaughter ewe value of $28/hd.

Selecting ewes! The milking ability of any ewe is difficult to see just by looking at her. Find the good milkers by weighing the lambs at weaning. Production records are an excellent tool for analyzing your ewe flock and finding those superior ewes. Records take some of the guess work out of selection.

Planned ewehood! When planning breeding strategy, concentrate both mating and lambing into short, predictable periods. Whether lambing early (Jan-Feb-Mar) or late (April-May-June), knowing ahead of time the mating and lambing dates allows more efficient use of feed at flushing and before lambing. Concentrated lambing allows optimum use of labor and housing as well as reduce pre- and post-partum ewe and lamb mortality. Plus, a concentrated lambing period should produce a more uniform set of lambs at weaning.

Feeding ewes! Observe ewes for body condition. During the first month after breeding, ewes should, if possible, maintain their weight and body condition. It is a good practice to assess body condition about eight weeks before lambing and take out the leaner ewes for preferential feeding. In late pregnancy (last 60 days), the ewe's requirements for energy and protein increase rapidly,especially during the final few weeks. Very often the period of greatest dependence on body reserves is during early lactation and if ewes are expected to have sufficient reserves for milk production, it is important that their body is in good condition.

Consider the following two examples of annual feed requirements for a ewe. The point to remember is the bulk of ewe feed costs comes during the time of maintenance and early pregnancy.

Estimated Annual Feed Requirements/Ewe

	200 days grazing ($0.03/day)
0.85 ton of hay($50/ton)	750 lbs of hay ($50/ton)
132 lbs grain ($0.04/lb)	132 lbs grain ($0.04/lb)
65 lbs/ram feed($.04/lb)	65 lbs/ram feed($.04/lb)
Annual Ewe Feed Cost = $50.38	Annual Ewe Feed Cost=$32.63

Don't cheat the ewes on feed during late pregnancy. Feeding 0.5 to 1.5 pounds of grain daily plus good quality roughage during the last 4 to 6 weeks of pregnancy is well worth the investment.

REPRODUCTIVE CHARACTERISTICS OF FEMALE OFFSPRING FROM RAMS SELECTED FOR PREDICTABLE OR NO PREDICTABLE CHANGE IN SEASONAL SCROTAL CIRCUMFERENCE

1991 Update

K.A. Ringwall, T.C. Faller, and P.M. Berg

INTRODUCTION

A major problem in the sheep industry is seasonal infertility. Not only is seasonal infertility a biological puzzle, but the effects of seasonal lambing limits managerial options and restricts a constant and dependable supply of lamb products to the consumer. In North Dakota, virtually all lambs are born from late January to early May. Producers have not been able to consistently produce a fall lamb crop for the purpose of grazing fall stubble and decreasing winter feed resources for the dry ewe. The purpose of this project is to provide additional information as to how the season of the year affects the ram and to explore the possibility of increasing the consistency of fall lambing for North Dakota producers by identifying potential sires that may produce daughters that will better fit a northern fall lambing program.

PROCEDURE

The influence of season on scrotal circumference of Rambouillet rams and reproductive characteristics of their offspring are being evaluated. Rambouillet rams are purchased yearly and classified as seasonal or nonseasonal rams. Seasonal rams are defined as those rams whose scrotal circumferences increase predictably from the January, February and March average scrotal circumferences to the August scrotal circumferences. Nonseasonal rams show less seasonal trend to change in scrotal circumferences. Initially, scrotal measurements are obtained in late February and late July from the Glenn Brown flock, Buffalo, SD and ram selection is based on these two measurements. The two rams with the greatest change and two rams with the least change are selected to assure that variability exists within the purchased rams for change in scrotal circumference. The rams range from 10 to 14 months of age when the initial scrotal measurements are obtained and 15 to 19 months of age when they arrive at the Research Extension Center.

Rams are permanently classified after a one-year residence at the Research Extension Center utilizing the previous January, February, March and August scrotal measurements. Rams may only be re-classified following the August scrotal measurement taken at 27 to 31 months of age. If a ram dies before August, the permanent classification equals the purchased classification. All rams are exposed to ewes during each breeding season and maintained during the non-breeding seasons on a 20% grain ration fed ad libitum.

Initially, 25 to 30 purchased Rambouillet ewes per ram were randomly mated yearly to four seasonal and four nonseasonal rams to produce first generation progeny. First generation seasonal and nonseasonal daughters were being compared at 10 months of age for ovulation rate and 14 to 18 months of age for the ability to conceive at the beginning or end of the breeding season. These ewes were initially evaluated as dry ewes exposed to rams during August or April. Once exposed to rams, all ewes go into an accelerated program for three years being exposed to rams as wet (recently weaned) or dry ewes during April, August or November.

When possible, the ewes will be mated to individual sires, but if individual sire fertility is questionable, the ewes will be group mated by seasonal or nonseasonal rams. Both types of ewes will be exposed to teaser wethers, teaser ewes and rams during the April breeding season to assure that both types of ewes have equal exposure to aggressive males. All ewes will be bled 7 days after the rams are removed in May to determine serum progesterone levels. Rams are fitted each breeding season with a "Sire-Sine" (Mid States Wool, Hutchinson, Kansas) marking harness to monitor daily mating activity. Marks are recorded as light if one or two marks are visible on the rump, medium if three or more individual marks are evident and heavy if individual marks have all blended into one solid mark.

Breeding seasons start based on the calendar day and the rams are pulled on the 34th day of breeding. All ewes are exposed each breeding season regardless of pregnancy status. August breeding starts August 8th (plus or minus one day). All lambs resulting from the August breeding are weaned 234 days (March 30) from the introduction of the rams. The November breeding season starts 100 days (November 16) after the introduction of rams in August. Lambs resulting from the November breeding are weaned at 56 days of age. The April breeding season starts 7 days (April 6) after weaning the January/February lambs or 241 days after the introduction of the rams in August. All lambs resulting from the April breeding are weaned 17 days (December 3) after the initiation of November breeding or 117 days after the introduction of rams in August.

RESULTS AND DISCUSSION

The results presented are preliminary and are provided for discussion only. Those ewes born in 1986 and 1987 have completed the accelerated program, while those ewes born in 1988 are just completing the accelerated program. A detailed evaluation of the data will be undertaken once the 1988 ewes have completed the program. Table 1 gives the current status and classification of the rams that sired the seasonal and nonseasonal ewes. Of the 12 rams, all have had the January/March to August measurements collected and the scrotal circumference changes were similar to changes prior to purchase with the exception of one ram. Selecting rams based on two measurements has been satisfactory for obtaining the variation needed in the sample of Rambouillet sires. Table 2 indicates the early growth characteristics of seasonal and nonseasonal daughters. There is no difference between nonseasonal and seasonal ewes.

Tables 3 and 4 provide the predicted overall reproductive performance of these ewes. Over the course of two years, the ewes have had the opportunity to lamb 0, 1, 2, or 3 times. Table 3 indicates the predicted frequency that these ewes have or will lamb as well as the subsequent lambing performance according to how many times that each ewe lambed. No obvious difference in lambs per ewe lambing or lambs per ewe weaned presently exists. Currently, seasonal ewes are producing 1.31

annual lambings per ewe exposed versus 1.12 annual lambings per ewe exposed for nonseasonal ewes (table 4). This translates into producing a 195% lamb crop born and 161% lamb crop weaned per ewe exposed for the seasonal ewe and 181% lamb crop born and 136% lamb crop weaned per ewe exposed for nonseasonal ewes. The annual attrition rate is slightly greater for nonseasonal ewes versus seasonal ewes (table 4). The lower reproductive performance of nonseasonal ewes can be partially explained by table 5. A decreased percentage of nonseasonal ewes are expressing estrus as determined by number of ewes with greater than 1 nanogram of progesterone or marking data. Not only did fewer nonseasonal ewes express estrus, but of those that did, fewer conceived (table 5).

Reproductive performance for the ewes is presented in tables 6-8. These tables are almost complete, since only a few ewes are left to progress through the acceleration phase of the trial. Table 6 reflects the prebreeding weight, condition score, lambs born per ewe lambing and lambs weaned per ewe lambing. The nonseasonal ewes tend to be slightly heavier prior to breeding. Lambs born per ewe exposed and lambs weaned per ewe lambing appears to be greater for the august breeding period. The November breeding period is currently producing the least in terms of lambs weaned per ewe lambing. A possible cause for this is that the ewes are bred with lambs at side during November. The additional stress of lactation plus winter probably results in a poorer conditioned ewe.

Table 7 reports estrous expression and the percentage of ewes mated within each breeding season. The nonseasonal ewes tend to express estrus less during April than the seasonal ewes, however of the ewes that do express estrous, a greater percentage of nonseasonal ewes mate during the first cycle (1st 17 days) of the breeding season (table 7). Estrous expression is similar between the two types of sheep during August. Conception data is presented in table 8. A trend does seem to be developing, indicating that the nonseasonal sheep have lower conception rates than do the seasonal ewes.

TABLE 1

SCROTAL CIRCUMFERENCE CHANGE FROM THE AVERAGE JANUARY, FEBRUARY AND MARCH SCROTAL CIRCUMFERENCE TO THE AUGUST (PRE-BREEDING) SCROTAL CIRCUMFERENCE FOR SEASONAL (S) AND NONSEASONAL (N) RAMS

PURCHASE YEAR	RAM NUMBER	CLASSIFICATION PURCHASED	PERMANENT	AVERAGE CHANGE (CM) PURCHASED	PERMANENT	ATTRITION YEAR
1985	2532	N	N	2.3	.1	1987
	4066	N	N	1.0	.3	1989
	4162	S	S	9.4	2.9	1989
	3289	S	S	11.9	3.8	1987
1986	6014	N	N	1.3	-.-	1987
	5367	S	N	8.2	3.1	
	6135	N	N	.6	4.9	1990
	5303	S	S	8.4	8.0	
1987	6559	N	N	2.4	-.-	1988
	6579	S	S	8.0	4.7	
	T311	S	S	6.3	5.2	
	7242	S	S	9.0	7.0	

TABLE 2

ACTUAL BIRTH AND WEANING WEIGHT, AGE ADJUSTED[a] WEANING, SEVEN MONTH AND TEN MONTH WEIGHT FOR EWE LAMBS SIRED BY SEASONAL AND NONSEASONAL RAMS

SIRE TYPE	NUMBER WEANED	BIRTH WEIGHT	WEANING WEIGHT	AGE ADJUSTED WEANING WEIGHT	7 M WEIGHT	10 M WEIGHT	15 M WEIGHT
nonseasonal	77	11.4	36.1	37.0	113.5	121.8	146.3
seasonal	97	11.2	37.6	36.7	114.2	120.5	144.1

[a]Weaning, 7M, 10M and 15M weights adjusted to 56, 225, 298 and 438 days, respectively.

TABLE 3

PREDICTED LAMBS PER EWE LAMBING AND LAMBS WEANED PER EWE LAMBING FOR SEASONAL AND NONSEASONAL EWES CLASSIFIED ON NUMBER OF LAMBINGS IN TWO YEARS[a]

EWE TYPE	TOTAL LAMBINGS PER EWE IN TWO YEARS	NUMBER OF EWES	NUMBER OF LAMBS PER EWE LAMBING	NUMBER OF LAMBS WEANED PER EWE LAMBING
seasonal	0	2		
	1	7	1.29	0.96
	2	33	1.61	1.35
	3	55	1.51	1.21
	overall	97	1.49	1.23
nonseasonal	0	3		
	1	7	1.67	1.48
	2	40	1.70	1.26
	3	23	1.65	1.20
	overall	73	1.62	1.21

[a]Ewes born in 1988 will finish the accelerated program spring 1991, their data is included based on ultrasound evaluation of pregnancy.

TABLE 4

PREDICTED ANNUAL LAMBINGS PER EWE EXPOSED, ANNUAL LAMBS BORN PER EWE EXPOSED, ANNUAL LAMBS WEANED PER EWE EXPOSED AND ANNUAL EWE ATTRITION RATE FOR SEASONAL AND NONSEASONAL EWES[a]

EWE TYPE	TOTAL EWES	ANNUAL LAMBINGS PER EWE EXPOSED[b]	ANNUAL LAMBS BORN PER EWE EXPOSED[c]	ANNUAL LAMBS WEANED PER EWE EXPOSED[d]	ANNUAL EWE ATTRITION RATE
seasonal	97	1.31	1.95	1.61	4.0%
nonseasonal	73	1.12	1.81	1.36	7.8%

[a]Ewes born in 1988 will finish the accelerated program spring 1991, their data is included based on ultrasound evaluation of pregnancy.
[b]Parturitions divided by initial ewe numbers.
[c]Average lambs born per ewe * annual lambings.
[d]Average lambs weaned per ewe * annual lambings.

TABLE 5

NUMBERS OF SEASONAL OR NONSEASONAL EWES WITH LESS THAN ONE NG SERUM PROGESTERONE OR ONE NG OR GREATER SERUM PROGESTERONE FOLLOWING APRIL EXPOSURE FOR TWO 17 DAY ESTROUS CYCLES

SIRE TYPE	NUMBER OF EWES					MATING	CONCEPTION
	TOTAL	<1 NG	>1 NG	MATED	LAMBED	PERCENTAGE[a]	PERCENTAGE[b]
seasonal	134	31	103	109[c]	88	81.3	85.4
nonseasonal	113	41	72	75	44	66.4	61.1

[a]Number of ewes mated divided by total number of ewes.
[b]Number lambed divided by number of ewes with >1 ng progesterone.
[c]One hundred nine ewes mated however one ewe was not bled.

TABLE 6

REPRODUCTIVE PROLIFICACY, PRE-BREEDING WEIGHT AND CONDITION SCORE FOR FEMALE OFFSPRING OF NONSEASONAL AND SEASONAL RAMBOUILLET RAMS DURING APRIL, AUGUST AND NOVEMBER WHEN EXPOSED FOR TWO ESTROUS CYCLES AS LACTATING OR NON-LACTATING EWES

BREEDING PERIOD	EWE STATUS	SIRE TYPE	PREBREEDING WEIGHT	PREBREEDING CONDITION	LAMBS BORN/ EWE LAMBING	LAMBS WEANED/ EWE LAMBING
April	Dry	N	157 (78)	3.5 (31)	1.39 (28)	1.11 (28)
April	Dry	S	151 (87)	3.8 (59)	1.29 (55)	1.09 (55)
April	Wet	N	159 (36)	3.0 (32)	1.47 (17)	1.24 (17)
April	Wet	S	151 (44)	3.1 (23)	1.59 (34)	1.29 (34)
August	Dry	N	166 (90)	3.3 (46)	1.87 (45)	1.44 (45)
August	Dry	S	161 (80)	3.4 (41)	1.67 (49)	1.43 (49)
August	Wet	N	157 (22)	2.5 (22)	1.69 (13)	1.38 (13)
August	Wet	S	151 (34)	2.2 (34)	1.73 (11)	1.45 (11)
November	Dry	N	165 (18)	3.1 (18)	1.33 (12)	1.17 (12)
November	Dry	S	157 (7)	3.1 (7)	1.67 (3)	1.00 (3)
November	Wet	N	176 (41)	2.9 (16)	1.77 (31)	1.06 (31)
November	Wet	S	169 (86)	2.7 (50)	1.56 (59)	1.17 (59)

TABLE 7

ESTROUS EXPRESSION AND PERCENTAGE OF TOTAL EWES MATED FOR FEMALE OFFSPRING OF NONSEASONAL AND SEASONAL RAMBOUILLET RAMS DURING APRIL AND AUGUST WHEN EXPOSED FOR TWO ESTROUS CYCLES AS LACTATING OR NON-LACTATING EWES[a]

			ESTROUS EXPRESSION[b]					
BREEDING PERIOD	EWE STATUS	SIRE TYPE	NONE	1ST CYCLE	2ND CYCLE	BOTH CYCLES	1ST CYCLE PERCENTAGE[c]	PERCENTAGE OF TOTAL EWES MATED[d]
April	Dry	N	34	29	12	4	73.3	57.0 (45)
April	Dry	S	21	21	41	5	38.8	76.1 (67)
April	Wet	N	7	5	14	11	53.3	81.1 (30)
April	Wet	S	2	12	12	18	71.4	95.5 (42)
August	Dry	N	14	17	40	11	41.2	82.9[e] (68)
August	Dry	S	19	18	28	16	54.8	76.5 (62)
August	Wet	N	1	6	10	5	52.4	95.5 (21)
August	Wet	S	0	11	22	1	35.3	100.0 (34)[f]

[a]No November estrous data collected because of temperature extremes.
[b]Includes those ewes that have medium or heavy breeding marks only.
[c]Total 1st cycle plus both cycle ewes divided by all ewes that mated.
[d]Total ewes mated divided by total ewes.
[e]Eight ewes were excluded from the data because of ram failure.
[f]Total number of ewes mated.

TABLE 8

CONCEPTION CYCLE AND PERCENTAGE OF MATED EWES CONCEIVED FOR FEMALE OFFSPRING OF NONSEASONAL AND SEASONAL RAMBOUILLET RAMS DURING APRIL, AUGUST AND NOVEMBER WHEN EXPOSED FOR TWO ESTROUS CYCLES AS LACTATING OR NON-LACTATING EWES

			CONCEPTION CYCLE[a]				
BREEDING PERIOD	EWE STATUS	SIRE TYPE	FAILED	1ST CYCLE	2ND CYCLE	1ST CYCLE PERCENTAGE[b]	CONCEPTION PERCENTAGE[c]
April	Dry	N	51	10	18	35.7	62.2
April	Dry	S	33	13	42	31.0	82.1
April	Wet	N	20	3	14	17.6	56.7
April	Wet	S	10	7	27	20.6	81.0
August	Dry	N	27	14	41[d]	25.5	80.9
August	Dry	S	25	18	38	32.1	90.3
August	Wet	N	9	4	9	30.8	61.9
August	Wet	S	3	11	20	35.5	97.1
November	Dry	N	6	7	5	58.3	__._[e]
November	Dry	S	2	1	2	33.3	__._
November	Wet	N	6	16	15	51.6	__._
November	Wet	S	14	33	26	55.9	__._

[a]Conception cycle based on actual estrous date or 150 day gestation length (actual mean seasonal and nonseasonal gestation length = 150.48 days; st. dev. = 2.82; min = 144; max = 165;).
[b]Number conceived in the 1st cycle divided by the total number of ewes that conceived.
[c]Number of ewes lambing divided by number of ewes mated.
[d]Eight ewes were excluded from the data because of ram failure.
[e]No November estrous data collected because of temperature extremes.

EWE REPRODUCTION AND OFFSPRING PERFORMANCE OF BOOROOLA MERINO X RAMBOUILLET SHEEP SELECTED FOR HETEROZYGOSITY OF THE BOOROOLA F GENE

1991 Update

K.A. Ringwall, T.C. Faller, P.M. Berg and L.D. Young

INTRODUCTION

Several questions have been raised in regards to the recent importation of the Booroola Merino. Booroola Merino sheep are noted for exceptional prolificacy and appear to produce a 60's to 62's fleece. However, Booroola sheep are small by American standards and ewes that weigh less than 100 pounds are not uncommon. Because of the severe restrictions on size, the initial cross between Booroola Merino rams and another ewe breed may not overcome the size restriction. Fortunately, prolificacy of the Booroola Merino is thought to be transmitted through classical Mendelian inheritance as a single gene called the F gene. This is in contrast to Finnish Landrace sheep which transmit their prolificacy through additive gene action which results in dilution of the genes with each successive outcross. In the case of Booroola Merino sheep, if ewes or rams that carry the gene can be easily identified early in life, then producers can select for prolificacy independent of body size. Eventually an acceptable ewe should be achieved that carries the Booroola prolificacy gene. The purpose of this study is to evaluate the genetic mechanism which determines increased prolificacy of Booroola Merino ewes and develop breeding schemes to introduce Booroola fertility into North Dakota flocks.

PROCEDURE

A flock of F1 Booroola Merino X Rambouillet ewes were produced at the NDSU Research Extension Center - Hettinger during 1984 and 1985 matings utilizing a group of Wyoming Rambouillet range ewes and Booroola Merino rams from USDA-Roman L. Hruska U.S. Meat Animal Research Center, Clay Center, Nebraska. The F1 ewes and rams produced from these matings and Rambouillet rams have been utilized to produce Dakota Rambouillets. The Dakota Rambouillet is being upgraded to Rambouillet through successive backcrossing to Rambouillet.

Dakota Rambouillets were initially produced in 1986 when F1 Booroola Merino X Rambouillet rams were mated to Wyoming Rambouillet ewes to produce the first set of 1/4 Booroola Merino X 3/4 Rambouillet ewes. In 1988, the second set was produced by mating F1 Booroola Merino X Rambouillet ewes to Rambouillet rams. Control Rambouillet ewes were produced from the Wyoming ewes bred to Rambouillet rams and are maintained as a line of straight bred Rambouillets.

Original Dakota Rambouillet ewes (3/4 Rambouillet X 1/4 Booroola) are selected based on the first two estimates of ovulation rate obtained. These can be either ovulation rate determined from corpora lutea number or lambing rate. Original ewes are maintained as Dakota Rambouillet if the ovulation rate at the first two estimates is two or greater or one of the estimates is three or greater. Successive generations (7/8 Rambouillet or greater replacement ewes) will be selected based on twinning ability at one year of age. Only those ewe lambs that breed and produce twins will be selected as replacements. Once a ewe is selected to keep, the only reason for culling her would be mastitis. No selection is applied to the Rambouillet flock.

Breeding seasons start based on the calendar day and the rams are pulled on the 34th day of breeding. All Dakota Rambouillet ewes are exposed starting late July or early August. All lambs resulting from the summer breeding are weaned in March approximately 230 days from the introduction of the rams. A November-December 34 day cleanup breeding season starts mid November. Lambs resulting from the November breeding are weaned at 56 days of age. All replacement and mature ewes are fed according to 1985 NRC standards.

RESULTS AND DISCUSSION.

Growth data are presented in Table 1 for Rambouillet and Dakota Rambouillet. Birth weight, weaning weight, eight month , ten month and fifteen month weight all tend to be similar for the straight Rambouillet and first generation Dakota Rambouillet. As mature ewes, the Rambouillet ewes have heavier prebreeding weights (table 2). The effect of breeding second generation Dakota Rambouillet ewe lambs is evident. The second generation Dakota Rambouillets weigh less to start with and failed to regain body weight prior to the second breeding season (table 2).

In comparison to straight Rambouillet ewes, reproduction performance of the Dakota Rambouillet ewes is greater for lambs born per ewe lambing and similar for lambs weaned per ewe lambing (table 3). Tables 4 and 5 present the estrous and conception data. An interesting difference can be observed between the Dakota Rambouillet ewes and Rambouillet ewes. A greater percentage of Dakota Rambouillet ewes conceive to the first 17 days of ram exposure than do Rambouillet ewes and Dakota Rambouillet ewes have greater conception rates during July/August mating.

The effects of selecting the second generation replacement Dakota Rambouillet based on number of lambs born at a year of age are large. Until the selected ewes overcome the handicap of lambing twins at a year of age in a competitive atmosphere, evaluation of lifetime performance is difficult. Use considerable caution in discussing the results of the second generation ewes until more numbers and production time are achieved.

TABLE 1

ACTUAL BIRTH AND AGE ADJUSTED[a] WEANING, EIGHT MONTH, TEN MONTH AND FIFTEEN MONTH WEIGHT FOR RAMBOUILLET AND DAKOTA RAMBOUILLET EWE LAMBS

		AGE ADJUSTED			
EWE TYPE	BIRTH WEIGHT	WEANING WEIGHT	7 M WEIGHT	10 M WEIGHT	15 M WEIGHT
Rambouillet[b]	11.3(292)	36.2(288)	104(282)	117(281)	142(148)
Dakota Rambouillet					
First Generation	10.5(40)	35.0(39)	111(36)	116(39)	141(39)
Second Generation	8.3(10)	26.8(10)	83(9)	104(9)	---(0)

[a]Weaning, 7M, 10M and 15M weights adjusted to 56, 225, 298 and 438 days, respectively.
[b]Rambouillet lambs born in January of 1987, 1988 and 1989.

TABLE 2

PRE-BREEDING WEIGHTS AND BODY CONDITION SCORE FOR RAMBOUILLET AND DAKOTA RAMBOUILLET EWES

EWE WEIGHT	PREBREEDING CONDITION	BODY TYPE
Rambouillet	164 (170)	3.3 (87)
Dakota Rambouillet		
First Generation	143 (100)	3.1 (66)
Second Generation	115 (8)	2.3 (8)

TABLE 3

GESTATION LENGTH, LAMBS BORN PER EWE LAMBING AND LAMBS WEANED PER EWE LAMBING FOR RAMBOUILLET AND DAKOTA RAMBOUILLET EWES

EWE TYPE	GESTATION LENGTH	LAMBS BORN/ EWE LAMBING	LAMBS WEANED/ EWE LAMBING
Rambouillet	150.5	1.77 (94)	1.43 (94)
Dakota Rambouillet			
First Generation	150.2 (92)	2.67 (94)	1.43 (70)
Second Generation	149.5 (2)	-.-- (0)	-.-- (0)

TABLE 4

ESTROUS EXPRESSION AND PERCENTAGE OF TOTAL EWES MATED FOR RAMBOUILLET AND DAKOTA RAMBOUILLET EWES

EWE TYPE	ESTROUS EXPRESSION[a] NONE	1ST CYCLE	2ND CYCLE	BOTH CYCLES	1ST CYCLE PERCENTAGE[b]	PERCENTAGE OF TOTAL EWES MATED[c]
Rambouillet	34	35	71	31	48.2	80.1
Dakota Rambouillet						
First Generation	4[d]	52	29	15	69.8	96.0
Second Generation	3	1	3	1	40.0	62.5

[a]Includes those ewes that have medium or heavy breeding marks only.
[b]Total 1st cycle plus both cycle ewes divided by all ewes that mated.
[c]Total ewes mated divided by total ewes. [d]One ewe marked light, and subsequently lambed.

TABLE 5

CONCEPTION CYCLE AND PERCENTAGE OF MATED EWES CONCEIVED FOR RAMBOUILLET AND DAKOTA RAMBOUILLET EWES

EWE TYPE	CONCEPTION CYCLE[a] FAILED	1ST CYCLE	2ND CYCLE	1ST CYCLE PERCENTAGE[b]	CONCEPTION PERCENTAGE[c]
Rambouillet	84	23	60	27.4	74.1
Dakota Rambouillet					
First Generation	3	55	42	55.0	100.0
Second Generation	5	--	3	0.0	60.0

[a]Conception cycle based on actual estrous date or 150 day gestation length (actual mean Rambouillet gestation length = 150.48 days; st. dev. = 2.82; min = 144; max = 165; actual mean Dakota Rambouillet gestation length = 149.8 days; st. dev. = 1.78; min = 145; max = 153).

[b]Number conceived in the 1st cycle divided by the total number of ewes that conceived.

[c]Number of ewes lambing divided by number of ewes mated.

EWE REPRODUCTION AND OFFSPRING PERFORMANCE OF F1 BOOROOLA MERINO X RAMBOUILLET, F1 FINNISH LANDRACE X RAMBOUILLET AND RAMBOUILLET UNDER SEMI-RANGE AND SEMI-CONFINEMENT MANAGEMENT SYSTEMS

1991 Update

K.A. Ringwall, T.C. Faller, P.M. Berg and L.D. Young

INTRODUCTION

Sheep producers that desire to provide a fine-wool product along with maximum pounds of lamb per ewe have not had many options in the past. These producers have utilized Rambouillet or Rambouillet type sheep and have had to rely on selection to increase the reproductive capacity of their flocks. Selection for increased reproduction has been a very slow process, and since the Rambouillet sheep does not provide much variation in reproductive capacity, consistent improvement has been little to none over the years. A new development within the sheep industry has been the importation of the Booroola Merino. The Booroola Merino is a sheep that would not decrease wool quality and offers increased reproductive capacity. By incorporating the Booroola Merino into a fine-wool producer's operation, the producer would have the ability to increase lamb production without hindering wool quality and subsequent income. The objective of this trial is to evaluate ewe production and offspring performance of specific crosses of Booroola Merino, Finnish Landrace, and Rambouillet breeds of sheep under different management systems so that a better understanding of the Booroola Merino sheep can be achieved and properly evaluated for use in North Dakota sheep flocks.

PROCEDURE

Reproductive performance, wool production, and attrition are being evaluated for F1 Booroola Merino x Rambouillet (BxR), F1 Finnish Landrace x Rambouillet (FxR) and Rambouillet (Rambouillet) ewes under confinement versus semi-range management. Crosses to obtain these ewes were made in 1984 and 1985 utilizing a group of Wyoming Rambouillet range ewes and Finnish Landrace or Booroola Merino rams from USDA-Roman L. Hruska U.S. Meat Animal Research Center, Clay Center, Nebraska. The Rambouillet control ewes were purchased from the same source as the ewes utilized in making the F1 crosses. In the falls of 1986 and 1987, a minimum of 36 BxR ewes, 36 FxR ewes, and 36 Rambouillet ewes per year were randomly selected from those lambs born during 1985 and 1986. These ewes were managed similarly until the fall of 1987 when the surviving ewes were assigned to confinement or semi-range management groups. The ewes were either 1 1/2 or 2 1/2 years of age at the start of the trial.

Ewes and lambs are fed by current NRC requirements for sheep with the exception that no increase in nutrition is given at breeding. Confinement lambs are raised under total confinement and go to the feedlot following weaning. Under the semi-range system, lambs are weighed the same time as the confinement group for weaning, but are returned to range for the rest of the summer with their dams. Both groups of ewes are combined from breeding to just prior to lambing and allowed to stubble graze until winter and are then fed under drylot conditions. Starting in mid November, Rambouillet rams have been used during the first 17 days of the breeding season. Suffolk or Columbia rams are used the last 17 days of the breeding season.

In 1989 all ewes were synchronized. Ewes were injected with a combined dose of .5 mg fenprostalene and 200 mg of oxytetracycline at 1:00 pm on November 2. Teaser wethers were placed with all the ewes on November 3 through November 6. The ewes were injected with a combined dose of .5 mg fenprostalene and 200 mg of oxytetracycline at 9:00 am on November 13. Rams were placed with all ewes at the time of the second injection. A random sample (nine ewes) of each breed group within treatment was placed with teaser wethers for AI to a Merino sire (J.C.&S. 50 Like - Western Breeders International) at 9:00 am November 14. The remaining ewes were randomly divided, with 15 head per pen and one Rambouillet ram per pen. At 9:00 am on November 15 all the ewes exposed to natural service were grouped into a multi-sire lot. The AI ewes were returned to the main breeding group November 17. All ewes remained with Rambouillet rams until December 7. Columbia rams replaced the Rambouillet rams on December 7 and the ewes were exposed to these rams until December 21.

RESULTS AND DISCUSSION

Initial ewe numbers, pre-breeding weight and ewe attrition are presented in table 1. The data is complete and currently undergoing statistical analysis. Management system does not have any obvious effects on ewe size at the start of the trial, but confined ewes fed a maintenance ration with no flush lost weight prior to the 1988 breeding and substantially more weight prior to the 1989 breeding season. The outside ewes that had access to fall grazing have maintained or even gained weight prior to breeding. Currently, FxR and Rambouillet ewes are similar in weight and are the heaviest ewe types. BxR are the lightest ewes within each system.

April reproductive performance and subsequent lamb survival are presented in table 2. FxR ewes are also the most fertile in both systems during November breeding, however, BxR ewes are the most prolific. Semi-range ewes appear to have a greater lambing percentage and the difference between semi-range and confinement ewes increased each additional year. The FxR ewes have the greatest first cycle conception in 1987 and 1988. The synchronized breeding in November of 1989 decreased the first cycle conception for all breeds and both systems except for confinement Rambouillet ewes. BxR ewes first cycle conception decreased the most in 1989 and Rambouillet ewes had little change in first cycle conception. The BxR ewes in both systems bummed the most lambs and had a greater lamb death loss. The FxR ewes are weaning the greatest percentage of lambs per ewe lambed. The BxR and Rambouillet ewes are similar in percentage of lambs weaned. The weaning percentage does not include those lambs that were sold as bum lambs at one day of age.

Lamb growth and annual wool weights are presented in table 3. Weaning weights are adjusted to 63 days. Weaning weights are similar between breeds within the confinement system, but more differences seem to be developing between breeds under semi-range. In either situation, the Rambouillet are producing a slightly heavier lamb. As lambs approach 5 months of age, the same trends are evident as were present at weaning time. However, in 1987 the confinement lambs were heavier at five months of age than the range lambs. The opposite was true in 1988 and 1989 when the range lambs outweighed the confinement lambs at five months of age. Lambs from BxR ewes appear to be expressing an early maturing growth pattern in contrast to the Rambouillet lambs. BxR ewes in both systems produced the least pounds of lamb at 5 months of age. Table 4 presents the results of synchronizing the ewes in November 1989. The procedure used was quite successful for the purpose of bringing the ewes in to estrus.

The ewes involved in this trial produced their final lamb crop under the present management system in April, 1990. Conclusions will be made soon based on the data collected. Speculation would indicate that BxR ewes have difficulty competing with larger framed FxR and Rambouillet ewes. Excessive prolificacy of BxR ewes increases the stress these ewes are under and the BxR ewes may require additional inputs and a non-competitive environment to express their full potential. FxR ewes are the most fertile and produced more lambs that grow similarly to Rambouillet lambs, therefore, produce increased total lamb pounds marketed at 5 months of age. Rambouillet ewes indicate the least fertility and prolificacy, so even with similar lamb growth rate of FxR ewes, total lamb marketings are limited.

TABLE 1

INITIAL EWE NUMBERS, EWE SIZE AND ATTRITION RATE OF BOOROOLA MERINO X RAMBOUILLET, FINNISH LANDRACE X RAMBOUILLET AND RAMBOUILLET X RAMBOUILLET EWES BORN DURING 1985 AND 1986 AND MAINTAINED UNDER SEMI-CONFINMENT OR SEMI-RANGE MANAGEMENT

	BOOROOLA MERINO		FINNISH LANDRACE		RAMBOUILLET	
	CONF.	RANGE	CONF.	RANGE	CONF.	RANGE
INITIAL EWE NUMBERS						
1987	31	32	32	34	37	30
1988	28	29	31	31	34	29
1989	25	28	27	25	31	26
1990[a]	24	26	26	25	30	26
PRE-BREEDING WEIGHT (LBS)						
1987	128	126	152	150	140	139
1988	128	139	157	161	153	160
1989	102	138	125	156	121	158
ACCUMULATED EWE ATTRITION (%)						
1987	9.7	9.4	3.1	8.8	8.1	3.3
1988	19.4	12.5	15.6	26.5	16.2	13.3
1989	22.6	18.8	18.8	26.5	18.9	13.3

[a]Ewe numbers at the termination of the project, fall 1990.

TABLE 2

APRIL REPRODUCTIVE PERFORMANCE OF BOOROOLA MERINO X RAMBOUILLET, FINNISH LANDRACE X RAMBOUILLET AND RAMBOUILLET X RAMBOUILLET EWES BORN DURING 1985 AND 1986 AND MAINTAINED UNDER SEMI-CONFINMENT OR SEMI-RANGE MANAGEMENT

	BOOROOLA MERINO		FINNISH LANDRACE		RAMBOUILLET	
	CONF.	RANGE	CONF.	RANGE	CONF.	RANGE
EWES LAMBING (%)						
1987	96.8	84.4	96.9	91.2	81.1	86.7
1988	89.3	93.1	93.5	96.8	85.3	93.1
1989	92.0	82.1	92.6	96.0	96.8	88.5
FIRST CYCLE CONCEPTION (%)[a]						
1987	90.3	71.9	90.6	88.2	62.2	76.7
1988	78.6	82.8	93.5	93.5	64.7	86.2
1989	48.0	42.9	74.1	72.0	71.0	61.5
LAMBS BORN PER EWE LAMBED (%)						
1987	263	274	229	235	160	158
1988	244	263	214	260	148	174
1989	226	287	192	242	150	204
LAMBS BUMMED PER LAMBS BORN (%)						
1987	25.1	21.5	17.0	16.6	1.9	0.0
1988	16.4	16.7	10.7	18.1	0.0	0.0
1989	17.3	10.5	12.5	13.6	0.0	17.2
LAMBS DEAD PER LAMBS BORN (%)						
1987	25.5	35.0	10.0	13.2	25.0	22.2
1988	29.5	25.5	13.6	17.7	25.7	14.9
1989	31.0	33.4	22.9	19.0	18.0	8.3
AVERAGE JULIAN LAMBING DATE						
1987	104	106	105	102	108	103
1988	113	113	111	111	117	113
1989	114	114	109	112	111	111
LAMBS WEANED PER EWE LAMBED (%)						
1987	130	119	168	165	117	123
1988	128	152	162	167	110	148
1989	117	161	124	163	123	152

[a]End of the first cycle calculated on a 150 day gestation length.

TABLE 3

LAMB AND WOOL GROWTH OF BOOROOLA MERINO X RAMBOUILLET, FINNISH LANDRACE X RAMBOUILLET AND RAMBOUILLET X RAMBOUILLET EWES BORN DURING 1985 AND 1986 AND MAINTAINED UNDER SEMI-CONFINMENT OR SEMI-RANGE MANAGEMENT

	BOOROOLA MERINO		FINNISH LANDRACE		RAMBOUILLET	
	CONF.	RANGE	CONF.	RANGE	CONF.	RANGE
AVERAGE 63 DAY WEIGHT (LBS)						
1987	42.7	36.7	40.0	41.3	46.0	40.0
1988	36.9	41.6	40.6	45.3	39.9	50.8
1989	31.6	34.7	37.8	39.3	40.5	41.2
AVERAGE 5 MONTH WEIGHT (LBS)[a]						
1987	64.4	53.2	68.0	60.4	70.9	59.7
1988	70.4	76.5	80.8	82.0	79.7	88.2
1989	60.6	70.2	71.9	78.4	73.3	73.9
FEEDER LAMBS PER EWE EXPOSED (%)						
1987	090.3	100.0	150.0	147.1	081.1	106.7
1988	103.6	127.6	135.5	148.4	079.7	127.6
1989	088.0	110.7	118.5	144.0	122.6	134.6
TOTAL 5 MONTH WEIGHT MARKETED PER EWE EXPOSED (LBS)						
1987	58.2	53.2	102.0	88.8	57.5	63.7
1988	72.9	97.6	109.5	121.7	63.5	112.5
1989	53.3	77.7	85.2	112.9	89.9	99.5
AVERAGE ANNUAL WOOL WEIGHT (LBS)						
1988	11.7	12.9	10.1	10.3	11.3	11.9
1989	9.4	12.3	7.8	9.8	9.4	11.6

[a] Average 5 month weight is adjusted to 129 days.

TABLE 4

ESTROUS RESPONSE TO SYCHRONIZATION WITH FENPROSTALENE

Date	Time	Post injection time (hours)	Number ewes in estrus	Percentage in estrus	Accumulated percentage
Nov 14	3:00 pm	30	0	0.0	0.0
Nov 14	6:00 pm	33	19	11.6	11.6
Nov 15	8:00 am	47	78	47.6	59.2
Nov 15	12:00 pm	51	15	9.1	68.3
Nov 15	6:00 pm	57	15	9.1	77.4
Nov 16	7:00 am	70	16	9.8	87.2
Nov 16	5:00 pm	80	3	2.8	89.0

LOW INPUT CROP-LIVESTOCK PRODUCTION

T.C. Faller and K.A. Ringwall

Hettinger Research Extension Center

Introduction

Many questions have been raised on the feasibility of utilizing crop residue (straw) and/or grain residue (screenings) for sustaining the ewe flock. North Dakota produces ample amounts of both types of residues to warrant further investigation. To improve the economics for the sheep producer, technology must help them increase levels of productivity or reduce expenses per unit of production. The first objective of this investigation will look at reducing expenses per unit of production utilizing crop and grain residues, in turn increasing income from the crop production system by marketing crop residues.

Quality and quantity of manure produced have historically not been evaluated as a component of the total animal production system. There is renewed interest in the utilization of naturally produced forms of fertilizer. The second objective of this investigation is to evaluate quantity and quality of manure produced as a potential component of the crop livestock production system.

Procedure

A flock of ninety western whitefaced two year old ewes was randomly allotted to three treatments with two replications. High Input (HI) diets consisted of alfalfa hay ground and self-fed. Low Input (LI) diets consisted of 50% alfalfa hay ground and 50% wheat straw ground and self-fed. Control (C) diets consisted of ground alfalfa and whole grains fed according to N.R.C. requirements. All diets were supplemented with grain prior to breeding, lambing and during lactation periods. In 1989 wheat screenings was used in lieu of whole grains for LI treatments. All groups were maintained in a controlled environment. Alfalfa was fed as ground dry hay or haylage converted to 90 percent dry matter.

Data collected was normal annual production information including breeding efficiencies. Additional ewe data was collected, routinely evaluating ewe body weights and condition scores. Condition scores were on a 1-5 scale with 1 being emaciated and 5 being obese. All feed and bedding inputs were recorded. Manure weights and quality were recorded. Quality of manure was measured by NIRS analysis and varified by wet lab analysis. Core samples of the manure pack was taken prior to removing and weighing the manure. Routine fecal samples were collected. The ewes were re-randomized between years one and two of the trial. Analysis of variance was used to evaluate the effect of treatment. Least square means were calculated for each variable.

Objectives

The first objective was to determine comparable feeding values of various salvage feedstuffs when compared to traditional sheep feeds. The second objective was to determine replacement fertilizer value of raw manure produced from non-traditional feeding regimes based on salvage feeds harvested. Values for manure quality are to be reported in a separate report.

Results and Discussion

The results from this trial are shown in Tables 1 through 6. Ewe body weights and condition scores are shown in Table 1. Ewe body weights for the HI feeding regime were significantly greater (<.05) than C at breeding and weaning. HI weights were significantly greater than C (<.05) at lambing. Body condition scores were significantly (<.05) greater for HI than C at breeding, lambing or weaning. Body condition would be considered at least adequate for normal production at all stages of production.

TABLE 1

TREATMENT EFFECT ON BODY WEIGHT AND CONDITION SCORE (2 YRS)

	INITIAL		BREEDING		LAMBING		WEANING	
TREATMENT	WT	COND	WT	COND	WT	COND	WT	COND
1 (C)	134.9	2.75	157.8^a	2.96^a	172.8^a	3.10^a	145.3^a	2.52^a
2 (HI)	136.4	2.75	164.9^b	3.19^b	188.5^b	3.67^b	157.5^b	2.83^b
3 (LI)	131.0	2.70	152.2^b	2.82	176.8	3.07	141.0^a	2.43

^{ab} means with different superscript in the same column differ (P<.05) from the control.

Reproductive performance is reported in Table 2. Ewes fed the LI diet lambed significantly (<.05) earlier than those maintained on the C diet. Fertility was significantly lower for those ewes maintained on the LI diet. In both years of the trial, lambs born per ewe lambing was greater for the ewes fed the LI diet but was not significant. HI fed ewes produced more grease wool in each year but the difference was not significant.

TABLE 2

TREATMENT EFFECT ON REPRODUCTIVE PERFORMANCE

TREATMENT	WOOL WT*	LAMBING DATE (JULIAN)	LAMBS BORN PER EWE LAMBING	LAMBS WEANED PER EWE LAMBING	PERCENT EWES LAMBING
1 (C)	8.8	116.4^a	1.55	1.21	93
2 (HI)	9.5	115.9	1.51	1.15	96
3 (LI)	8.7	113.8^b	1.64	1.29	82

* Year two grease fleece weights adjusted to 365 day production.

^{ab}means with different superscript in the same column differ (<.05) from the control.

Table 3 indicates that lamb birth and growth information was quite similar across treatments with no significant differences.

TABLE 3

TREATMENT EFFECT ON LAMB BIRTH WEIGHT AND GROWTH

TREATMENT	BIRTH WT	LAMB ACTUAL WEANING WT	LAMB ADJUSTED WEANING WT
1 (C)	11.8	40.0	38.5
2 (HI)	12.1	41.4	39.0
3 (LI)	11.5	39.7	36.3

Tables 4 through 6 indicate differences in the amounts of feed fed, feed costs and manure production for each year of the trial. Feeds costs as represented in Table 5 are based on the consumption data of Table 4. While neither have been analyzed for significance, there are apparent economic advantages when comparing LI diets to HI and C diets. LI diets indicate the value of straw as a component of sheep rations. Table 6 indicates raw manure production of the different feeding regimes. Gross manure production was lower in all lots for the year 1990 as compared to 1989. Bedding use was similarily lower in 1990 compared to 1989. It is felt that the lower manure production may reflect the combination of lower dry matter intake and reduced bedding use. Less bedding was required due to milder climatic conditions. Upon analysis the manure may similarily be dryer.

The ewe's response to the LI diet and feeding regime when comparing performance to costs warrants further investigation, potential with other salvage feeds such as past harvest corn stalks.

Acknowledgement

The grant provided by the North Central Region LISA Project was very instrumental in accomplishing this research.

Technician support of Dave Pearson and Don Stecher was very important in the accuracy of reporting the data collection in this trial.

TABLE 4

ANNUAL FEED AND BEDDING CONSUMPTION PER EWE

		Rep 1			Rep 2		
		Pen 1	Pen 2	Pen 3	Pen 1	Pen 2	Pen 3
Treatment		(C)	(HI)	(LI)	(C)	(HI)	(LI)
Hay	1989	1563.2	2142.2	1092.5	1565.6	2164.3	1099.8
	1990	1142.1	1534.0	885.1	1147.5	1536.3	854.9
Grain	1989	176.1	176.1	176.1	176.1	176.1	176.1
	1990	197.9	197.9	197.9	197.9	197.9	197.9
Straw Fed	1989	0	0	1007.5	0	0	1015.5
	1990	0	0	879.3	0	0	862.3
Bedding	1989	222.7	220.7	219.2	219.3	237.9	215.5
	1990	160.0	156.6	164.0	158.7	162.6	159.9

TABLE 5

ANNUAL FEED AND BEDDING COSTS* PER EWE

		Rep 1			Rep 2		
		Pen 1	Pen 2	Pen 3	Pen 1	Pen 2	Pen 3
Treatment		(C)	(HI)	(LI)	(C)	(HI)	(LI)
Hay	1989	46.90	64.27	32.78	46.97	64.93	32.99
	1990	34.25	46.02	26.55	38.61	46.09	25.65
Grain	1989	8.14	8.14	3.26[1]	8.14	8.14	3.26[1]
	1990	9.90	9.90	9.90	9.90	9.90	9.90
Straw	1989	0	0	15.11	0	0	15.23
	1990	0	0	13.19	0	0	12.93
Bedding	1989	3.34	3.31	3.29	3.30	3.57	3.23
	1990	2.40	2.35	2.46	2.38	2.44	2.40
1989 Total		58.38	75.82	54.44	58.41	76.64	54.74
1990 Total		46.55	58.29	52.10	50.89	58.43	50.88

*Costs are based on assuming: Hay $60/T, Straw $30/T, Grain $100/T and Wheat Screenings $40/T. 1989 Haylage converted to 90% DM. [1]Screenings were fed in lieu of whole grains in 1989.

TABLE 6

ANNUAL MANURE* PRODUCTION PER EWE

		Rep 1			Rep 2		
		Pen 1	Pen 2	Pen 3	Pen 1	Pen 2	Pen 3
Treatment		(C)	(HI)	(LI)	(C)	(HI)	(LI)
Manure (Lbs.)	1989	2709.7	3049.7	3030.0	2929.3	3240.3	3271.3
	1990	2429.3	2819.0	2821.7	2599.7	2706.3	2596.3

*Represents raw manure production with no correction for moisture content.

*Both bedding use and raw manure production were lower in 1990 than 1989 which may be indicative by differences in winter climate.

SECTION II
MANAGEMENT SECTION

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32ND ANNUAL SHEEP DAY

HETTINGER RESEARCH AND EXTENSION CENTER
HETTINGER, NORTH DAKOTA

FEBRUARY 13, 1991

been improved to 96 percent in 1990. Lambing rate has improved from 142 percent in 1989 to 161 percent in 1990. An increase in lambing percent usually also brings about an increase in lamb mortality. In these flocks the increase in lamb mortality has been held to 3 percent. The combined effect of these changes is to increase the pounds of lamb produced per ewe exposed from 89 pounds in 1989 to over 105 pounds per ewe exposed in 1990. At todays market price of approximately 50 cents per pound this translates into eight dollars of additional income per ewe over production last year.(b)

This project will continue through the winter 1990-91 and the spring 1991 lambing season. Information on production and financial results will be gathered and reported following completion of the project. For more information contact Dan Nudell at the NDSU Research and Extension Center in Hettinger. Phone (701)567-4323.

(a) Dr. Harlan Hughes, NDSU Extension Economist, taken from a Market Advisor
(b) Dan Nudell, Project Coordinator, taken from report to Advisory Committee, August 15, 1989 to August 15, 1990

A SHED MADE FROM STRAW USED FOR A SHEEP SHELTER

MAINTENANCE IN FIRST YEAR

DAN NUDELL

ABSTRACT: In 1989 a shed was constructed of straw walls with a roof made of 2"X4" rafters covered with a plastic tarp. Total usable inside space is 765 square feet. Total cost of the materials was $892.00. Total labor was approximately three man days. Excluding labor charge the cost of the shelter is $1.17 per square foot. Average price of traditional pole construction is approximately $2.50-$3.00 per square foot.

In the fall of 1989 a shed utilizing large square flax straw bales as a major construction component was erected on the south unit of the NDSU Research And Extension Center at Hettinger, N.D. During the winter of 1989-1990 it was used as the sole source of shelter for overwintering approximately 300 ewe lambs.

A summary of weather data for the first year of life of the shed is:

MONTH	MAX TEMP F.DEGREE	MIN TEMP F.DEGREE	MAX WIND SPEED MPH	TOTAL PRECIP INCHES
OCT 89	79	17	34	2.39"
NOV 89	67	-3	36	0.71"
DEC 89	49	-34	28	0.51"
JAN 90	51	-8	39	0.66"
FEB 90	51	-14	29	0.21"
MAR 90	64	1	38	0.27"
APR 90	85	12	33	0.85"
MAY 90	81	23	37	1.45"
JUN 90	98	40	36	3.32"
JUL 90	102	42	27	0.96"
AUG 90	96	47	37	0.92"
SEP 90	97	27	30	0.07"
OCT 90	88	12	33	0.49"

The tarp roof failed on October 3 1990. We observed wear in the tarp starting approximately two months prior to total failure. Wear points at the bottom ends of the rafters and along the ridge pole began to appear. As they increased in size the tarp began to fray and finally failed and was totally destroyed. On October 3 the maximum temperature was 58 degrees F. with a minimum temperature of 37 degrees F. During the day peak wind speed was 28.2 mph.

The tarp roof was replaced with a new tarp. Cost of the tarp was $80.00 plus the cost of shipping. While the tarp is the most visible sign of maintenance needs for the shed it is not the only maintenance problem and certainly not the most expensive part of upkeep.

The sheep continue to aggressively work at the fence in an effort to consume the shed walls. In a mostly unsuccessful attempt to protect the walls several expensive additions to the shed have been added this year. First more steel posts were added to brace the inside snow fence. This was followed with the addition of a double row of 1"X6" boards above the fence. When this proved inadequate sheets of 4'X8' material were added to protect the walls. Both gable ends required new tarps this year. Upkeep costs for the year are:

TARP----------$80.00
POSTS---------$ 6.00
GABLE TARPS--$30.00
1"X6"---------$77.50
4'X8'SHEETS--$80.00
SCREWS--------$ 5.00

Total cost of additional materials was $278.50 plus the expenditure of three days of labor. Not including a labor charge this is an upkeep cost of 36.4 cents per square foot of space or 31 percent of the cost of total building replacement. It is interesting to note that the upkeep labor equalled the total labor spent in the initial construction. Initial cost of the shed was $892. Total cash expenditure in the first two years was $1170.50. A comparable size permanent structure could be erected for an initial cost of $1900 to $2300 with a yearly maintenance cost of $57 to $69 based on a construction cost of $2.50 to $3.00 per square foot and an upkeep cost of three percent of building value.

The shed appears to be headed for an early failure due to the excessive consumption of the walls. At this point it appears that unless the materials for construction can be scavenged from the farm at very low cost and labor for repair is available that yearly upkeep costs will make this structure a very costly alternative to conventional building materials and methods. If we assume a twenty year life for conventional building and use the high end of the price scale for cost a building of this size would cost $2300 and require $69 per year in maintenance for a total cost of $3611 over its life. This is a cost of 180.55 per year of use. If we assume a five year life of the straw building, which may be optimistic in view of the rate of consumption of straw, and then add the first two years cost plus the cost of replacing the tarps only for the next three years we have a total cost of $1530.50. The straw building has a per year cost of $306.10.

SHEARING MANAGEMENT

Timothy C. Faller

Hettinger Research Extension Center

Animal production systems are in a constant state of flux. Producers are always making decisions that eventually effect their profitability. Some decisions such as breed selection and sire selection are of a long term nature. Normal management decisions may have long term effects but in general are thought of as only effecting profitability on an annual basis. Time of shearing is one of those management choices that is made on an annual basis and really only effects profitability in one given year. Producers have already made a decision when they wish to lamb and this decision may effect if they decide to shear prior to or after parturition. The hazard of environmental and climatic change are essential determinates of time of shearing.

The following is a list of considerations for producers when deciding which shearing date might fit them best.

ADVANTAGES

1. Reduced space requirements based on removing the annual wool clip or the provision of needed space for the baby lambs which are soon to arrive. If you shear after lambing you must provide space for the ewe, the wool and the lambs.

2. Warmer and drier lambing facilities are very positive advantages to consider when making shearing time decisions. Wool has a very absorbent characteristic which tends to keep more moisture in the lambing facility when the ewes are in full fleece. Wool is also an excellent insulator which reduces the effect of body heat when the ewes are housed inside in full fleece.

3. It is a well known fact that newborn lambs will find the teat more easily when the udder is bare. If your system requires shearing after lambing then you should shear away all wool from the udder to assist the newborn lamb in finding the teat. You may do this individually as the ewes lamb providing that you are usually present at lambing. If not you should crutch the whole brood ewe flock just prior to the first lamb being born. Crutching does increase variable costs.

4. More ewes will tend to lamb indoors when you allow them to go outside during the day for feeding purposes if they are shorn as opposed to not. Producers may experience a reduced problem with chilled udders when the ewes are shorn and fed outside than when they are crutched and fed outside.

5. A much cleaner wool clip is a major advantage to shearing prior to the onset of lambing. Most wool contamination from the lambing process

comes from bedding techniques, lambing fluids, and normal body fluids associated with parturition.

6. Many times a wool break occurs because of the lambing process. It occurs because of normal fevers and stress associated with lambing. If it does occur it is better to have the break on the outside of the fleece than on the inside.

7. Paint brands will remain more legible when the ewe is branded and in short fleece as opposed to the long staple. Shearing after lambing may set up the incidence of having to rebrand the ewes and again increasing variable costs.

8. A major advantage of shearing prior to lambing is that the producer has an opportunity to evaluate and pick up body condition if the ewes are found to be too thin. The producer may find that only certain individuals are too thin possibly because of age differences or the presence of internal parasites. To use this management tool effectively it would suggest that shearing should occur about thirty days prior to the onset of lambing.

9. The most effective time to treat for external parasites is when the ewe is freshly shorn. The elimination of both internal and external parasites prior to lambing is just one less stress the ewe must contend with at this very important time.

After considering the advantages of shearing prior to lambing producers should not fail to equally weigh the disadvantages which may not be as numerous but may be the limiting factors for his operation.

DISADVANTAGES

1. If the sheep producer has selected a very severe or variable climatic time as his best time to lamb and availability of quality housing is limited the sheep producer may chose to shear after lambing. In a future year the producer might adjust his lambing time to better mesh lambing time with the desire to shear in advance of lambing.

2. Taking the wool off the ewes body when it is cold or inclement increases her energy requirement. This clearly says that a shorn ewe requires more feed during bad weather than a ewe with her wool coat on.

After you weigh the pros and cons of shearing time it would appear that most but not all sheep operations would profit by selecting a shearing date prior to the onset of lambing. The producer that does select to shear prior to lambing is faced with some additional management considerations.

Many producers perform a wide array of management tasks approximately 25-35 days prior to the start of lambing. Shearing, treating for internal and external parasites, vaccinating for entrotoxemia, and trimming hooves are all routine management tasks that fit well together. Actual shearing date selection, lining up quality shearers, providing dry, clean housing, and climatic conditions of the date selected are all factors that will influence success of accomplishing actual shearing on the date selected.

Management associated with harvesting of the sheep producers second crop is a very important factor in determining ultimate profitability of the total sheep enterprise.

HETTINGER BRANCH EXPERIMENT STATION

FLOCK CALENDAR - OUTLINE

The following guidelines are neither inclusive nor intended to fit every sheep operation. Each operation is different, therefore each "calendar of events" should be tailored to each flock's needs.

PRIOR TO BREEDING

1. Bag and mouth ewes and cull those that are not sound.

2. Replace culled ewes with top-end yearlings or ewe lambs.

3. Keep replacement ewe lambs on growing ration.

4. Evaluate sires: use production records.

    a. Be sure they are vigorous, healthy and in good breeding condition.

    b. Rams should be conditioned at least a month before the breeding season. Flush rams in poor condition.

    c. Allow at least two mature rams or four buck lambs per 100 ewes.

5. Flush ewes:

    a. 1 pound grain/day two weeks to five weeks before breeding (usually 17 days).

    b. If ewes are overconditioned, the effect of flushing will be lessened.

6. Vaccinate all ewes for vibriosis and enzootic abortion (EAE) 50 days prior to breeding and booster 21 days later all ewe lambs and new ewes in the flock.

7. Identify all ewes and rams with ear tags, paint brands or tattoos.

BREEDING

1. The ovulation rate of a ewe tends to be lowered at the first part of the breeding season. Vasectomized or teaser rams run with the ewes through the first heat period tend to stimulate them and increase the ovulation rate at the second heat period.

2. Use a ram marking harness or painted brisket to monitor breeding. Soft gun grease with paint pigment mixed in works well for painting the brisket. A color sequence of orange, red and black is recommended with colors being changed every 17 days.

3. Leave rams in NO LONGER than 51 days (35 days is more desirable).

   a. An exception may be with ewe lambs. Allowing them four heat cycles or 68 days may be beneficial.

4. Remove rams from ewes after the season (don't winter rams with ewes).

PRIOR TO LAMBING - EARLY PREGNANCY (First 15 Weeks)

1. Watch general health of ewes. If possible sort off thin ewes and give them 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.

3. An exception to the above is feeding pregnant ewe lambs. They should receive good quality roughages and grain (about 20 percent of the ration) during this period.

LAST SIX WEEKS BEFORE LAMBING

1. Trim hooves and treat for internal parasites.

2. Six to four weeks before lambing feed 1/4 to 1/3 pound grain/ewe/day.

3. Shear ewes before lambing (even up to one to two weeks prior is satisfactory). Keep feeding schedule regular and watch weather conditions immediately after shearing (cold).

4. Vaccinate ewes for enterotoxemia.

5. Control ticks and lice immediately after shearing.

6. Four weeks before lambing increase grain to 1/2 to 3/4 pound/ewe/day (usually done immediately after shearing).

7. Give A-D-E preparations to ewes if pastures and/or roughages are or have been poor quality.

8. Feed selenium-vitamin E or use an injectable product if white muscle is a problem. **Caution!** Don't do both.

9. Check facilities and equipment to be sure everything is ready for lambing.

10. Two weeks before lambing increase grain to 1 pound per ewe per day.

LAMBING

1. Be prepared for the first lambs 142 days after turning the rams in with the ewes, even though the average pregnancy period is 148 days.

2. Watch ewes closely. Extra effort will be repaid with more lambs at

weaning time. Saving lambs involves a 24-hour surveillance. Additional help at this time is money well spent.

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

4. Grain feeding the ewes during the first three days after lambing is not necessary!

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

6. Disinfect lamb's navel with iodine as soon after birth as possible.

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

8. Use additional heat sources (heat lamps, etc.) in cold weather.

9. Brand ewe and lambs with identical number on same sides. Identify lambs with ear tags, tattoos or both.

10. Turn ewe and lambs out of jug as soon as all are doing well (one to three days).

11. Bunch up ewes and lambs in small groups of four to eight ewes and then combine groups until they are a workable size unit.

12. Castrate and dock lambs as soon as they are strong and have a good start (two days to two weeks of age). Use a tetanus toxoid if tetanus has been a problem on the farm (toxoids are not immediate protection. It takes at least 10 days for immunity to build).

13. Vaccinate lambs for soremouth at one to two weeks of age if it has been a problem in the flock.

14. Provide a place for orphaned lambs. Make decision on what lambs to orphan as soon after birth as possible for the best success. Few ewes can successfully nurse more than two lambs.

END OF LAMBING TO WEANING

1. Feed ewes according to number of lambs suckling. Ewes with twins and triplets should receive a higher plane of nutrition.

2. Provide creep feed for lambs (especially those born during the winter and early spring).

3. Vaccinate lambs for overeating at five weeks and seven weeks of age.

WEANING

1. Wean ewes from lambs, not lambs from the ewes. If possible, remove ewes from pen out of sight and sound of lambs. If lambs have to be

moved to new quarters, leave a couple of ewes with them for a few days to lead the lambs to feed and water locations.

2. Lambs should be weaned between 50 and 60 days of age or when they weigh at least 40 pounds and are eating creep and drinking water. The advantage of early weaning is that the ewe's milk production drops off to almost nothing after eight weeks of lactation.

3. Grain should be removed from the ewe's diet at least one week prior to weaning and low quality roughage should be fed. Restriction of hay and water to the ewe following weaning lessens the chance of mastitis to occur. Poorer quality roughage should be fed to the ewes for at least 10 to 14 days following weaning.

4. Handle the ewes as little as possible for about 10 days following weaning. Tight udders bruise easily. If possible, bed the area where the ewes will rest heavily with straw to form a soft bed for the ewes to lay on.

WEANING TO PRE-BREEDING

1. If ewes go to pasture, treat for internal parasites.

2. Feed a maintenance ration to the ewes. Put ewe lambs that lambed back on a growing ration once they have quit milking.

3. Adjust ewe's conditions so they can be effectively flushed for next breeding season. Don't get ewes too fat prior to breeding.

ORPHAN LAMBS - MANAGEMENT IDEAS

1. To buy a good milk replacer it should be 30% fat and at least 24% protein. Good replacers are available but will cost approximately $1.00 per pound and each lamb will require from 15 to 20 pounds.

2. Use good equipment. Self priming nipple and tube assemblies have been found to be excellent for starting orphans. Many types of feeding systems can be homemade.

3. Start on nurser quickly. Young lambs start easier. Check ewe's udder right after she lambs and make the 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 short term

(two weeks) protection use antitoxin. For long term protection use bacterial toxiods (cl. perfringens type C & D).

7. Vaccinate to protect against "white muscle" disease. Use 1 cc of 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 antibody globulins to protect against disease organisms. Cow colostrum milk can be substituted for ewe colostrum milk. It can be kept frozen in 1-4 ounce containers, 2 ounces are ideal.

11. Provide supplemental 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. Do not worry - lambs will make compensating gains later on.

SHEEP BARNS AND EQUIPMENT PLANS

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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.)

CORRALS AND BARNS

Plan No.	Plan Title	Sheets
MW 72050	Pole Utility Buildings	$2.00
MW 72505	Slatted Floor, 40'x72', Feeder Lamb Barn	3.00
MW 72506	240 Ewe and Lambing Barn, 40'x104'	3.00
MW 72507	500 Ewe and Lamb Feeding Barn, 74'x256'	3.00
MW 72508	12' x 16' Portable Lamb Feeding Shed	2.00
MW 72509	40 Ewe and Lambing Barn, 24x32'	2.00
ND Plan	Confinement Sheep Barn & Hay Storage (at Hettinger)	1.00
Reprint #759	Practical Sheep Housing for North Dakota	No Charge
USDA 6096	Shearing Shed & Corral Arrangement	1
USDA 6236	Portable Handling Corral for Sheep (Metal Wood)	1
AE-683	Sheep Barn Layout	No Charge
AED-13	Insulation and Heat Loss	No Charge
AED-19	Slip Resistant Concrete Floors	No Charge
AED-25	Earth Tube Heat Exchange System Planning	No Charge
MWPS-3	Sheep Housing and Equipment Handbook (This 116 page booklet was revised in 1982. It includes barn and layout planning plus plans for fences and sheep equipment.)	6.00
MWPS-9	Designs for Glued Trusses	5.00

FEED HANDLING & FEEDERS

USDA 5917	Fencing, Feeding, and Creep Panels	1
Reprint #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	$ 3.00
MW 73111	36 ft. Wide Clearspan Pole Frame Hay Shed	3.00
MW 73112	48 ft. Wide Clearspan Pole Frame Hay Shed	3.00
MW 73113	32 ft. & 48 ft. Wide Pole Frame Hay Shed (Interior Poles)	3.00
MW 73210	Moveable Grain Storage Walls, 6' to 12' High	2.00
MW 73217	20, 45, 170, and 340 Bu. Hoppered Grain Bins	3.00
MW 73220	48 ft. Wide Pole Frame Grain Storage	2.00
MW 73250	Grain Storage Buildings, 600, 1000, 1200, 15000, or 2000 Bu.	3.00
MW 73293	Grain-Feed Handling Center, Work Tower Across Drive	4.00
MW 73294	Grain-Feed Handling Center, Work Tower Beside Drive	4.00
APA	10 Ton Hoppered Feed Bin	No Charge
APA	4 Compartment Bin for Feed Mill	No Charge
AED-15	Horizontal Bunker Silos, Concrete Tilt-up	No Charge
USDA 6090	5500 Bushel Wooden Grain Bin	2
MWPS-13	Planning Grain-Feed Handling Handbook	5.00