

## TIME OF LAMBING

One of the major decisions a sheep producer must make is to set his lambing date. Many considerations relative to availability of winter feed and summer pasture, seasonal availability of labor and available housing and markets must be made.

This trial was designed to compare the results obtained in terms of monetary return and the costs involved when lambing ewes at various times of the year. Results are to be used as guides to producers when establishing their own management systems.

### EXPERIMENTAL PROCEDURE

Sixty three commercial Columbia ewes were divided equally as to weight and age into three groups. Group I started lambing on February 1. The lambs were creep fed, weaned and placed on the early market as fat lambs. Group II started lambing on March 13. These lambs were not creep fed, but were allowed to graze early crested wheat grass, then alfalfa and then native pastures. At weaning time, they were weighed and priced as feeders and then fed out and sold as fat lambs. Group III started lambing May 1 on grass. These lambs were handled in the same manner as those in Group II. All groups were bred to the same Suffolk rams.

Table 1 Basic Information

Feed Prices

Corn. . . . .	\$ 1.35 per bushel
Oats. . . . .	.60 per bushel
Barley. . . . .	.90 per bushel
Two year old alfalfa hay. . . . .	15.00 per ton
New alfalfa hay . . . . .	18.00 per ton

Pasture Charges

Crested and native pasture. . . . .	\$ 2.50 per A.U.M.
Alfalfa pasture . . . . .	4.00 per A.U.M.

Animal Unit Conversion Rates

5 ewes with lambs = one animal unit or 150 sheep days - one A.U.M.  
 7 dry ewes = one animal unit or 210 sheep days - one A.U.M.

Cost considered constant between all groups

Sires	Shearing
Veterinary	Fencing
Ewe replacement	Salt and mineral
Drenching	

Cost considered constant between February and March lambs

Bedding - Housing - Labor

Selling Costs

Shrink - 6% to St. Paul Market  
 Shrink - 2% to local market  
 Commission and trucking to St. Paul - \$2.00 per head  
 Commission to local market - .50 per head

Fleece

11.0 pound average per ewe @71¢ or	\$ 7.81
Estimated federal subsidy	1.25
	<u>\$ 9.06</u>

TABLE II: Summary of Four Years Data:

		Feb. 1	Mar. 15	May 1
		Group 1	Group 2	Group 3
Number of ewes involved	1963	19	21	19
	1964	19	16	18
	1965	21	21	21
	1966	21	21	21
	Total	80	79	79
Lambs dropped (per cent)	1963	157.9	157.1	126.3
	1964	152.6	131.3	133.3
	1965	142.9	181.0	133.3
	1966	157.1	109.5	133.3
	Average	152.6	144.7	131.6
Lambs weaned (per cent)	1963	131.6	123.8	100.0
	1964	147.4	112.5	122.2
	1965	142.9	161.9	119.5
	1966	142.9	109.5	114.3
	Average	141.2	126.9	114.0
Days of age @ weaning	1963	81.4	138.8	123.7
	1964	93.6	116.3	149.4
	1965	81.5	123.4	131.6
	1966	84.5	131.2	136.9
	Average	85.3	127.4	135.4
Average weaning weight	1963	67.4	81.7	66.5
	1964	64.3	69.7	80.5
	1965	70.8	84.5	62.1
	1966	68.9	89.0	92.7
	Average	67.9	81.2	75.5
Lambs marketed (per cent)	1963	131.6	123.8	94.7
	1964	147.4	112.5	122.2
	1965	138.1	161.9	119.5
	1966	142.9	109.5	114.3
	Average	140.0	126.9	112.7
Days of age @ market	1963	130.9	188.7	232.6
	1964	149.8	193.8	207.9
	1965	143.4	175.2	218.2
	1966	152.0	161.4	156.2
	Average	144.0	179.8	203.7
Average market weight	1963	94.2	103.4	113.8
	1964	93.8	109.3	108.1
	1965	100.4	105.0	104.2
	1966	103.6	100.7	98.9
	Average	98.0	104.6	106.3
Annual Feed Cost per ewe (not including lamb feed)	1963	9.09	9.36	8.58
	1964	11.25	10.89	9.69
	1965	13.77	14.37	12.30
	1966	13.94	12.81	10.13
	Average	\$12.01	\$11.86	\$10.18

TABLE II (cont'd)

		<u>Group 1</u>	<u>Group 2</u>	<u>Group 3</u>
Lamb feed cost per lamb	1963	3.95	2.40	4.54
	1964	4.91	4.29	3.08
	1965	5.84	3.40	6.41
	1966	<u>5.57</u>	<u>1.60</u>	<u>1.01</u>
	Average	\$ 5.07	\$ 2.92	\$ 3.76
Return per ewe over feed cost if lambs sold as feeders	1963		17.20	11.89
	1964		13.41	17.43
	1965		22.55	10.58
	1966		<u>16.51</u>	<u>20.49</u>
	Average		17.42	15.10
Return per ewe over feed cost if lambs sold as fats	1963	20.24	18.06	15.19
	1964	19.61	16.87	19.92
	1965	15.70	23.66	16.00
	1966	<u>16.59</u>	<u>16.84</u>	<u>19.91</u>
	Average	18.04	18.86	17.47

## SUMMARY

After four years of this trial it is apparent that the number of lambs weaned and marketed is the most important factor influencing the relative profits from the three lambing groups.

The February and March lambing groups had a small advantage in return per ewe over feed cost. Return per ewe was not consistent over the four years, however, with differences between years being more important than differences between lots.

Because there is not a clear cut difference in the relative profits of the three lambing groups, other factors, such as availability of shelter and labor, have to be considered when deciding when to lamb.

## ESTRUS CONTROL IN SHEEP

Jim Tilton

Control of reproduction in ewes has been attempted many times and by many different means during the past two decades. Progress in this area was aided by the development of a compound which could be given orally for a limited period of time, then withdrawn. This was followed by a large percentage of the females exhibiting sexual desire. The compound to first undergo extensive study was Provera (6-methyl-17-acetoxypregesterone). It was definitely successful in synchronizing the occurrence of estrus but its use was limited because many were dissatisfied with the fertility levels subsequent to its use.

Another area of interest to the sheepmen was work initiated to stimulate out of season breeding activity. This also has not been successful to the extent desired. Certain breeds do show some response to hormonal stimulation, but those responding are breeds that naturally exhibit a limited amount of estrual activity at times when sheep are considered anestrus, or non-breeders.

### TRIAL I:

Work at Fargo and Hettinger stations in recent years has involved two different compounds, one given orally and one absorbed intravaginally. Work involving melengestrol acetate was initiated both at Fargo and Hettinger and was mentioned at this sheep day two years previous. Melengestrol acetate was developed to control heat in feed-lot heifers, but because less material is needed for estrus control it was decided to study its effectiveness in sheep. The compound was group-fed 14 days at a level of 0.2 mg. per head per day. At Hettinger one group also received a 500 I.U. injection of HCG two days post-treatment to increase the chance of occurrence of ovulation. Results of its initial use are presented in Table 1.

TABLE 1

SYNCHRONIZATION AND FERTILITY RESULTS  
WITH MELENGESTROL ACETATE (MGA)

	Fargo Ewes			Hettinger Ewes	
	Treated	Control	Control	MGA	MGA+HCG
Number	37	37	25	24	25
Mean Interval from Treatment to Estrus	2.6	4.9	8.3	3.0	5.7
Percent Synchronized	78.4	---	--	91.7	76.0
Mean interval from Treatment to Conception	12.3	9.8	8.3	6.0	6.0
First Service Conception Rate (%)	55.9	64.9	100.0	87.5	96.0
Percent Conceived Twenty Days Post-Treatment	88.9	83.8	100.0	87.5	88.0
Percent Open Ewes	11.8	14.7	0	12.5	4.2
Lambing Percent/Ewes Bred	144.0	152.9	164.0	133.3	162.5
Lambing Percent/Ewe Lambing	163.3	179.3	164.0	152.4	169.6
Percent Lambs Weaned Per Ewe Bred	91.2	102.9	144.0	108.3	158.3
Percent Lambs Weaned Per Ewe Lambing	103.3	120.7	144.0	123.8	165.2
Percent Lamb Mortality	36.7	32.7	12.2	15.4	2.6
Ave. Weaning Weight (lb.)	71.8	74.8	73.7	74.6	73.7

Synchronization was good but first service conception was slightly reduced. The Columbia ewes at Hettinger responded to the treatment but differences were not meaningful because of an exceptional group of control ewes. Trends indicated a slight reduction in fertility in all MGA treated groups with an advantage in lambing and weaning percent for the control group. Average weaning weight was similar in all groups.

#### TRIAL II

The following spring MGA was used to study any possible effect it might have on stimulating out-of-season mating. Four breeds of ewes were treated with combinations of 0.2 mg MGA, 500 I.U. of pregnant mares serum (PMS) or 500 I.U. of human chorionic gonadotropin (HCG). Some response was attained in all breeds where MGA was given alone or followed by a PMS injection. None of the other treatments were followed by any noticeable influence on estrus or fertility (Table II).

The Rambouillet and Dorset ewes did respond to treatments imposed in this trial. Of the 36 ewes treated in these two breeds, 20 ewes were observed in estrus. Note should be taken that these figures include 4 of 5 controls in estrus. Lambs weaned per ewe bred were much improved in the Rambouillet and Dorset ewes as compared to the Hampshires and Suffolks. Of the 20 Dorset and Rambouillet ewes exhibiting estrus, 17 lambed. Of the Suffolk and Hampshire ewes in estrus (21) only eight lambed.

Ewes which normally exhibit some expressions of estrus in spring responded slightly to our treatments. The normally anestrous ewes responded to only very limited degree. Another indication of this observation is the response of the control Suffolk and Hampshire ewes in estrus (1 of 10) versus the control Rambouillets and Dorsets (4 of 5).

INFLUENCE OF VARIOUS COMBINATIONS OF  
PROGESTINS AND PLACENTAL GONADOTROPINS  
ON ESTRUAL BEHAVIOR AND LAMBING RESPONSE

TREATMENTS

Breed of Ewe	MGA				PMS				HCG				TOTAL
	MGA	PMS	HCG		MGA	PMS	HCG		MGA	PMS	HCG	D	
<b>Suffolk</b>													
No. Treated	9	8	7	7	7	7	9	9	7	7	5	5	59
No. in Estrus	2	2	2	2	1	1	1	1	3	0	0	0	10
No. Synchronized	1	1	1	1	1	1	1	1	3	0	0	0	7
Percent Synchronized	11.1	12.5	14.3	14.3	14.3	14.3	14.3	14.3	42.9	0	0	0	11.9
<b>No. Lambing</b>													
No. Lambing	1	2	1	1	0	0	0	0	1	0	0	0	5
Percent Lambing	11.1	25.0	14.3	14.3	0.0	0.0	0.0	0.0	14.3	0.0	0.0	0.0	16.9
Lambing Rate/Ewe Bred	50.0	100.0	100.0	100.0	0.0	0.0	0.0	0.0	33.3	0.0	0.0	0.0	70.0
Lambing Rate/Ewe Lambing	200.0	100.0	200.0	200.0	0.0	0.0	0.0	0.0	100.0	0.0	0.0	0.0	140.0
Lambs Weaned/Ewe Bred	50.0	100.0	100.0	100.0	0.0	0.0	0.0	0.0	33.3	0.0	0.0	0.0	60.0
Lambs Weaned/Ewe Lambing	100.0	100.0	200.0	200.0	0.0	0.0	0.0	0.0	100.0	0.0	0.0	0.0	120.0
<b>Hampshire</b>													
No. Treated	12	6	6	6	8	8	8	8	7	6	5	5	58
No. in Estrus	3	2	0	0	1	1	1	1	3	1	1	1	11
No. Synchronized	1	0	0	0	0	0	0	0	0	1	0	0	2
Percent Synchronized	8.3	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	16.7	0.0	0.0	3.4
No. Lambing	1	0	0	0	0	0	0	0	2	0	0	0	3
Percent Lambing	8.3	0.0	0.0	0.0	0.0	0.0	0.0	0.0	28.6	0.0	0.0	0.0	5.2
Lambing Rate/Ewe Bred	50.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	100.0	0.0	0.0	0.0	27.3
Lambing Rate/Ewe Lambing	100.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	100.0	0.0	0.0	0.0	100.0
Lambs Weaned/Ewe Bred	33.3	0.0	0.0	0.0	0.0	0.0	0.0	0.0	66.7	0.0	0.0	0.0	27.3
Lambs Weaned/Ewe Lambing	100.0	0.0	0.0	0.0	00.0	00.0	00.0	00.0	100.0	0.0	0.0	0.0	100.0



Table 2 (continued)

INFLUENCE OF VARIOUS COMBINATIONS OF  
PROGESTINS AND PLACENTAL GONADOTROPINS  
ON ESTRUAL BEHAVIOR AND LAMBING RESPONSE

TREATMENTS

Breed of Ewe	MGA				PMS				HCG				Total
	MGA	PMS	HCG	Total	MGA	PMS	HCG	Total	MGA	PMS	HCG	Total	
<b>Dorset</b>													
No. Treated	2	2	1	5	2	2	2	6	2	2	3	7	15
No. in Estrus	2	0	1	3	1	1	0	2	1	1	2	4	8
No. Synchronized	1	0	1	2	0	0	0	0	0	0	-	0	2
Percent Synchronized	50.0	0.0	100.0	50.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	13.3
<b>No. Lambing</b>													
No. Lambing	1	0	1	2	1	1	0	2	1	1	0	2	5
Percent Lambing	50.0	0	100.0	50.0	50.0	50.0	0	50.0	50.0	50.0	0	50.0	33.3
Lambing Rate/Ewe Bred	100.0	0.0	100.0	100.0	100.0	100.0	0.0	100.0	100.0	100.0	0.0	100.0	87.5
Lambing Rate/Ewe Lambing	200.0	0.0	100.0	100.0	100.0	100.0	0.0	100.0	100.0	100.0	0.0	100.0	140.0
Lambs Weaned/Ewe Bred	100.0	0.0	100.0	100.0	100.0	100.0	0.0	100.0	100.0	100.0	0.0	100.0	75.0
Lambs Weaned/Ewe Lambing	200.0	0.0	100.0	100.0	100.0	100.0	0.0	100.0	100.0	100.0	0.0	100.0	120.0
<b>Rambouillet</b>													
No. Treated	3	3	3	9	3	3	3	9	2	2	2	6	21
No. in Estrus	3	2	1	6	1	1	0	2	0	1	2	3	12
No. Synchronized	1	2	1	4	0	2	0	2	0	0	-	0	4
Percent Synchronized	33.3	66.7	33.3	44.4	0.0	66.7	0.0	22.2	0.0	0.0	0.0	0.0	19.0
<b>No. Lambing</b>													
No. Lambing	3	3	1	7	1	3	1	5	1	1	2	4	12
Percent Lambing	100.0	100.0	33.3	77.8	33.3	33.3	33.3	33.3	50.0	50.0	100.0	100.0	57.1
Lambing Rate/Ewe Bred	166.7	166.7	200.0	166.7	200.0	200.0	200.0	200.0	200.0	200.0	200.0	200.0	175.0
Lambing Rate/Ewe Lambed	166.7	166.7	200.0	166.7	200.0	200.0	200.0	200.0	200.0	200.0	200.0	200.0	175.0
Lambs Weaned/Ewe Bred	166.7	133.3	200.0	166.7	133.3	200.0	166.7	166.7	100.0	100.0	0.0	33.3	116.7
Lambs Weaned/Ewe Lambed	166.7	133.3	200.0	166.7	133.3	200.0	166.7	166.7	100.0	100.0	0.0	33.3	116.7

### TRIAL III

Results obtained with MGA were not different enough from Provera to continue work with that compound. It was therefore decided to shift our efforts to another material called cronolone. The mode of administration of this compound was quite different and found to be more desirable. The compound was impregnated in a sponge which was inserted about 3-5 inches into the vagina. The material was slowly absorbed through the walls of the vagina and thus inhibited the occurrence of estrus. The sponge was left in place approximately 12 days and then removed. The ewes then began coming in estrus and mating occurred.

Vaginal pessaries were first used in a group of ewes to test their effectiveness in controlling estrus during treatment, ease of insertion and removal, degree of synchronization, and fertility of the ewes after insertion.

Results of this pilot trial are presented in Table III. Synchronization in the three breeds of ewes used was excellent. The interval from treatment to occurrence of estrus was short and first service conception in the Hampshire and Cheviot ewes was very good. Apparently there were ram fertility problems in the two Suffolk lots. Nearly 40 percent of these ewes were open at the end of the breeding season. Lambing percents were excellent with high lamb mortality in the Hampshire a major factor reducing percent lambs weaned per ewe bred or lambing.

Results of this trial would indicate excellent synchronization with good fertility and lambing production data following use of vaginal pessaries to control mating activity. These pessaries were used, however, when breeding activity would be expected to be maximal.

TABLE III  
 REPRODUCTIVE RESPONSE IN EWES  
 TREATED 12 DAYS WITH VAGINAL PESSARIES

Criteria	Breed of Ewe		
	Hampshire	Suffolk	Cheviot
No. Treated	32	35	9
No. Synchronized	31	34	9
Percent Synchronized	96.9	97.1	100.0
Mean Interval from Trt. to Estrus (days)	3.7	2.6	2.6
First Service Conception Rate (%)	76.0	34.5	88.9
Percent Conceived			
Twenty Days Post-trt. Percent Open Ewes	88.0	62.1	100.0
Percent Open Ewes	12.0	37.9	0.0
Lambing Percent/ Ewe Bred	152.0	93.1	162.5
Lambing Percent/ Ewe Lambing	172.7	150.0	162.5
Percent Lambs Weaned/ Ewe Bred	96.0	86.2	150.0
Percent Lambs Weaned/ Ewe Lambing	109.1	138.9	150.0
Percent Lamb Mortality	40.0	7.4	8.7
Ave. Weaning Wt. (lb.)	80.0	80.1	69.7

#### TRIAL IV

Vaginal pessaries and PMS were used alone or in combination to study any possible stimulatory influence they might have on out-of-season reproductive behavior. Again four breeds were used. The pessaries were inserted for 12 days and then removed. Immediately following removal the PMS (1000 I.U.) was given to approximately half of the ewes that had a pessary and half to the control ewes.

Mating to fertile rams began in May. Some synchronization of estrus was observed in all breeds especially where pessaries alone or with PMS were administered. The ewes that did respond were observed to exhibit estrus once; however; initiation of further cycles did not occur. Therefore, if conception did not occur at this first mating, no lambs were produced. Of the ewes receiving the pessary, 46 of 82 were observed in estrus. However, only 19 of these later produced a lamb. In the control ewes or those not having the pessary, 21 of 77 were in estrus and 11 subsequently lambed.

The use of PMS was of some value in increasing the percent lambing in the ewes treated with pessaries but not in the control ewes. It also increased lambing rate both in the pessary and control treated groups.

TABLE IV

SYNCHRONIZATION AND FERTILITY WITH VAGINAL  
PESSARIES IN A FALL LAMBING PROGRAM

Breed of Sheep	No.	No in Estrus	Int. from trt. to Estrus	Percent Synchronized	Percent Lambing	Lambing Rate
<b>Suffolk</b>						
P	18	12	3.8	66.7	11.1	100.0
P+PMS	17	8	3.9	47.1	23.5	100.0
C	15	3	9.0	-----	0.0	0.0
C+PMS	19	7	5.3	-----	0.0	0.0
<b>Hampshire</b>						
P	14	6	4.3	42.9	7.1	100.0
P+PMS	18	8	4.5	47.1	23.5	175.0
C	13	2	5.5	-----	15.4	100.0
C+PMS	15	3	7.7	-----	13.3	150.0
<b>Rambouillet</b>						
P	3	1	2.0	33.3	0.0	0.0
P+PMS	4	4	6.8	100.0	75.0	166.7
C	3	3	11.0	-----	100.0	133.3
C+PMS	5	2	4.0	-----	20.0	200.0
<b>Dorset</b>						
P	4	3	4.0	75.0	50.0	150.0
P+PMS	4	4	2.5	75.0	75.0	100.0
C	4	0	0	-----	50.0	100.0
C+PMS	3	1	6.0	-----	33.3	100.0
<b>Overall</b>						
	159	67	5.4	-----	18.9	130.0
P	39	22	3.5	56.4	12.8	120.0
P+PMS	43	24	4.4	55.8	32.6	135.7
C	35	8	8.5	-----	20.0	114.3
C+PMS	42	13	5.8	-----	9.5	150.0

a Pessarys removed May, 1968

Project: N D 3719

TITLE: Field Evaluation of a Repellant to Reduce Coyote  
Predation in Sheep

OBJECTIVES:

1. To test the effect of dynamic aldehyde on coyote predation of sheep
2. To test the effect of a collared repellant on lamb growth.
3. To test the lifespan of collars - when applied to sheep.

METHODS:

Collars containing dynamic aldehyde were put on 610 lambs and 609 lambs without collars were utilized on control animals at five ranches. The five ranches involved were in distinctly different topographical locations. Twenty-five each of the treatment and control lambs were randomly selected, weighed, and marked for identification at each ranch. Information concerning the numbers of lambs born and death causes prior beginning the project was obtained from each ranch site. Regular weekly visits were made to each ranch for observation. When losses occurred at any site trained personnel went to that site and determined the cause of death. Information concerning and pictures were obtained as each loss occurred.

TABLE I

Effect of Collars on Weight Test Lambs (5 ranches)

	Collared Lambs	Non-Collared
Initial Number	125	125
Lambs Lost to Coyotes	2	8
Lambs Lost to Coyotes %	1.6	61.4
Lambs Lost to Other Causes	13	16
Lambs Lost to Other Causes %	10.4	12.8
Total Lambs Lost	15	24
Total Lambs Lost %	12.0	19.2
Average Daily Gain (lbs.)	.3260	.3269

TABLE II  
Ranch Differences on Weight Test Lambs

	Ranch 1	Ranch 2	Ranch 3	Ranch 4	Ranch 5
Initial No.	50	50	50	50	50
Lambs Lost to Coyotes	6	4	0	0	0
Lambs Lost to Coyotes %	12.0	8.0	0	0	0
Lambs Lost to Other Causes	9	12	6	0	0
Lambs Lost to Other Causes %	18.0	24.0	12.0	0	4.0
Total Lambs Lost	15	16	6	0	2
Average Daily Gain (lbs.)	.254	.3235	.386	.438	.2322

TABLE III  
Total Lamb Losses

	Ranch 1	Ranch 2	Ranch 3	Ranch 4	Ranch 5
Breeding Ewes	50	330	275	90	225
Lambs Born	142	480	325	95	340
Lambing Percnet	94.6	145.5	118.2	105.6	151.1
Lambs Lost in Lambing Season	6	48	13	15	81 <sup>1</sup>
Lambs at Beginning of Test Period	136	432	312	80	259
Lambs Lost to Coyotes	15	61	1	0	0
Lambs Lost to Other Cause <sup>2</sup>	17	43	26	0	15

1. A large number of lambs ( $\frac{1}{2}$ ) were bumed and sold (triplets)
2. Some may have been due to coyotes but could not be verified.

TABLE IV  
Causes of all Lamb Losses (5 Ranches)

Death Cause	Number	Percent
Stillborn lambs	45	15.05
Poisonous Plants	1	.33
Coyote Predation	77	25.75
Entrotoxemia	26	8.70
Starvation	44	14.72
Unknown Causes	106	35.45
Total	299	100.00

TABLE V  
Effect of Collaring Lambs with Cynamic Aldehyde on Coyote Predation

Death Cause	Collared	Non-Collared
Poisonous Plants	0	1
Coyote Predation	27	50
Entrotoxemia	11	12
Unknown Causes	36	41
Total	74	104

SUMMARY:

The following information is offered concerning comparisons from field tests of a collared repellent. The use of collars on lambs had no effect on gains of lambs. Of the lambs selected for the weight test 1.6% of the collared lambs were lost to coyote predations as opposed to 6.4% of the non-collared lambs. 8.2% of the total non-collared lambs were lost to coyote predation as compared to 4.4% of the collared lambs. 43.3% of the lambs lost during the test period were lost to coyote predation. 25.8% of all losses including those prior to the test period were lost to verified coyote predation. Five percent of the total lambs born on the five ranches involved were lost to coyote predation. The losses of lambs to coyote predation may or may not have been greater, as some of the lambs lost for unknown causes could have been the result of coyote predation.

CONCLUSION:

It was found that a significant number of all lambs born were lost to coyotes and collared cynamic aldehyde did decrease the loss. It should be noted that more lambs were lost to other causes than were lost to coyote predation.



SECTION II

Reports of  
Research in Progress

at the  
Hettinger Experiment Station

Presented by  
Timothy C. Faller  
Superintendent

at the  
17th Annual Sheep Day

Hettinger Experiment Station  
Hettinger, North Dakota

February 11, 1976



PROJECT: H-7-36

TITLE: Nutrient Requirements for Confined Ewes

PERSONNEL: M. R. Light, J. E. Tilton, D. O. Erickson and W.E. Dinnusson

OBJECTIVES:

To determine the effect of type of mineral mixtures, vitamin E, pasture and dry lot on ewe productivity.

PROCEDURE:

Approximately two hundred purebred Suffolk, Hampshire, Columbia Rambouillet, North Country Cheviots and Border Leicester ewes were assigned by breed and age to salt-mineral mixtures I and II. Salt mineral mixture I was composed of two parts white iodized salt plus one part dicalcium phosphate. Mineral II was Mortons 8.4 salt mineral mixture. Each salt mineral mixture group was sub-divided into four vitamin treatments groups. Group 1 was the control. Group 2 was the vitamin E group. Group 3 was the selenium group and group 4 was the vitamin E plus selenium group. Ewes that were to receive additional vitamins or selenium were injected once monthly commencing in June until they had lambed. All experimental ewes were maintained on native blue grass pastures or rape pastures until two weeks prior to breeding when they were confined to dry lot and fed alfalfa haylage or a haylage-corn-silage mixture. All ewes were supplemented with 1 pound of oats daily during the mating season.

The results of the 1975 experiment are given in tables 1-4.

Table 1  
EFFECT OF VITAMIN E AND SELENIUM WITH MINERAL I ON EWE REPRODUCTION

	Control	Vitamin E	SE	SE+E
No. ewes assigned	26	23	24	26
No. ewes lambing	23	20	21	24
% dry ewes	11.5	13.0	12.5	7.7
No. lambs born	39	31	37	42
No., lambs alive	37	29	32	36
% born ewes/assigned	150.0	134.8	154.2	161.5
% born/ewe lambing	169.6	155.0	176.2	175.0
% survival	94.9	93.6	86.5	85.7

Table 2  
EFFECT OF VITAMIN E AND SELENIUM WITH MINERAL II ON EWE REPRODUCTION

	Control	Vitamin E	SE	SE+E
No. ewes assigned	24	25	25	22
No. ewes lambing	22	22	21	19
% dry ewes	8.3	12.0	16.0	13.6
No. lambs born	34	35	34	28
No. lambs alive	32	32	31	24
% born/ewe assigned	141.7	140.0	136.0	127.3
% born/ewe lambing	154.6	159.1	161.9	147.4
% survival	94.1	91.4	91.2	85.7

Table 3  
COMBINED RESULTS - EFFECT OF VITAMIN E AND SELENIUM ON EWE REPRODUCTION

	Control	Vitamin E	SE	SE+E
No. ewes assigned	50	48	49	48
No. ewes lambing	45	42	42	43
% dry ewes	20.0	12.5	14.3	10.4
No. lambs born	73	66	71	70
No. lambs alive	69	61	63	60
% lambs/ewe assigned	146.0	137.5	144.9	145.8
% lambs/ewe lambing	162.2	157.1	169.1	162.8
% lamb survival	94.5	92.4	88.7	85.7

Table 4  
EFFECT OF MINERAL SUPPLEMENTATION ON EWE PRODUCTIVITY

	Mineral I	Mineral II
No. ewes assigned	99	96
No. ewes lambing	90	84
% dry ewes	9.1	12.5
No. lambs born	149	131
No. lambs alive	134	119
% lambs/ewe assigned	150.5	136.5
% lambs/ewe lambing	165.6	155.9
% lamb survival	89.9	90.8

There was no effect on lambing rate or lamb survival because of supplemental vitamin E, selenium or selenium plus vitamin E except that there was a lowered twinning rate and lamb survival where vitamin E and selenium was administered to ewes supplemented with mineral II.

The fertility of ewes supplemented with Mortons 8.4 mineral mixture has been lower than that of ewes provided with iodized salt and dicalcium phosphate in each of the years that this project has been in effect.

PROJECT: H-7-056

TITLE: Border Leicester and Finn Crossbred Ewe Evaluations Under  
Two Environments

PERSONNEL: M.R. Light, D.O. Erickson, J.E. Tilton, M. J. Marchello and  
T. C. Faller

OBJECTIVES:

To evaluate crossbred ewe productivity under western North Dakota conditions and under conditions in eastern North Dakota.

PROCEDURE:

Fifty-six Border Leicester and fifty-six Finn sired ewe lambs were purchased in July of 1973. All ewe lambs originated from the same South Dakota flock. One half of each cross was randomly assigned to the Hettinger Experiment Station at Hettinger and to the Main Station at Fargo. Ewe lambs assigned to Hettinger were grown on grass pastures following purchase. Ewe lambs assigned to Fargo were grown through their yearling year on alfalfa hay and two pounds of oats daily from July through February.

ABSTRACT OF THE PAST YEARS EXPERIMENTATION: (MAIN STATION)

Experimental ewes were handled as one group. They were flushed on rape pastures for six weeks prior to mating to Hampshire and Suffolk rams in dry lot. Lambing commenced April 1, 1975. Lambs were weighed at birth and 28 days after which ewes and lambs were placed on June grass and brome pastures. Following weaning, all lambs were placed on finishing rations of corn, SBOM and oats plus alfalfa in dry lot. Sample lambs from each group were slaughtered as they attained weights of 100 to 105 pounds, and carcass data recorded.

ABSTRACT OF THE PAST YEARS EXPERIMENTATION (HETTINGER)

Experimental ewes were handled as one group. They were flushed on alfalfa pasture and mated to Hampshire and Suffolk rams in drylot. Lambing commenced March 20, 1975. Lambs were weighed at 28 days and weaned at approximately 55 days after which they went directly to finishing rations of corn, oats, barley, SBOM and alfalfa in drylot. Sample lambs were from each group and were slaughtered as they attained weights of 100 to 105 pounds and slaughter data recorded. Ewe and lamb performance is presented in Table 1.

Table 1

EWE AND LAMB PERFORMANCE  
(Both Stations)

	Border Leicester Cross		Finn Cross	
	Fargo	Hettinger	Fargo	Hettinger
No. ewes mated	24	25	23	27
No. ewes lambled	24	23	23	26
Wt. at breeding 1975	156 lb.	138.5 lb.	133. lb.	115.9 lb.
No. lambs born	48	35	53	48
No. lambs weaned	46	31	48	42
% lambs born	200.0	140.0	230.0	177.8
% lambs weaned	192.0	124.0	209.0	155.6
Avg. lamb birth wt.	10.89 lb.	10.77 lb.	8.35 lb.	8.23 lb.
Avg. lamb 28 day wt.	24.1 lb.	23.4 lb.	18.7 lb.	18.7 lb.
Avg. lamb weaning wt.	59.6 lb.	42.32 lb.	50.4 lb.	31.85 lb.
	2742.9	1312.0	2722.0	1338.0
Total lbs. lamb weaned/ group	114.3		118.3	
Lbs. lamb weaned/ewe		52.48		49.6
Age @ weaning (days)		57.1		53.2

The performance of the Fargo group has been outstanding by any criteria. Death loss from birth to weaning ranged from 4.4% for lambs from the Border Leicester ewes to 10.9% for the Finn cross ewes. These results indicate both the high level of management and also the value of three way crosses in the production of market lambs.

The performance of the Hettinger group was excellent. 69.2% of the Border Leicester cross ewes and 62.9% of the Finn cross ewes lambled as ewe lambs. Lambing as ewe lambs may have affected performance of the same ewes for the 1975 lambing period. Death loss from birth to weaning ranged from 11.4 for lambs from the Border Leicester cross ewes to 12.5 for the Finn cross ewes.

WORK PLANNED FOR NEXT YEAR:

All ewes were mated to Hampshire and Suffolk rams in 1975. Data will be collected and accumulated on all groups of commercial ewes.





SECTION III

Reports of  
Sheep Research in Progress

At the  
Main Station, Fargo, N. D.

Presented by  
Merle R. Light

at the  
17th Annual Sheep Day

Hettinger Experiment Station  
Hettinger, North Dakota

February 11, 1976



RELATIVE RESPONSE OF SELECTION PRESSURE APPLIED TO THE EWE FLOCK  
(A Progress Report)

Important to every sheep operation is the selection of the replacement ewes. Many factors of importance should be considered such as: production, soundness, type, etc.

Experimental Objectives

In 1966 an experiment was initiated to determine the rate of change in production of wool and the production of lamb at 120 days when these factors are selected as single traits and the pressure is applied to the ewe flock only.

Experimental Procedure

The Hettinger Station purebred flock of 90 Columbia ewes were lotted on the basis of weight and age into three groups of 30 ewes each. Three registered rams are to be used each year. Each ram to be exposed to ten ewes from each lot in order to distribute the influence of sires equally across groups.

Culling of ewes will be conducted each fall on the following basis:

1. Age
2. Mechanical (ill health, spoiled udder, etc.)
3. Flock A. Low lamb production  
Flock B. General type (visual selection)  
Flock C. Low Wool production

Each year, 8 ewes will be selected and replaced into the group on the following basis:

- Flock A - 1. Yearling ewes born as twins with preference to those from ewes with the greatest corrected lamb production at 120 days.
2. Replacement yearlings must be physically sound.
- Flock B - 1. Ewe lambs showing most desirable Columbia breed type as suggested by the Columbia Sheep Breeders Association.

Flock C - 1. Yearling ewes with heaviest fleeces at first shearing.

2. Replacement yearlings must be physically sound.

Results:

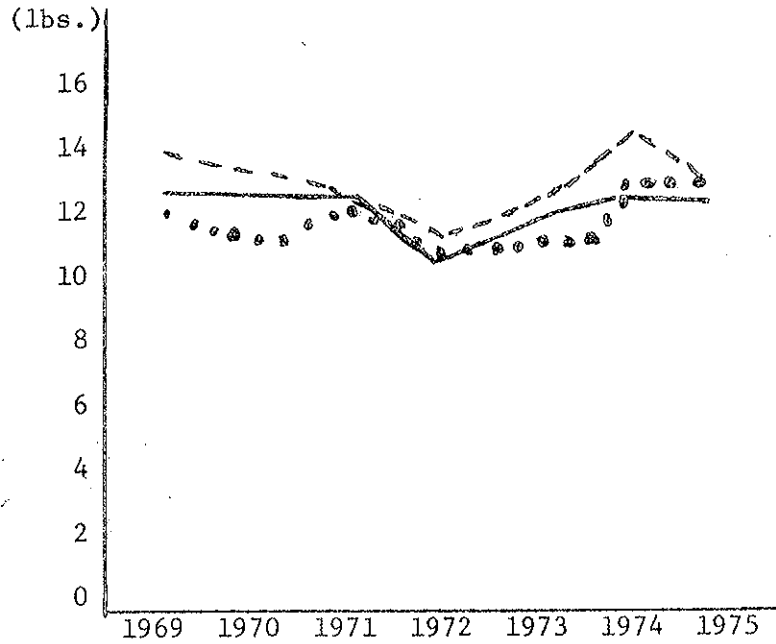
Yearly comparisons of productive performance are presented on Chart I, and Graph I which shows the comparisons of the three groups on the basis of the two traits selected for.

This report is offered as a progress report, no attempt has been made to test the data for significance or to make recommendations on the basis of data collected.

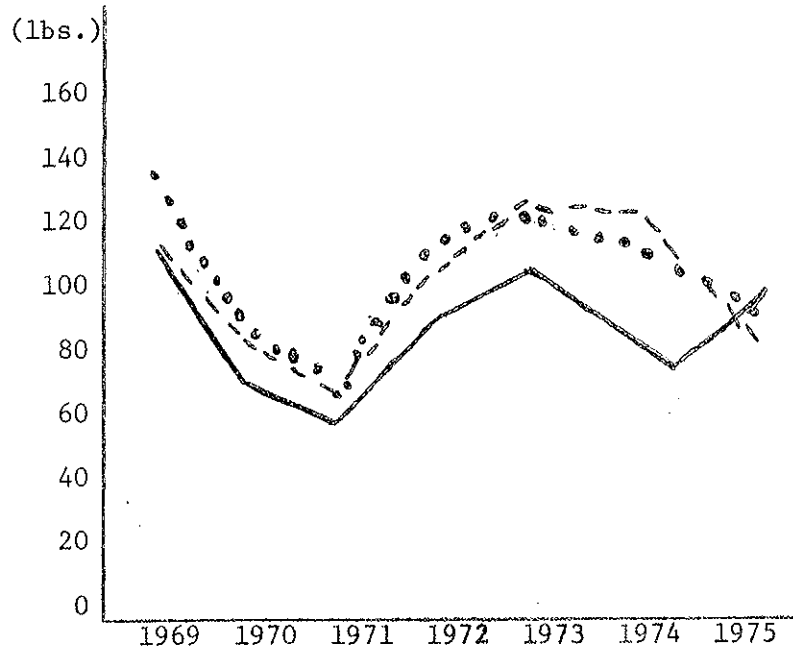
PRODUCTION OF YEARLING EWE REPLACEMENTS

	1969	1970	1971	1972	1973	1974	1975
Percent Lambs Dropped							
Lot 1	146.7	75.0	112.5	150.	150.0	87.5	100.0
Lot 2	140.0	100.0	125.0	162.5	162.5	137.5	100.0
Lot 3	125.0	112.5	87.5	150.0	150.0	150.0	100.0
Percent Lambs Weaned							
Lot 1	126.7	75.0	75.0	112.5	112.5	62.5	100.0
Lot 2	140.0	100.0	75.0	150.0	150.0	112.5	100.0
Lot 3	125.0	87.5	75.0	137.5	150.0	150	87.5
Pounds of Lamb @120 Days							
Lot 1	114.5	60.7	56.1	82.5	105.1	65.9	93.7
Lot 2	124.6	83.9	62.9	110.8	119.1	100.3	91.9
Lot 3	113.9	64.5	60.5	105.8	120.1	119.0	82.1
Grease Fleece Wt.							
Lot 1	13.4	12.6	12.8	10.8	12.3	12.9	12.3
Lot 2	12.7	11.7	13.0	11.2	11.5	13.4	13.6
Lot 3	13.8	11.3	13.0	11.6	12.8	15.1	13.3

Lot 1. Lamb Production \_\_\_\_\_  
 Lot 2. Visual . . . . .  
 Lot 3. Wool Production -----



Pounds Wool Production

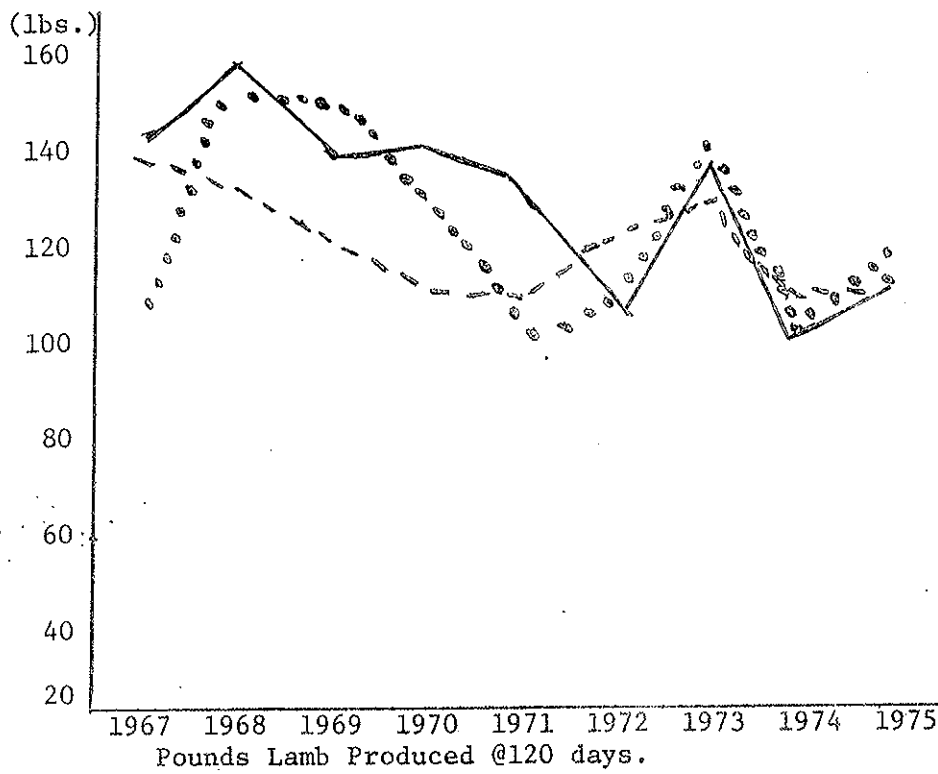
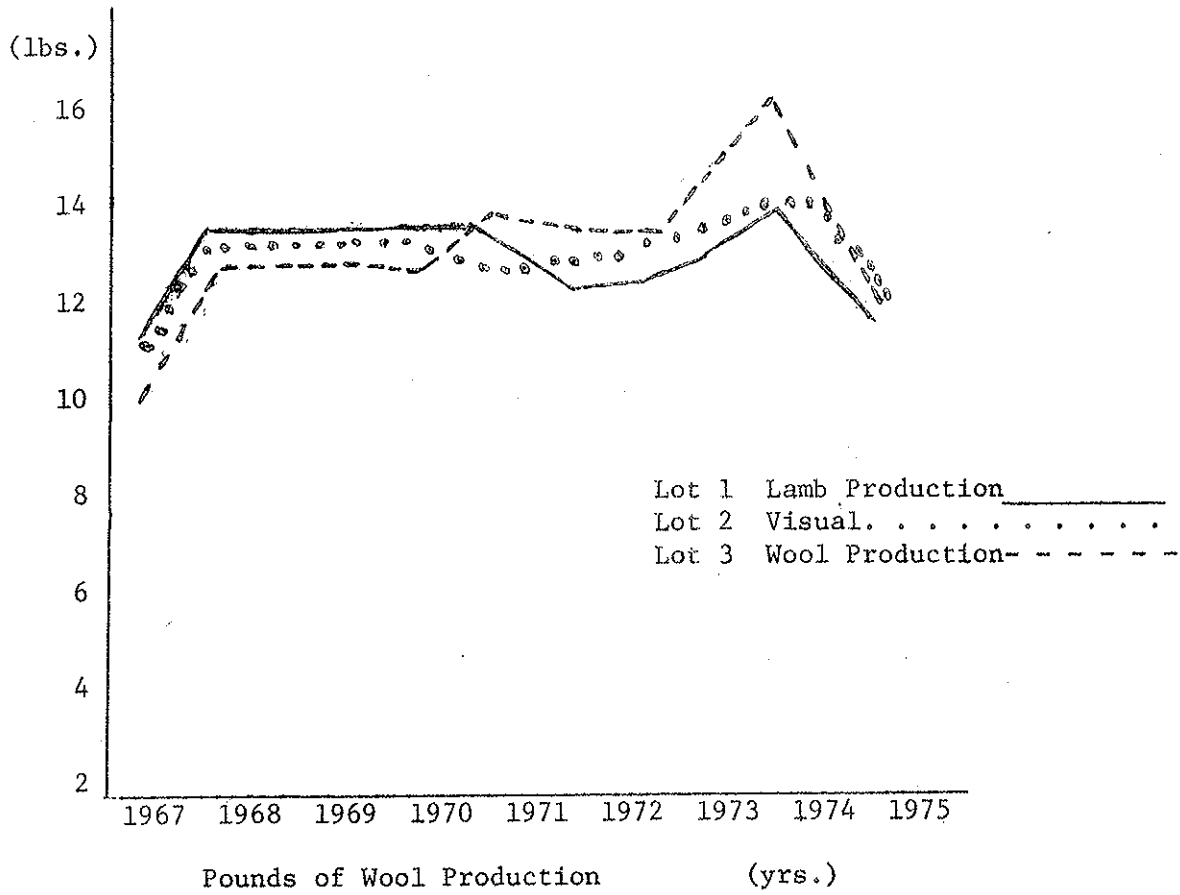


Pounds Lamb Produced @120 Days

SUMMARY OF "MEANS OF DATA"

	Lot 1. Lamb Prod 1969-74 Average Prod.	1975 Prod.	Lot 2. Visual 1969-74 Average Prod.	1975 Prod.	Lot 3 Wool Prod'n 1969-74 Average Prod.	1975 Prod.
Ewes Exposed	30	30	30	30	30	30
Age @ Breeding	2.73	2.6	2.77	2.5	2.67	2.5
Initial Wt. (lbs.)	157.6	149.9	158.9	155.6	156.05	151.4
Gain During Breeding	1.03	3.0	1.62	4.9	1.5	2.6
Gain Breeding to Lambing	22.52	19.7	21.3	16.1	20.87	15.1
Ewes Lambing	28.2	28.0	27.1	30.0	27.3	27.0
% Lambs Dropped						
Per Ewe Exposed	161.8	140.0	155.3	140.0	152.2	140.0
% Lambs Weaned						
Per Ewe Exposed	137.1	116.7	128.2	130.0	130.65	116.7
Corrected pound of lamb/ewe @120 day.	112.6	108.0	106.1	117.0	106.97	107.5
Grease Fleece Wt.	12.82	11.2	12.59	11.9	12.99	11.8
Lamb Birth Wt.	10.8	11.5	10.62	11.8	10.65	10.8
Uncorrected Weaning Wt.	70.97	44.2	70.53	43.6	71.25	44.1
Corrected Weaning Wt	82.93	92.6	82.2	92.3	81.33	92.1
Age in days @ weaning	111.77	58.6	111.38	57.9	113.13	59.1
Birth Type of Dams @lotting						
% Singles	5.93	0	23.90	20	27.5	23.3
% Twins	83.65	80.0	74.08	80	69.3	73.3
% Triplets	10.22	20.0	2.0	0	3.2	3.3

TOTAL EWE FLOCK  
PRODUCTION





	Sire No. 1	Sire No. 2	Sire No. 3
Sire Records - 1967	Marshall	NDSU #1	Archibald
Ewes Exposed	29	30	30
% Lambs Dropped	151.7	166.7	166.7
% Lambs Weaned	134.5	143.3	140.0
Sire Records - 1968	Marshall	NDSU #1	E. Ehlers
Ewes Exposed	30	30	30
% Lambs Dropped	163.3	150.0	140.0
% Lambs Weaned	150.0	143.0	136.7
Sire Records - 1969	J. Ehlers	NDSU #2	E. Ehlers
Ewes Exposed	30	30	30
% Lambs Dropped	143.3	150.0	150.0
% Lambs Weaned	130.0	143.0	140.0
Sire Records - 1970	Osborne	NDSU #2 <sup>1</sup>	E. Ehlers
Ewes Exposed	30	30	30
% Lambs Dropped	163.3	76.7	166.7
% Lambs Weaned	140.0	66.7	153.3
Sire Records - 1971	Osborne	Shown #1	Shown #2
Ewes Exposed	30	30	30
% Lambs Dropped	160.0	153.3	173.3
% Lambs Weaned	140.0	123.3	150.0
Sire Records - 1972	Hall	Shown #1	Shown #2
Ewes Exposed	29	30	30
% Lambs Dropped	162.1	190.0	166.7
% Lambs Weaned	144.8	140.0	130.0
Sire Records - 1973	Hall	Shown #3	H E S #1
Ewes Exposed	30	30	30
% Lambs Dropped	166.7	163.3	182.8
% Lambs Weaned	140.0	156.7	165.5
Sire Records - 1974 <sup>2</sup>	H E S #2	Shown #3	H E S #1
Ewes Exposed	30	30	30
% Lambs Dropped	140.0	150.0	120.0
% Lambs Weaned	116.7	130.0	96.7
Sire Records - 1975	H E S #2	Burchill #1	Larsen
Ewes Exposed	30	30	30
% Lambs Dropped	136.7	123.3	156.6
% Lambs Weaned	120.0	110.0	143.3

1. Ram went sterile during breeding season

2. Lower Percentages due to Mycotic Abortion

## SUMMARY

The selection project is a long duration project to evaluate the productive improvements that can be made through selection of dams based on single traits.

Severe yearly variations due to: climate, feed, management, etc., may indicate that no improvement is being accomplished, however, it will take 3-4 complete flock turnovers to accomplish significant improvement to establish heritability estimates.

At this time one complete turnover has been made and the three groups are just past the mid-point of the second turnover. It may be necessary to make more rapid replacement to speed up turnover rate.

PRODUCTIVITY OF SELECTED SHEEP BREEDS AND CROSSES  
UNDER NORTH DAKOTA CONDITIONS  
(1975 Report)

The most important factor to a profitable sheep enterprise is the number of lambs marketed per ewe exposed. Many factors influence the percent lamb crop marketed. Of these, selection of parental stock having the genetic capability of conceiving and bearing large numbers of offspring is of primary importance.

An experiment was initiated in 1965 to determine the potential of crossbred offspring of two breeds not commonly raised in North Dakota or other parts of the United States, the North Country Cheviot and the Border Leicester. These breeds are white faced, medium to large in size, clean faced and clean legged. They do not carry a reputation for being outstanding wool producers but are used extensively in the British Isles to sire crossbred commercial ewes. Rams of these two breeds were mated to Columbia and Rambouillet ewes and these crossbred offspring are being compared with each other and with straightbred Columbia and Rambouillet ewes and also with Columbia x Rambouillet crossbreds.

Experimental Procedure

The Hettinger Branch Experiment Station contracted with a commercial Columbia sheep producer and with a commercial Rambouillet producer to produce the experimental females for this experiment. Each producer randomly allotted his ewes into four groups of about 40 each. Each group was then mated to either a Columbia, Rambouillet, North Country Cheviot or Border Leicester ram considered to be of typical commercial quality. The initial matings were made in the fall of 1965 and the first delivery of eight breeds or breed combinations was made to the experiment station in the fall of 1966. All lambs were handled as a single unit during the winter and summer period that followed.

Additional like matings were made in the fall of 1966.

These ewe lambs were delivered the fall of 1967 as the final ewes for evaluation.

The initial matings of the experimental ewes were made in the fall of 1967 to Hampshire and Suffolk rams. Ewe groups were randomly assigned to Hampshire and Suffolk ram groups and to February and April lambing groups

## RESULTS

The major objective of this study was to evaluate total lifetime productivity of two breeds, Columbia and Rambouillet, their reciprocal crosses, and two crosses of each produced from Border Leicester and North Country Cheviot rams. During the course of this study 1205 matings were made. 1,875 lambs were born, 1,681 lambs were weaned and 1,640 reached market.

Table I presents information concerning wool production during the course of the study. There was little difference in grease fleece weights, however, the use of North Country Cheviot sires did significantly ( $P < .05$ ) reduce wool production. Border Leicester rams significantly ( $P < .01$ ) increased staple length and decreased fleece grade. Rambouillet rams decreased staple length and increased fleece grade.

Border Leicester, Rambouillet crossbred ewes had significantly ( $P < .01$ ) higher birth and weaning rates than the average of the eight crossbred ewe types. Border Leicester, Columbia crossbred ewes did not perform similarly, their production was lower than the purebred Columbia which served as the dam for this cross. Table II shows differences in number of lambs born and weaned for the eight different ewe types.

There were few differences in lamb performance from the eight different crosses. Birth, weaning and market weights and gains of lambs between periods are displayed in Table III. Lambs from Border Leicester, Rambouillet crossbred ewes were significantly heavier ( $P < .05$ ) at birth. All lambs from ewes sired by Border Leicester rams had diminished average daily gain from weaning to market.

TABLE I  
WOOL PRODUCTION

Breed Cross	Grease Fleece Production (lbs.)	Staple Length (MM)	Fleece Grade
Rambouillet x Rambouillet	11.2	75.6	63.1
Border Leicester x Rambouillet	11.6	113.5	54.4
North Country Cheviot x Rambouillet	9.6	90.8	57.8
Columbia x Rambouillet	11.5	82.1	59.7
Columbia x Columbia	9.8	96.5	56.9
Border Leicester x Columbia	10.0	137.8	51.0
North Country Cheviot x Columbia	8.4	98.9	55.7
Rambouillet x Columbia	10.4	80.1	60.3

TABLE II  
BIRTH AND WEANING RATES<sup>1</sup>

Breed Cross	Percent Lambs Born	Percent Lambs Weaned
Rambouillet x Rambouillet	159.88	135.80
Border Leicester x Rambouillet	189.05	173.72
North Country Cheviot x Rambouillet	170.00	152.00
Columbia x Rambouillet	154.41	132.35
Columbia x Columbia	150.77	136.15
Border Leicester x Columbia	141.84	128.37
North=Country Cheviot x Columbia	152.03	136.49
Rambouillet x Columbia	139.49	130.57

<sup>1</sup> Based on total ewes exposed to the ram.

TABLE III

## LAMB PERFORMANCE

Breed Cross	Birth Wt. 1 (lbs.)	Daily Gain Birth To Weaning (lbs.)	Weaning 2 Weight (lbs.)	Daily Gain Weaning to Market (lbs.)	Market 3 Weight (lbs.)	Daily Gain Birth to Market (lbs.)
Rambouillet x Rambouillet	11.73	.575	64.27	.530	106.18	.560
Border Leicester x Rambouillet	12.47	.593	67.14	.519	108.31	.569
North Country Chev. x Rambouillet	11.34	.542	61.55	.531	106.39	.560
Columbia x Rambouillet	11.42	.565	63.49	.549	105.88	.558
Columbia x Columbia	11.15	.556	62.42	.556	105.88	.560
Border Leicester x Columbia	11.70	.562	63.22	.507	105.86	.557
North Country Chev. x Columbia	11.18	.553	63.34	.542	106.34	.558
Rambouillet x Columbia	11.73	.580	65.04	.518	106.34	.564

- Adjusted for: Sex, birth type and year
- Adjusted for: Year, sex, birth type, rearing type and weaning type
- Adjusted for: Year, sex, birth type, rearing type and market age.

## TIME OF LAMBING

Lambing time is an important consideration when selecting breeds and breed crosses. Many differences in productivity were found when comparing February and April lambing, as displayed by Table IV.

Time of lambing has little effect on fleece production, however, wool weights from the April group were significantly heavier ( $P < .05$ ). Grease fleece weights may or may not be reliable when comparing lambing time as the amount of yolk (lanolin) and vegetable matter may vary enough to significantly change grease fleece weights.

When comparing April and February lambing many differences in ewe weights and lamb production were evident. There was no difference in weights of the ewes prior to breeding time. Ewes bred in September for February lambing gained significantly ( $P < .01$ ) more during the breeding period than ewes bred in November for April lambing. Ewes bred for April lambing gained significantly ( $P < .01$ ) more during gestation and were heavier at lambing time. Weaning weights of April lambing ewes were significantly ( $P < .01$ ) heavier than the February lambing group. The February lambing group was maintained in confinement and the April lambing group was on tame grass pasture. This fact most certainly biased weaning weights of the ewes in favor of the group on pasture.

April lambing ewes gave birth to, and raised to weaning, significantly ( $P < .01$ ) more lambs than did ewes that lambed during the February period. Most of the eight ewe types worked with performed similarly in favor of the later lambing time, as displayed by Table V. Birth and weaning rates from North Country Cheviot, Rambouillet crossbred ewes showed the largest difference between February and April lambing times (141.89 vs 186.42). Many of the ewes of this type were not cycling for breeding in September, thus numerous ewes of this cross and lambing time did not conceive. When bred to April lambing high percentages of the North Country Cheviot, Rambouillet crossbred ewes were cycling and did conceive.



TABLE V  
EFFECT OF TIME OF LAMBING ON EWE PRODUCTION AND LAMB PERFORMANCE

Variable	Early Lambing (February)	Late Lambing (April)
Ewe Production		
Staple length (MM)	95.02	97.68
Fleece Grade (MM)	57.367	57.347
Fleece Weight (lbs.)*	10.39	10.16
Pre-Breeding Weight (lbs.)	152.65	154.72
Post Breeding Weight (lbs.)**	158.60	154.52
Pre-Lambing Weight (lbs.)**	173.52	176.67
Weaning Weight (lbs.)**	134.97	150.76
Lambs Born <sup>1</sup> (%)**	151.97	162.93
Lambs Weaned <sup>1</sup> (%)**	135.59	146.20
Lamb Performance		
Birth Weight <sup>2</sup> (lbs.)	11.52	11.72
Weaning Weight <sup>3</sup> (lbs.)**	72.67	54.18
Market Weight <sup>4</sup> (lbs.)	106.84	106.02
Market Weight Shrunk (lbs.)**	100.30	99.15
Shrink (lbs.)**	5.54	6.87
ADG Birth to Weaning (lbs.)**	.612	.532
ADG Weaning to Market (lbs.)**	.574	.443
ADG Birth to Market (lbs.)	.590	.500

1. Based on total ewes exposed to the ram.
  2. Adjusted for: Sex, birth type, and year.
  3. Adjusted for: Year, sex, birth type, rearing type, and weaning age.
  4. Adjusted for: Year, sex, birth type, rearing type, and market age.
- \* (P < .05)  
\*\* (P < .01)

TABLE IV

## THE AFFECT OF TIME OF LAMBING ON BIRTH AND WEANING RATES (1968-1973)

Breed Cross	Percent Lambs Born <sup>1</sup>		Percent Lambs Weaned <sup>1</sup>	
	Early	Late	Early	Late
Rambouillet x Rambouillet	151.22	155.42	132.93	133.74
Border Leicester x Rambouillet	185.71	191.43	167.14	181.43
North Country Cheviot x Rambouillet	141.89	186.42	127.03	169.14
Columbia x	151.39	161.11	140.28	122.22
Columbia x Columbia	141.33	156.14	129.33	138.60
Border Leicester x Columbia	144.29	135.44	130.00	122.78
North Country Cheviot x Columbia	153.25	146.67	137.66	129.33
Rambouillet x Columbia	137.5	140.54	120.83	137.83

<sup>1</sup> Based on total ewes exposed to the ram.

## Finn-Cross Ewe Performance

In 1971 ewes of Columbia and of Rambouillet parentage were bred to Finnish Landrace rams and the resulting F<sub>1</sub> ewe lambs were added to the crossbreeding experiment. The following consists of information dealing with productive performance for a three year average for the Finn-cross ewes and straight bred ewes of their dams parentage.

TABLE I EWE PERFORMANCE

Variable	Rambouillet	Finn x Rambouillet	Columbia	Finn x Columbia
Fleece wt.	10.53	9.38	9.39	7.82
Staple Length (MM)	77.72	100.46	94.35	110.60
Pre-Breeding wt. (lbs.)	142.15	120.84	130.59	113.67
Pre-lambing wt. (lbs.)	164.95	144.80	156.08	128.33
Lambs born <sup>1</sup> (%)	139.47	191.22	130.16	172.22
Lambs weaned <sup>1</sup> (%)	115.79	159.65	106.35	161.11

TABLE II LAMB PERFORMANCE

Variable	Rambouillet	Finn x Rambouillet	x Columbia	Finn x Columbia
Birth wt. (lbs.)	11.06	8.05	10.96	8.05
Weaning wt. (lbs.)	45.84	36.28	47.78	35.44
Weaning age (days)	62.35	59.41	61.98	62.17
Market wt. (lbs.)	99.58	100.25	98.71	99.29
Market age (Days)	170.42	187.42	157.57	189.71

<sup>1</sup> Lambs born per ewe exposed

This report is only a progress report, however, table one would seem to indicate that the crossbred ewes are more productive when compared to ewes of their dams parentage. Table I would also seem to indicate that staple length is increased and fleece weight decreased when Columbia and Rambouillet ewes are compared to Finn-Columbia and Finn-Rambouillet cross-bred ewes.

Table II indicates that lambs from Finn-Columbia and Finn-Rambouillet ewes and sired by Hampshire and Suffolk rams to be smaller at birth, lighter at weaning and require a longer growing period to get to market than lambs born of similar sires and from ewes of their dams parentage.

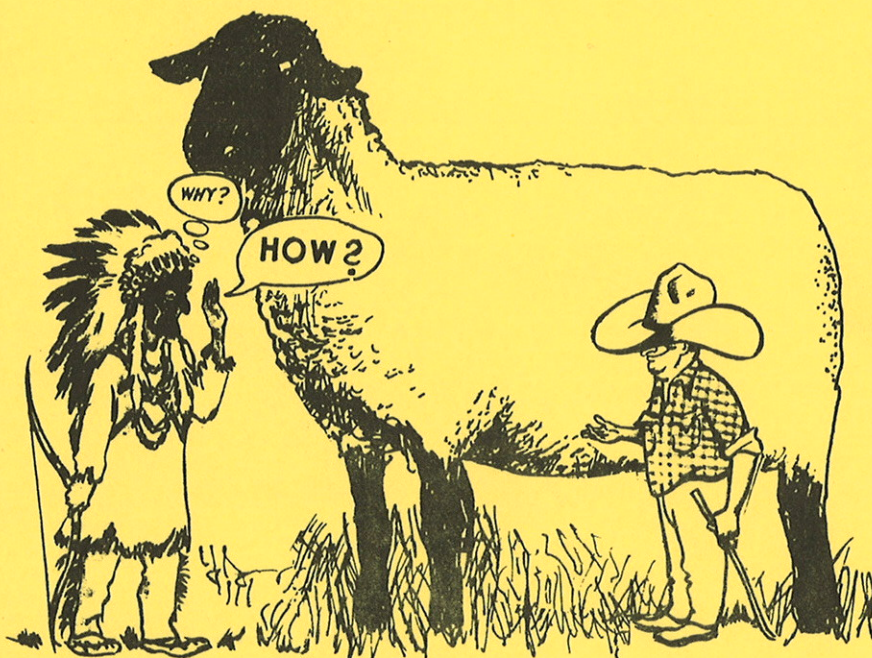




# 17th ANNUAL WESTERN DAKOTA SHEEP DAY

WEDNESDAY, FEBRUARY 11, 1976 HETTINGER ARMORY

Do we need  
BIGGER SHEEP?



TIMOTHY C. FALLER, SUPT.

HETTINGER BRANCH EXPERIMENT STATION  
NORTH DAKOTA STATE UNIVERSITY





SHEEP DAY DIGEST

by

Timothy C. Faller, Supt.  
Hettinger Experiment Station

1. COBALT FOR LAMBS  
A comprehensive study investigating cobalt deficiency in Feeder lambs - Sec. I - pp. 1-2
2. CREEP FEEDING EARLY LAMBS UNTIL PASTURES ARE AVAILABLE  
How much economic gain can be made by creeping lambs prior to pasture? Sec. I pp. 3-4
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The effect of additional cobalt supplied to enhance ewe performance. Sec. I pp 5-6
4. SUPPLEMENTARY FALL FEEDING OF EWES DURING BREEDING  
What effect does supplementary fall feeding have on increasing ewe productivity? Sec. I pp 7-8
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6. FARM FLOCKS ON WESTERN N. D. FARMS  
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8. CREEP FEEDING LAMBS ON PASTURE  
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9. CONFINEMENT SHEEP PRODUCTION  
A management system new to western North Dakota sheep producers. Sec. I pp. 22-23
10. GENETIC PARAMETERS OF ECONOMIC TRAITS IN FARM FLOCK SHEEP  
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11. EFFECT OF INJECTABLE VITAMINS ON LAMB PRODUCTION  
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12. EFFECT OF FALL SHEARING ON LAMB PRODUCTION  
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14. ESTRUS CONTROL IN SHEEP  
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15. CONTROLLING COYOTE PREDATION  
A field test of non-lethal methods of coyote predation.  
Sec. I pp. 46-48
16. NUTRIENT REQUIREMENTS OF CONFINED EWES  
An attempt to define mineral needs at the ewe on pasture  
and in drylot. Sec. II pp. 49-51
17. BORDER LEICESTER AND FINN CROSS EWES  
Evaluation of two productive crossbred ewe types under  
two different conditions. Sec. II pp. 52-53
18. SELECTION  
A review of results of the selection of dams for single  
heritability traits. Sec. III pp. 54-61
19. CROSSBREEDING  
Results from the crossbreeding trial involving 7 breeds  
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SECTION I

REPORTS OF  
COMPLETED SHEEP RESEARCH

From Past  
SHEEP DAY REPORTS

1961 - 1975

15 yr. ROUNDUP

HETTINGER EXPERIMENT STATION

HETTINGER, NORTH DAKOTA

February 11, 1976

THE UNIVERSITY OF CHICAGO

PHYSICS DEPARTMENT

PHYSICS 340

1961-62

LECTURE NOTES

BY RICHARD FEYNMAN

AND ROBERT LEIBERMAN

CHICAGO, ILLINOIS

## COBALT FOR LAMBS

Cobalt is one of the mineral elements classified as a trace mineral, meaning that it is required in very small amounts to meet the nutritional requirements of the animal. The symptoms of cobalt deficiency in lambs are lack of appetite, anemia, lack of thrift and generalized weakness. In fact, when severely deficient, lambs will appear to "starve while standing in front of a full feed bunk". The symptoms of this disease show marked similarities to those of internal parasitism. The amount of cobalt required per lamb is very small and can be met adequately by feeding salt containing 0.1 ounce of cobalt (0.2 ounce of cobalt chloride) per 100 pounds of salt. Hays and pasture grasses containing 0.07 parts per million of cobalt on a dry matter basis have been shown to prevent occurrence of cobalt deficiency in sheep. North Dakota is not definitely known to have cobalt deficient areas. It is thought, however, that cobalt deficiency may occur sporadically. There has been some question as to whether or not the feeding of trace mineralized salt satisfied the needs for cobalt in sheep. Therefore, an experiment was designed to test the value of using cobalt "bullets" for lambs. Cobalt bullets are bullets that are orally administered. They lodge in the stomach and are said to dissolve slowly over a considerable period of time. Theoretically, this guarantees enough cobalt to meet nutritional requirements for an extended period.

Procedure: Thirty ewe and thirty ram lambs were paired and allotted into four groups. One group of each sex was given cobalt "bullets". The lambs were pastured together on typical western North Dakota range pastures of native and crested wheat grasses. Due to drought conditions, the pastures were extremely poor the first year of trial but would be considered very good for the second year of trial. A commercial trace mineralized salt was mixed with dicalcium phosphate and phenothiazine and was provided free choice. Lambs were weighed every 30 days. The results of the first 120 day trial are summarized in table 1. Results of the second 120 day trial are summarized in Table 2.

Table 1. The effect of cobalt bullets on lamb gains (1959)

Lot number . . . . .	1	2	3	4
No. lambs. . . . .	15	15	15	15
Sex . . . . .	Ewe	Ewe	Ram	Ram
Cobalt bullets . . . . .	Yes	No	Yes	No
Av. initial wt. lbs. . . . .	71.0	73.0	84.0	83.0
Av. final wt. lbs. . . . .	82.0	83.0	106.0	106.0
Av. gain per lamb lbs. . . . .	11.0	10.0	22.0	23.0
Cost of bullets per lot. . . . .	\$6.30	6.30	6.30	6.30

Table 2. The effects of cobalt bullets on lamb gains (1960)

Lot number . . . . .	1	2	3	4
No. lambs. . . . .	15	15	15	15
Sex. . . . .	Ewe	Ewe	Ram	Ram
Cobalt bullets . . . . .	Yes	No	Yes	No
Av. initial wt. lbs. . . . .	86.7	86.5	94.5	94.5
Av. final wt. lbs. . . . .	106.2	107.9	125.2	122.6
Av. gain per lamb lbs. . . . .	19.5	21.4	30.7	28.1
Cost of bullets per lot. . . . .	\$6.30	6.30	6.30	6.30

Summary: The use of cobalt bullets did not significantly affect rate of gain of lambs with the conditions under which the experiment was conducted.



CREEP FEEDING EARLY LAMBS UNTIL PASTURES ARE AVAILABLE

Purpose: Many sheep producers in the area do not finish their lambs for market, but rather, market grass through the production of feeder lambs. Also, many of these producers like to lamb in March so that the majority of their lambing work load is over when spring field work starts. This test was designed to determine whether or not creep feeding early lambs until pastures are available is a profitable practice.

Procedure: Our purebred flock of 100 Columbia ewes was divided at lambing time into two groups of similar management background. That is, both groups had as nearly as possible equal representation of influences from other trials and sires as well as age and weight of ewes. One group of lambs was creep fed and one was not. The first lamb was born on January 16 and all lambs were placed on creep at about one week of age. Lambs and ewes went to pasture May 4; were weaned June 15.

Creep rations used:

First ration:     250 lbs. Corn  
                  800 lbs. Oats  
                  550 lbs. Barley  
                  200 lbs. Soybean Oil Meal  
                  200 lbs. Wheat bran  
                  40 lbs. Trace mineralized salt  
                  100 lbs. Vitamin supplement  
                  40 gms. Aureomycin

Cost including grinding and mixing - \$56.45 per ton.

Second ration:   500 lbs. Corn  
                  1000 lbs. Barley  
                  500 lbs. Oats

Cost including rolling - \$36.00 per ton.

Whole oats was fed in separate feeders and alfalfa hay was available in the creep at all times.

Creep feed cost per lamb - \$1.29

Results:

	<u>Lot 1</u> <u>Creep Fed</u>	<u>Lot 2</u> <u>No Creep</u>
Number of ewes in lot.....	50	50
Number of lambs at weaning.....	57	58
Number of sets of twins at weaning.....	17	15
Average birth weight .....	11.1	11.2
Average 30 day weight.....	28.2	27.9
Average weight at pasture.....	60.2	40.2
Average age at pasture.....	86.0	85.3
Average weight of lamb per day at pasture...	.70	.471
Average weight at weaning.....	80.9	73.3
Average at weaning.....	128.6	128.3
Average weight of lamb per day at weaning...	.629	.571
Average weaning weight adjusted to 120 days.	75.48	68.52
Difference in gain per lamb at 120 days.....		6.96
 Average weight loss of ewes Jan. 13 to May 3	 33.6	 43.1

Average results for two years trials:

	<u>Lot 1</u>	<u>Lot 2</u>
Weaning weight at 120 days 1960.....	80.16	76.56
Weaning weight at 120 days 1961.....	75.48	68.52
Average of two years.....	77.82	72.54

Summary: As would be expected, the lambs that were creep fed gained faster while on creep feed than those not creep fed. However, after being turned to pasture, the lambs that had not been creep fed seemed to "catch up". The break even prices or price of lambs necessary to pay for the extra feed was \$16.40 per cwt. the first year and \$18.53 per cwt. the second year. The second trial seems to prove more strongly than the first that although lambs on creep feed gain much more rapidly it is not a profitable practice if the lambs are to be turned to pasture without creep feed.

## COBALT BULLETS FOR PREGNANT EWES

Cobalt is one of the mineral elements classified as a trace mineral, meaning that it is required in very small amounts to meet the nutritional requirements of the animal. The symptoms of cobalt deficiency in lambs are lack of appetite, anemia, lack of thrift and generalized weakness. In fact, when severely deficient, lambs will appear to "starve while standing in front of a full feed bunk". The symptoms of this disease show marked similarities to those in internal parasitism. On occasion, cobalt deficiencies have been confused with parasitism. The amount of cobalt required per lamb is very small and can be met adequately by feeding salt containing 0.1 ounce of cobalt (0.2 ounce of cobalt chloride) per 100 pounds of salt. Hays and pasture grasses containing 0.07 parts per million of cobalt on a dry matter basis have been shown to prevent occurrence of cobalt deficiency in sheep. North Dakota is not definitely known to have cobalt deficient areas. It is thought, however, that cobalt deficiency may occur sporadically. There has been some question as to whether or not the feeding of trace mineralized salt satisfied the needs for cobalt in sheep. Therefore, an experiment was designed to test the value of using cobalt "bullets" for lambs. Cobalt bullets are bullets that are orally administered. They lodge in the stomach and are said to dissolve slowly over a considerable period of time. Theoretically, this guarantees enough cobalt to meet nutritional requirements for an extended period. After obtaining no significant results from the use of cobalt bullets on lambs, it was decided to test the value of their use on pregnant ewes.

Procedure: Our purebred flock of 100 Columbia ewes was divided into two groups so as to have in each group, equal influences of sires, weight and age of ewes and equal distribution of ewes with different management backgrounds resulting from other trials being conducted on the same band of ewes. One group of 50 was given bullets in August of 1959 and 1960 - in 1961, bullets were given Sept. 7 to 40 head. The two groups were handled as one for feeding and management. Trace mineralized salt plus Dicalcium phosphate in a ratio of 3:1 was feed free choice.

Average results of three years of trial:

Average weight of lamb produced per ewe bred at 120 days.

	With Cobalt Bullets	No Cobalt Bullets
1960 lamb crop.....	85.68	78.87
1961 lamb crop.....	80.90	84.67
1962 lamb crop.....	93.00	90.60
Total.....	259.58	254.14
Average.....	86.53	84.71
Average Difference.....		1.82

Summary: In each of these trials, average weight of lamb produced per ewe was computed by taking the average weight per day of age at weaning of all lambs in the lot x 120 days x percent of lambs weaned in each lot. Throughout the three years of this trial, many factors such as percent of lambs dropped, percent of lambs weaned and weights of lambs at various ages have been compared. Increases in these factors either singly or in combination are essential to produce increases in over all lamb production. There were no consistent differences between lots in any of these factors. There were no significant differences noted in ewe gains and losses or in fleece production. Differences in total pounds of lamb produced per ewe were not consistent from year to year. The averages of the three years of this trial show that the ewes that received Cobalt Bullets produced 1.82 pounds of lamb more per ewe bred at weaning than those that received no extra cobalt. At 42¢ per bullet, lambs would have to be worth \$23.08 per live cwt. to break even on the cost of the bullets. It seems quite apparent that when trace mineralized salt is fed free choice and is available at all times, sheep producers will receive no benefit from the use of cobalt bullets as a source of cobalt.

SUPPLEMENTARY FALL FEEDING OF EWES DURING BREEDING SEASON

Many successful sheepmen feel that the feeding program followed during breeding season and two weeks following is a very critical period as far as increased lamb production is concerned. Many producers increase the energy intake of their ewes during this time. This practice is often called "flushing". It is also felt that there might be some chance of fertilized eggs becoming more firmly established in ewes that are on a higher level of nutrition. This might be especially true in cases of rather rigorous conditions.

Our flock of 100 purebred Columbia ewes was divided into two groups giving each group as nearly as possible equal influences of age, weight and sires as well as equal influences of other trials being conducted simultaneously. The first year, one group was fed  $\frac{1}{2}$  pound of oats and  $\frac{1}{4}$  pound of Soybean Oil Meal per head daily. The second year this group was fed  $\frac{1}{2}$  pound of oats,  $\frac{1}{4}$  pound of Soybean Oil Meal and 1 pound of good quality alfalfa hay per head daily. Grazing was on native pasture and stubble fields. Feeding was carried on for 60 day periods beginning the day the rams were turned with the ewes. Supplemental feed costs were \$1.11 per head the first year and \$1.78 per head the second year.

Results:

	With fall feed			No fall feed		
	1960	1961	Average	1960	1961	Average
Percent lambs dropped.....	122.45	138.0	130.22	129.78	130.0	129.89
Percent lambs weaned.....	102.04	114.0	109.02	106.38	116.0	111.19
Percent dries and dead....	10.2	12.0	11.1	8.51	12.0	10.25
Ave. weight of lambs produced perewe bred at 120 days*.....	77.59	81.26	79.42	84.13	84.35	84.24

\*Average weight of lamb produced per ewe at 120 days obtained by multiplying average weight of lamb per day of age at weaning x 120 days x percent of lambs weaned.

Summary: Production differences between years can be accounted for by noting that in the fall of 1959, the native pastures and stubble fields used were very poor while in the fall of 1960, these were quite good.

There was an average difference of 4.82 pounds of lamb per ewe bred in favor of the ewes that were not given additional feed. Before making hasty conclusions, it should be noted that in both years, the ewes were weaned at least 6 weeks prior to breeding. They were in relatively good condition. If the ewes had been thin, at the time of breeding, it is quite conceivable that the results might be different. However, from information collected, these two consecutive years, it appears conclusive that for ewes in good flesh, we can expect no increase in lamb production from feeding additional concentrates.

## FEEDLOT CONFINEMENT OF EWES DURING BREEDING SEASON

Purpose: This station has had considerable trouble over the years with a large percentage of dry ewes. There have been mixed reports from sheepmen in the area concerning this problem. We have noted the conditions under which we must handle our ewes during breeding season. They must travel over two miles to their pasture area each morning and come home each evening for water and sorting into their respective breeding pens. It is felt that perhaps this long walk could bring about a reabsorption of fertilized eggs or embryonic death. This trial was designed to determine whether or not it would be economically feasible to confine the ewe flock during breeding season and feed them alfalfa hay and a small amount of grain.

Procedure: Our flock of 40 unregistered Columbia ewes were divided into two groups giving each group as nearly as possible, equal distribution of age and weight. One group made the daily trip to pasture and were fed no extra grain or roughage. The other group was placed in a large corral and fed 5 pounds per head per day of alfalfa hay plus  $\frac{1}{2}$  pound per head per day of oats.

Two Hampshire rams were used. They were turned in with the ewes nights only and alternated between the two lots every other night. The two flocks were turned together early in November and handled as one flock until weaning.

### Results:

Feed cost for ewes in dry lot were \$4.51 per ewe in 1961 and \$4.00 per ewe in 1962.

	Pasture			Dry Lot		
	1961	1962	Average	1961	1962	Average
Percent lambs dropped....	130.0	160.0	145.0	145.0	185.0	165.0
Percent lambs weaned.....	120.0	150.0	135.0	130.0	155.0	142.5
Percent lambs marketed...	115.0	140.0	127.5	120.0	145.0	132.5
Percent dries and dead...	15.0	0.0	7.5	10.0	0.0	5.0
Average weight of lamb produced per ewe at 120 days*.....	122.98	147.96	135.47	123.5	134.48	128.99

\*Average pounds of lamb produced per ewe at 120 days obtained by multiplying average weight of the lambs per day at weaning x 120 days x percent lambs weaned.

Summary: It must first be noted that there were no problems such as difficult lambing or pregnancy disease that could be attributed to the relatively small amount of exercise allowed to those ewes in dry lot from the beginning of breeding season through weaning. In both years of this trial, the ewes fed in dry lot during breeding and on, dropped more lambs, weaned more lambs and marketed more lambs than those that were pastured during the same period. However, those ewes that were not in dry lot produced an average of 6.48 pounds of lamb more per ewe bred than those fed in dry lot. A slight increase in wool production was noted in both trials from ewes that were fed in dry lot. It seems apparent from these two trials that there is no advantage in dry lotting ewes during breeding season if reasonably good pastures are available.



## FARM FLOCKS OF SHEEP ON WESTERN NORTH DAKOTA FARMS

Objective: To determine whether or not sheep production might be considered by farmers in this area who have limited amounts of pasture available. Many farmers in this area have several factors which might well be considered for use in a sheep production program: 1.) Most of them have a certain amount of land that is too steep, rocky, or sandy to be cultivated. The native grass that does grow on these areas is probably not lush enough in most years to produce top feeder lambs. However, it is felt that it will maintain dry ewes through the summer. 2) Many of these same farms have several acres of crop land that is farmed in strips. There is always a certain amount of grain that is left in the field after combining. Sheep will pick up most of this plus any weed growth present. These strips might well be used for "flushing" a ewe flock during breeding season. 3) Many of these same farmers have some extra time available during February and March before they must start their spring field work. 4) The lamb market is almost always at its peak in the spring or early summer.

Considering these factors, it is thought that many farmers might include a sheep flock in their program by lambing before field work starts, weaning when the grass is ready, and full feeding their lambs from birth to finish, thus taking advantage of the early higher market.

Procedure: The first year of trial, 30 unregistered Columbia ewes of mixed ages were used. The following two years, the flock was made up of 40 ewes. They represent quite closely the quality of ewes that are available for purchase in this area almost every year. They were bred to Hampshire ram lambs to start lambing on January 15 one year and February 1 the other two years. A pole type shelter was constructed which served as housing all winter with no specially heated lambing quarters. Heat lamps were used. Lambs were creep fed until weaned and continued on full feed to market. Complete records were kept of costs and returns. The only cost not included is the value of the native grass pasture and the labor required during a normally slack season. This will vary

a great deal from farm to farm. Lambs were marketed in two groups as they reached desirable market weights and choice grades. The first marketings were in June and the second in July.

Data: Feed prices varied greatly as to availability from year to year. Alfalfa hay varied from \$20.00 to \$30.00 per ton, oats from 45¢ to 65¢ per bushel, barley from 75¢ to 86¢ per bushel and corn from \$1.15 to \$1.20 per bushel. Based on the relative cost of TDN in the feeds, barley was used as the finishing feed for two years and corn one year.

The starting creep ration which was ground and mixed varied slightly from year to year but was essentially:

Corn or barley..... 800#  
 Oats..... 800#  
 Soybean Oil Meal..... 200#  
 Wheat Bran..... 200#  
 Salt (TM)..... 40#  
 Aureomycin..... 40 gm.  
 Vitamin A..... 2,000,000 I.U. (included the last year)

By May 1 each year, the lambs were weaned and were almost completely switched over from the mixed creep ration to whole grain and alfalfa hay.

Annual Fixed Costs were as follows:

Ram @ \$80.00 (plan to use average of 3 years.....	\$26.66
40 ewes @ \$20.00 (estimated annual replacement cost of 20%.....	160.00
Housing (pole barn) @\$525.00 depreciated 20 years.....	26.25
Shearing @40¢.....	16.00
Veterinary expense including drenching and vaccination and prorated cost of tools, etc.....	40.00
Bedding (estimated) .....	25.00

Averages for three year trial:

	Winter feed cost per ewe	Average Selling Price	Percentage of lambs marketed	Profit or loss per ewe
1959-60	\$15.05	\$21.62	90.0	-\$3.39
1960-61	10.52	18.75	120.0	+ 4.17
1961-62	12.40	22.25	142.5	+ 9.49
3 year Ave.	12.66	20.87	117.5	+ 3.42

Summary: In the first year of trial, some lambs were lost from overeating disease and urinary calculi. These problems were remedied partially in subsequent years by vaccinating the ewes and including salt in the creep ration. It should be noted that large variations in feed costs, lamb prices and percentages of lambs marketed were encountered. It is felt that the average results of these three years are indicative of the results farmers in the area might expect when using this early lambing and straight to market system. Experienced sheep producers are aware that some fluctuations in feed prices, lamb prices and lambs marketed are to be expected. There seems to be "good years" and "bad years" in most operations.

When inspected closely, many costs applied to these trials could be lowered such as housing if certain farms should have some unused buildings available. Or, perhaps the cost of replacement ewes could be lowered by careful buying.

On the basis of these three trials, it is concluded that many farmers in the Western Dakota could include this type of sheep production program profitably.

SYNCHRONIZING ESTRUS AND STIMULATING EWE FERTILITY BY HORMONE ADMINISTRATION  
Light, M. R., C. N. Haugse and M. L. Buchanan<sup>1 2</sup>

No one factor is more important to profitable sheep production than the marketing of a high percentage of lambs per ewe bred. A high percentage of lambs raised is possible only when a large number of lambs are dropped per ewe lambing. An important factor in the number of lambs born is the number of fertile ova produced by the ewe at the time of mating.

Palsson (1956) reportedly increased the number of lambs dropped by 65% in a group of Icelandic ewes by intramuscular PMS administration. Recent experiments by Combs (1961) and Hinds (1961) demonstrated that the estrus cycle of sheep could be synchronized.

This experiment was designed to determine the possibility of synchronizing estrus and increasing fertility levels as determined by the number of lambs dropped.

EXPERIMENTAL PROCEDURE:

Forty-two actively cycling ewes of uniform age and of Columbia extraction were randomly assigned to four lots. The experimental design was a 2 x 2 factorial to test the effects of medroxyprogesterone acetate on heat synchronization and the effects of intramuscularly administered PMS on the reproductive performance of ewes.

All ewes were fed 5 pounds of poor quality alfalfa hay daily. One pound per head of grain pellets (75% barley + 25% SBOM) was fed daily for a seven day conditioning period prior to the feeding of medicated grain pellets. Grain supplementation was continued throughout the breeding season. Medroxyprogesterone acetate (Repromix) was mixed with the grain in an amount calculated to provide 60 mg. per pound of feed. Medicated feed was fed to lots 1 and 3 at a level of one pound per head daily for 14 days. A vasectomized ram with a marking harness was turned with the ewes to determine the effectiveness of Repromix in stopping heat manifestation. Five-hundred I.U. of PMS was injected intramuscularly into the ewes in lot 3 on the 14th day of the heat synchronization period and a fertile ram was turned with them. Breeding dates were recorded.

Lots 2 and 4 served as control groups for lots 1 and 3. Heat was not synchronized but the day of heat was determined by use of a vasectomized ram. On the 14th day following heat each ewe in lot 2 was intramuscularly injected with 500 I.U. of PMS. The ewes were grouped with the lot 4 ewes and following PMS administration, a fertile ram was placed with them.

RESULTS AND DISCUSSION:

The feeding of Repromix was effective in suppressing estrus and synchronizing estrus. Breeding marks were recorded for three of twenty-one ewes during

<sup>1</sup> The authors are indebted to the Upjohn Co., Kalamazoo, Michigan for their donations of Repromix and Gonadagen.

<sup>2</sup> Sigvaard Hendrickson ably assisted in the experiment and managed the ewe flock.

the period of Repromix medication. It is thought that this might be expected since ewes were group fed. Uniform feed consumption by all ewes is impossible under group feeding conditions. Two-thirds of the ewes mated within a three day period following the withdrawal of Repromix from the grain mixture.

The results of PMS administration on the last day of Repromix feeding or on the 14th day post-estrus are shown in Table 1.

Table 1. Effect of PMS on Lamb Production with Synchronized or Naturally Cycling Ewes.

Treatment	Synchronized 500 Mg. PMS	Synchronized NO PMS	Natural cycle 500 Mg. PMS	Natural Cycle NO PMS
Lot No.	1	2	3	4
No. Ewes	11	10	11	10
No. Ewes Lambing *	11	10	8	7
No. Lambs Dropped	23	15	18	11
% Lamb Crop Dropped				
Per Ewe Lambing	209	150	225	157
% Lambs Per Ewe Bred	209	150	164	110

\*One ewe was removed from lot 3 for failure to exhibit estrus. Two ewes failed to lamb in lot 3 and 3 failed to lamb in lot 4.

Estrus synchronization by the feeding of Repromix may promote ewe conception. These limited data reveal that all ewes in the synchronized groups conceived and lambed. Only 15 of 21 ewes lambed in the normal cycling groups. Further investigation of this observation is indicated.

The conception rate to first mating, as indicated by the average length of the lambing season, was not affected by estrus synchronization. The average length of the lambing period for the synchronized groups was 4.5 days. The average duration for non-synchronized groups was 13.4 days.

Intramuscular administration of 500 I.U. PMS on the 14th day of Repromix feeding or on the 14th day post-estrus was equally effective in increasing ewe fertility. The combined data shows a 63% increase in the number of lambs born to ewes that lambed that had received PMS. The increases in lamb numbers is in accord with the reported work of Grant et al (1959) and Palsson (1956).

#### SUMMARY:

The feeding of Repromix to cycling ewes was effective in synchronizing the estrus cycle and materially shortened the lambing period. The intramuscular administration of 500 I.U. of PMS on the last day of Repromix feeding or on the 14th day after they had been marked by a vasectomized ram resulted in an increase in the number of lambs dropped per ewe lambing.

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CREEP FEEDING LAMBS ON PASTURE - DOES IT PAY?  
Merle R. Light & C. N. Haugse<sup>1</sup>

The creep feeding of commercial lambs on pasture is not widely practiced in North Dakota. Because it is highly desirable to grow lambs quickly to take advantage of higher market prices which usually prevail early in the season, experiments were designed to test the effects of creep feeding on gains of grazing lambs. Trials were conducted during the 1963 and 1964 pasture seasons.

Experimental Procedure -

Trial I - 1963 - Forty-two ewes and their lambs were allotted into two groups according to age, sex, and birth type of lambs. Lot 1 served as the control group and Lot 2 was creep fed during the grazing period. The creep feed consisted of 50% whole oats and 50% whole corn and was fed in calf creep feeders that were modified for use by lambs. The creep feeders were located near the water supply and no particular problems were noted in getting lambs to consume feed.

The creep feeding period began on May 17, 1963 and was completed when all lambs were weaned on August 5th.

All lambs were drenched and reallocated after weaning to determine the feasibility of finishing lambs on pasture as compared to finishing in dry lot. One half the lambs from each lot were assigned to dry lot or to pasture finishing groups and were fed a ration consisting of 50% oats and 50% corn plus one pound of alfalfa pellets per day.

Trial II - 1964 - Sixty ewes and their lambs were allotted into four groups to test the value of creep feeding on pasture. Each group was equalized as far as possible according to sire, sex, and birth type of lambs. Lots 1 and 3 were creep fed and Lots 2 and 4 served as control groups.

<sup>1</sup> The authors gratefully acknowledge the able assistance of Sig Hendrickson in the care and management of the animals during these trials.

The creep feeding period began May 8, 1964 and was completed on July 24, 1964 when all groups were weaned and placed in dry lot for finishing to market weight.

The rations for creep feeding and finishing were pelleted and formulated as shown in Table I.

Table I -- 1964 Ration Composition

Ingredient	Ration 1	Ration 2 <sup>1</sup>
Corn	500	540
Oats	185	400
SBOM	100	50
Alfalfa	200	
Dicalcium phosphate	5	5
TM Salt	10	5

Vitamin A was added at the level of 1,000 I.U./lb.

Vitamin D was added at the level of 200 I.U./lb.

By analysis ration 1 contained 15% protein.

Ration 2 contained 13.9% protein.

#### Results and Discussion

The results of the 1963 pasture creep feeding trial are shown in Table II.

Table II -- Creep Feeding vs. No Creep -- 1963

Treatment	Creep fed	Non-Creep fed
No. lambs	24	29
No. Days	77	77
Av. Gain lbs.	52.8	44.6
ADG	.463*	.402
Av. Daily Feed Consumed	.65	-----

<sup>1</sup> Fed June 6 until lambs were weighed off and marketed.

\* Significant at the 5% level



The creep fed lambs consumed a total of 2108 pounds of feed during the creep feeding period. Creep fed lambs had noticeably more "bloom" when weaned. If grain is figured at 2¢ per pound and lamb prices were assumed to be \$21.50, then the cost for feed and the advantage of gain almost exactly counter balance one another.

The results of pasture finishing as compared to dry lot finishing lambs after weaning are presented in Table III.

Table III - - Dry lot vs pasture finishing

Lots No.	1	2	3	4
Treatment	Pasture & Grain--Dry Lot	--Pasture & Grain--Dry Lot		
Initial wt. (lbs.)	53.4	46.4	49.3	46.6
Final Wt. (lbs.)	93.3	106.5	98.9	107.3
No. Days	98	98	98	98
ADG (lbs.)	.316	.508*	.335	.461*
Feed/lb gain	10.3	6.2	8.0	5.76
Feed cost lb/100 gain	\$18.06	\$10.81	\$15.02	\$10.83

The superiority of finishing lambs in dry lot as compared to pasture is clearly evident. Even though fall pasture and weather conditions were considered adequate, the performance of lambs on pasture was inferior under the conditions of this trial.

The 1964 creep feeding summary is shown in Table IV.

Table IV - - Creep Feeding on Pasture - 1964

Lot. No.	1	2	3	4
Treatment	Control	Creep Fed	Control	Creep Fed
Initial Wt.	29.5	31.4	30.6	32.1
Weaning Wt.	68.2	72.8	60.3	75.8
Days	77	77	77	77
ADG (pasture	.498	.537	.383	.559

\* - Significant at 1% level.

The average gain for creep fed lambs was 42.1 lbs. as compared to 34.1 lbs. for non-creep fed lambs or 19% faster. The creep fed lambs were, as in 1963, fatter and had more bloom. The creep fed lambs consumed 1.04 lbs. of creep feed per day during the 1964 trial. Using the same figures of 2¢ per pound for feed and \$21.50 as the price of lambs, the cost of gain is quite similar to the value of the gain (\$1.60 vs. \$1.72).

Following weaning, all lambs were finished for market in dry lot. The ration fed was ration 2 shown in Table V.

Table V - - Dry Lot Performance - 1964

Lot No.	1	2	3	4
Prior Treatment	Control	Creep Fed	Control	Creep Fed
Initial Wt.	68.2	72.8	60.3	75.8
Final Wt.	104.0	101.2	97.3	103.4
Days	76	48	76	48
ADG	.471	.592	.487	.576

Summary of Performance - 1964

Table VI

Treatment	Creep Fed	Control
No. Lambs	39	43
Av. Initial Wt.	31.3	30.0
Av. Final Wt.	102.2	100.6
Total Creep Feeding	3130	----
Total Finishing Feeding	7129	12,822
Total Gain Lbs.	2737	3,020
Lbs. feed/lb. gain	3.74	4.25

A point of particular interest is the length of time required to bring the lambs to market weight. Creep fed lambs were finished for market 28 days more quickly than non-creep fed lambs. Each group of lambs sold for top market prices on the day when sold. The creep fed lambs sold for \$2.00

more per hundred pounds than the non-creep fed lambs due to the fact that they were marketed on September 14th as compared to October 12th for non-creep fed lambs. The actual total feed required to finish pasture fed lambs is not far different for either group but is in favor of creep fed lambs. The practice of creep feeding lambs on pasture under the conditions of this trial was advantageous from the standpoint of time and feed required to finish the lambs.

Summary:

1. Dry lot finishing after weaning was superior to pasture finishing in terms of rate of gain and in cost of gain.
2. Creep fed lambs gained significantly faster than non-creep fed grazing lambs.
3. Cost of gains for creep fed lambs was approximately equal to the increased value of the lamb when weaned.
4. Creep fed lambs outperformed non-creep fed lambs in the finishing lot.

Project No: H-7-20

Title: Confinement Sheep Production

Objectives:

1. To determine the effects of sheep management systems on relative costs of production, effects on health, and effects on productivity.

Procedure:

The sheep in this project are divided into three management groups to study the various aspects of three systems of management on farm flock sheep production. Management systems to be compared are: (a) total confinement, (b) January to February lambing with ewes pastured during grazing season, and (c) April and May lambing with ewes and lambs grazed during the summer and fall months.

The date of initiation of this project was November 9, 1965, when the University flocks of Hampshires and Suffolks were assigned to this study. Due to the late date of the project initiation, all ewes were bred for early lambs and consequently the late lambing group was not included.

The plan of management was to feed the confined group a maximum of whatever silage was available. Corn silage and alfalfa silage was fed during the year. Hay was fed to this group during a time when the silage system failed. Ewes were fed oats six weeks prior to lambing and until lambs were weaned. All lambs were creep fed and were topped out and marketed when they weighed between 95 and 105 pounds.

Ewes not confined were wintered on alfalfa hay and were fed oats as indicated for the confined group. This group was pastured for 191 days.

Results:

Average rations fed to ewes and costs are presented in Table 1.

TABLE I

Ave. Feed/day	Confined Groups		Early Lambing Pasture Groups	
	Hampshires	Suffolks	Hampshires	Suffolks
Silage	6.02 lbs.	6.29 lbs.	-----	-----
Alfalfa Hay	2.44 lbs.	2.22 lbs.	2.38 lbs.	2.38 lbs.
Oats	.45 lbs.	.43 lbs.	.838 lbs.	.838 lbs.
Pasture Days	-----	-----	191	191
Total Costs	\$18.81	18.45	11.84	11.84

Feed costs used: Silage @ \$8.00 a ton, Alfalfa hay @ \$15.00 a ton, Oats @ \$2.00/cwt, Pasture @ \$2.50 per animal unit.

In addition to these feed costs, each lamb consumed 240 pounds of creep feed costing .025 cents per pound for a total cost of \$5.00 per lamb.

All ewes assigned to this experiment were drenched for internal parasites at the beginning of this project. The ewes which were pastured were drenched in June, and again in November. Confined ewes and lambs have not been drenched since allotted and fecal examination has indicated that this group is relatively parasite free and drenching has not been necessary.

The general health of ewes confined to dry lot has been excellent and is not noticeably different for those pastured during the summer and fall months. The long term effects are unknown, however at this time.

Replacement ewe lambs for each group will be provided from each management group. Each group will be grown out under the same management regime under which ewes are maintained.

#### Work Planned for Next Year:

The project will continue as outlined, 1966 will mark the first year in which all groups will lamb as indicated. The confined and early lambing pasture groups are now lambing and the late lambing groups was bred to lamb beginning in May. Comparative figures will be available for all groups in 1966.

Prepared by: Merle R. Light

Project No.: H-7-12 Genetic Parameters of Economic Traits in Farm Flock Sheep.

Cooperating Agencies & Principal Accomplishments: Animal Science Department, North Dakota State University, Animal Science Department, Wooster, Ohio. Dixon Springs Experiment Station, Robbs, Illinois.

Personnel: M. R. Light, Leader; C.N. Haugse, Statistical, V.K. Johnson, Meats

Progress of Work and Principal Accomplishments: Data on productive performance have been collected according to plan. These data in simple average form are presented in Table 1. Data collected from the College purebred flocks of Columbia, Hampshire and Suffolk sheep are presented as a matter of interest.

Table 1. Productive Performance of N. D. Lambs

Line	N.D. Suffolks Selected	N.D. Hampshire	Illinois Suffolks	N. Dak. Suffolk
No. Lambs	64	31	69	54
Birth Wt (lb)	10.6	10.7	10.5	10.5
30 day wt. (lb)	28.7	24.9	30.2	29.3
90 day wt. (lb)	74.5	71.3	66.3	65.5
% Loss to 90 days	23.4	19.4	15.9	31.5

Line	N.D. Columbias	Ohio Columbias	N. D. Columbias
No. lambs	54	55	53
Birth Wt. (Lb)	10.2	10.2	10.1
30 Day Wt. (lb.)	24.6	25.9	24.5
90 Day Wt. (lb)	63.6	53.1	52.4
% Loss to 90 days	18.5	25.5	22.6

Line	Ohio Col N.D. Suff.	N.D. Suff. Ohio Col.	Ill. Suff N.D. Col.	N.D. Col. Ill. Suff.
No. Lambs	28	19	8	30
Birth Wt. (lb)	10.3	10.4	11.9	10.2
30 Day Wt. (lb)	29.5	26.7	31.9	28.2
90 Day Wt. (lb)	61.0	60.8	64.6	61.4
% Loss to 90 Days	31.0	36.8	12.5	20.0

In addition to the ewes groups reported in Table 1, there were 19 crossbred ewes that lambed. From limited observation in 1966 it would appear that lambs from these ewes had superior liveability.

North Dakota has continued to experience heavy losses of ewes particularly in the Columbia breed from disease of the pulmonary system. Although we initiated the experiment with greater numbers of Columbias than Suffolks we now have more Suffolk than Columbia ewes.

Efforts to curtail disease losses for 1966-67 have included the use of an antogenous bacterin, the alternate use of phenothiazine and thiobendazole drenches 6 times yearly and the daily feeding of a supplement containing aureomycin (60 mg/ew/day) and vitamins A and D. In addition, our sheep are fed Morton's Tm 6 mineral mixture which also contains A & D. Each ewe will be injected with 600 mg of terramycin intermuscularly immediately following parturition. Fifty mg. of terramycin will be injected intermuscularly into each living lamb immediately following birth. Observations on lambs from College non NC50 ewes which are now lambing indicate that lambs from treated ewes are very strong at birth and that ewes are milking excellently. N.D.S.U. preventative measures also include vaccination against contagious ecthyma, vibronic abortion, listeriosis and enterotoxemia approximately 6 weeks to 2 months prior to parturition.

Breeding Data: N.D.S.U. used ram lambs for the breeding season of 1965. Results of their use are shown in Table 3.

Table 3 - Ram Performance

Ram Group	N.D. COL.	OHIO COL.	N.D. SUFF.	ILL. SUFF.	AVE.
% Ewes Lambing	79.22	80.95	80.88	87.71	81.4
% Lamb/ewe lambing	1.49	1.49	1.55	1.56	1.49
% Lambs/ewe exposed	1.12	1.19	1.25	1.34	1.25

In no instances were there ram lambs that failed to impregnate ewes in their breeding pens. The conception rate for three heat cycles varied from 100% to 60%. The overall flock fertility level is not good. A lambing rate of 1.25 lambs per ewe exposed, plus a loss of lambs to weaning that exceeds 20% makes progress in generation turnover something less than spectacular.

#### Carcass Traits of Columbia, Suffolks and their Reciprocal Crosses

Eighty lambs representing the various possible crosses were slaughtered at N.D.S.U. during 1966. These following data were taken on all lambs.

#### Data Collected

- |                                 |                                        |
|---------------------------------|----------------------------------------|
| 1. weight weighed off           | 22. feet and legs                      |
| 2. shrunk weight                | 23. pasterns                           |
| 3. hot carcass weight           | 24. wrinkles                           |
| 4. cold carcass weight          | 25. face covering                      |
| 5. USDA grade                   | 26. face color                         |
| 6. conformation score           | 27. horns                              |
| 7. maturity score               | 28. neck                               |
| 8. quality score                | 29. shoulder                           |
| 9. over all score               | 30. back                               |
| 10. loin eye area               | 31. loin                               |
| 11. fat thickness               | 32. condition - USDA grade             |
| 12. thickest point of fat (rib) | 33. rump                               |
| 13. fat 4-5 lumbar junction     | 34. leg                                |
| 14. shoulder width              | 35. grade                              |
| 15. leg width                   | 36. uniformity                         |
| 16. leg circumference           | 37. black fiber                        |
| 17. % of rack                   | 38. length of point of shoulder to hip |
| 18. % of trimmed hind saddle    | 39. length of point of shoulder to pin |
| 19. kidney knob                 | 40. length from hip to pins            |
| 20. conformation                | 41. age in days                        |
| 21. back conformation           | 42. hind saddle index                  |

Carcass Data

Carcass data were collected on eighty lambs during this past year. Simple averages of some of the carcass traits are presented in Table 2.

Table 2 - 1966 NC-50 Carcass Traits

Type mating <sup>1</sup>	44	55	66	77	46
No. Lambs	10	13	5	7	9
Age at Slaughter	174.3	157.5	154.4	185.3	165
Live wt. lbs.	93.5	104.7	105	88.0	103.3
Carcass wt.	45.6	55.4	56.3	44.5	53.8
USDA Grade <sup>2</sup>	10.2	12.1	11.4	10.4	11.4
Conformation Score	10.6	12.6	12.8	10.7	12.3
Loin eye area	1.79	2.20	2.55	1.75	2.09
% Rack	51.1	51.2	50.7	51.4	51.1
% Hind Saddle	48.9	48.8	49.3	48.6	48.5
Hind Saddle Index	106.2	154.1	160.4	104.2	142.6

1 - 44=Ohio Col., 55= Ill. Suff., 66= N.D. Suff., 77= N.D. Col.,  
46= Ohio Col. x N.D. Suff.

2 - 15= p<sup>+</sup> 14= p<sup>o</sup> 13= p<sup>-</sup>

Table 2 - 1966 NC-50 Carcass Traits (cont.)

Type Mating <sup>1</sup>	64	57	75	64x4	46x6
No. Lambs	5	1	9	16	5
Age at Slaughter	164.4	153.	151.1	181.8	146.4
Live wt. lbs.	100.2	109.	102.8	99.5	109.0
Carcass Wt.	50.9	55.	51.9	50.4	57.2
USDA Grade <sup>2</sup>	11.2	11.0	11.7	10.9	11.6
Conformation Score	11.8	12.0	12.0	11.1	12.6
Loin eye area	2.01	1.99	2.09	1.92	2.22
% Rack	51.5	52.7	50.8	50.8	50.9
% Hind Saddle	48.9	47.3	49.2	49.2	49.1
Hind Saddle Index	133.9	145.8	140.7	130.3	158.5

64=N.D. Suff x Ohio Col. 57=Ill. Suff x N.D. Col. 75= N.D. Col. x Ill. Suff.

2 - 15=p<sup>+</sup> 14= p<sup>o</sup> 13= p<sup>-</sup> These data indicate wide breed differences in carcass characteristics.



Analysis of these data show that significant differences between breeds were found characteristics except 11, 12, 13, 17, 18, 21, 22, 27, 36, and 39.

Selected data concerning carcass characteristics are presented in simple averages in table 2.

## EFFECTS OF INJECTABLE VITAMINS ON LAMB PRODUCTION

Objective: To determine if Vitamin A administered as a single injection will give a positive response in lamb production and which level will give the greatest response.

Procedure: A flock of 42 purebred Suffolk ewes were divided into three lots of equal age, weight and management background (one half of the ewes were fall shorn). Lot 1 ewes were given a single injection of 500,000 I.U. of Vitamin A about two weeks before the beginning of breeding season. Lot 2 received an injection of 250,000 I.U. of Vitamin A at the same time. Lot 3 was used as a control lot, receiving no vitamin injection.

Three flocks of commercial Columbia ewes to start lambing February 1, March 15 and May 1 were lotted and treated in the same manner as the Suffolk flock.

SUMMARY OF DATA FOR THREE YEARS:

		500,000	250,000	Control
		Lot 1	Lot 2	
No. ewes in trial	1964	32	32	32
	1965	35	35	35
	1966	35	35	35
	Total	102	102	100
Lambs dropped/ewe bred (percent)	1964	159.4	153.1	143.3
	1965	154.3	157.1	157.1
	1966	122.8	151.4	151.4
	Average	145.1	153.9	151.0
Lambs weaned/ewe bred (percent)	1964	143.8	137.5	123.3
	1965	140.0	142.9	142.9
	1966	111.4	140.0	142.8
	Average	131.4	140.2	137.0
Percent born 1st 17 days of lambing	1964	92.2	72.3	62.8
	1965	64.5	72.7	72.7
	1966	83.7	79.2	84.9
	Average	80.1	74.7	73.5
Pounds of Lamb Produced per ewe at 120 days	1964	104.7	105.9	96.4
	1965	116.1	123.3	117.9
	1966	97.7	118.6	121.4
	Average	106.2	116.2	112.7
Death loss of lambs (percent)	1964	9.8	10.2	14.0
	1965	9.3	9.1	9.1
	1966	9.3	7.5	5.7
	Average	9.5	8.9	9.3

SUMMARY:

After the third and final year of this trial, no distinct pattern of response to injectable Vitamin A can be seen.

In 1966 a consistently lower lambing percentage was observed for the lots receiving 500,000 units of Vitamin A. This response was not consistent over the three years, however. No consistent patterns were observable for data concerning lamb weights.

Data averaged over the three years shows an advantage in lambing percent, death loss and pounds of lamb produced at 120 days for the lots receiving 250,000 units of Vitamin A. Because of the variable response, however, the use of injectable Vitamin A can not be recommended for ewes being handled under similar conditions.

It must be remembered that these ewes were wintered on good quality alfalfa hay. The response to Vitamin A may be different under different conditions.

Title: EFFECTS OF FALL SHEARING ON LAMB PRODUCTION

Objective: To determine if shearing ewes prior to breeding has a beneficial effect in terms of increased twinning or more rapid and uniform conception rates due to fewer ill effects from warm fall weather.

Procedure: A flock of 42 purebred Suffolk ewes was divided into two lots of equal age and weight. One lot was shorn approximately 2 weeks before breeding and the other left unshorn. Both lots were handled as a single flock except for shearing. One ram was turned with the flock nights only.

Records were kept on ewe weight changes during the breeding season, gestation and lactation, number of lambs born and their 30 day and weaning weights.

SUMMARY OF A 4 YEARS DATA:

Percent lambs born per ewe bred		Not shorn	Shorn
		Lot 1	Lot 2
	1963	135.0	160.0
	1964	171.4	145.0
	1965	190.4	133.3
	1966	123.3	185.7
	Average	155.0	156.0
Percent Lambs Weaned per ewe bred			
	1963	105.0	125.0
	1964	166.6	120.0
	1965	161.9	123.8
	1966	123.3	166.6
	Average	139.2	133.9
Pounds of Lamb Produced per ewe at 120 days of age.			
	1963	80.9	95.1
	1964	120.8	90.3
	1965	136.3	93.6
	1966	109.4	141.8
	Average	111.9	105.2

SUMMARY:

After the fourth and final year of this trial the four year averages show that shearing ewes prior to breeding is a negative practice in North Dakota in terms of percent lambs weaned and pounds of lamb produced per ewe.

The results of this trial were not consistent from year to year. In those years, such as 1966, that weather during the breeding season was very mild, fall shearing did produce a large positive effect in percent lambs dropped and consequently, in pounds of lamb produced per ewe. However, because the weather in the Northern Plains is not predictable from month to month, fall shearing could not be recommended for this area.