

Controlling Spurge - 1998 Sheep Day Report

MANAGEMENT STRATEGIES TO EFFECTIVELY CONTROL LEAFY SPURGE IN RANGELAND BY GRAZING SHEEP

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Introduction and Justification

North Dakota has in excess of one million acres of rangeland that is impacted by the presence of leafy spurge. Most of the land is controlled (owned or rented) by producers of beef cattle. Severity of infestation is impacted by waterways, overhead electrical transmission lines, railways and roadways. Presence of trees, high water tables, waterways and environmentally protected plant and animal species are constraints to the usage of many herbicides as useful control methods. Increasing leafy spurge populations has negatively impacted economic well-being of many livestock producers in North Dakota.

Feed costs is the largest single component of total cost of production faced by sheep producers. Birth rate and survivability of lambs from birth to weaning are critical factors impacting gross income and net profit for the sheep producer.

The opportunity to reduce variable costs and increase cash flow while adequately controlling leafy spurge in an environmentally friendly manner is attractive for many North Dakota livestock producers. Cattle are a poor utilizer of leafy spurge plants as components of the range composition while many species of wildlife and small grazing ruminants are a very good utilizer of leafy spurge as a component of the range setting. Many livestock producers truly do not want to get heavily involved in the production of alternative species of livestock (primarily sheep and goats). Management strategies that will allow them to integrate with existing sheep producers, or potentially establish profitable associated enterprises that will reduce the presence of leafy spurge are attractive to many North Dakota livestock producers. An acceptable alternative may be to develop a cooperative structure that would establish sheep production units owned by cattle producers in areas where there are high concentrations of leafy spurge. These units might serve as a form of economic development for communities in the spurge impacted area. To do so they need a smorgasbord of alternatives and hard numbers to represent the income and expense of such proposed arrangements.

The North Dakota sheep industry provides in excess of \$10,000,000 new wealth annually (1993 ND Ag Statistics). Loss to the North Dakota Ag Economy is estimated to be in excess of 70 million annually from the impact and costs associated with controlling leafy spurge (Leistriz, 1991). The loss of the Federal Wool Incentive program will negatively impact the future of sheep producers in North Dakota. The potential exists to reduce costs for sheep producers by providing no-cost or low cost summer grazing and in turn improving range production for the sake of enhancing impacted beef producer's incomes.

The Sheepbud Shepherd IMS enterprise analysis was developed to assist sheep producers evaluate the economics of their operation (Nudell, 1994). Sheepbud Shepherd IMS is presently being S.P.A. tested and will be available to be used as a method of cross referencing the different strategies developed to control leafy spurge in the rangeland.

Experimental Procedure

Actual production associated with a variety of research trials at Hettinger Research Center will be evaluated economically to provide numerous strategies to be presented to industry for application. The strategies will address three different primary approaches to incorporating small ruminant animals in grazing plans focused on controlling leafy spurge. The strategies will be categorized on the basis of intensity of sheep production. Primary focuses will be: High Intensity (HI), Traditional Approaches (TI) and Low Intensity (LI). Data will be collected on; longevity, lamb survivability and routine production measures. An initial flock of 400 ewes will be established composed of 200 each of Rambouillet and Montadale x Rambouillet ewes. Half of each group will be born in 1993 and the other half in 1994. Similar breed type yearling replacement ewes will be added annually to keep numbers relatively constant. Similar numbers from each year and breed type will be initially assigned to each of five management strategies. The five management strategies will be compared to an existent accelerated lambing flock of 500 ewes (HI).

High Intensity Approach (HI)

Rambouillet ewes and rams will be utilized to increase the incidence of out of season mating. The attempt will be to select all replacements from fall born lambs of a closed flock of 500 ewes. Ewes will be mated and allowed to lamb in January and September as often as possible. Presently this flock of ewes is lambing at 1.4 lambings annually and presenting 1.5 lambs per lambing. This provides in excess of two lambs born per ewe annually. A 56 day weaning strategy will allow ewes to graze leafy spurge infested rangeland without the presence of lambs to reduce losses to predators under both lambing times. Both sets (January lambing and September lambing ewes) will summer graze leafy spurge at the Missouri River Correctional Center (MRCC), Bismarck, North Dakota. The High intensity group will be limited to fall born ewes which are similar age to the ewes in the other groups.

Traditional Approach (TI)

Rambouillet and Montadale x Rambouillet cross ewes that lamb in January and are exposed to lamb once annually with resulting production to be weaned at 60 days of age and put in the feedlot will be compared to genetically similar ewes that will lamb in April-May, weaning weights will be taken at 60 days. Both groups will be shed lambed with half to be reared in confinement and half in outside lots.

Low Intensity Approach (LI)

Rambouillet and Montadale x Rambouillet cross ewes of similar genetic background to the TI group will be mated to begin lambing mid-May. The intent is to begin lambing on the range at the onset of the time ewes begin grazing leafy spurge. The intent of this group is to measure if the sheep operation can support itself with the primary interest being to improve the range resource for the benefit of the beef cow. Also of interest will be observing the bonding mechanism as described at the Jornada Experiment Range site in New Mexico. Bonding of sheep to cattle would be of advantage to sustaining the sheep component of this strategy.

Economic Procedure

The approach will be to measure actual production figures and imply sound economics using the Sheepbud Shepherd IMS financial analysis program to cross reference comparisons.

Duration

The data accumulated from five lambing years for each of the strategies will be utilized to evaluate economic viability of the treatments. Data from the multi-species trial will be utilized to measure effectiveness of leafy spurge control and the impact on species composition at the site. (Economic impact should be known in five years, however, it may take longer to acquire full knowledge of impact on the range site.)

1997 Results and Discussion

The results presented are preliminary and provided for discussion only. A detailed systems evaluation of the data will be conducted at the conclusion of the project. Tables 1-6 represent performance data for the ewes of the five management systems for the years 1995 through 1997. Tables 1 and 2 give production information for the various ewe types and management systems lambing in the project. Tables 3 and 4 indicate performance of the lambs born in the project to a 60 day weaning time. Lambs born and reared on grass were weighed at a similar date and left on the ewe. Table 5 indicates reproductive performance of a similar age group of Rambouillet ewes HI on an accelerated lambing project as a control and table 6 the performance of those HI generated lambs.

Tables 7-11 merge data to look at some other questions that have been popular producer questions. Again this assembly of data is for discussion purposes only as it will require at least one productive lifetime to get a feeling for differences in the systems of production.

*It should be specifically noted that there is no selection for performance during the course of this project which will account for lower production because of deficiencies in maternal traits. The only criteria for removal from the trial is failure to perform reproductively or total lack of milk production.

Table 7 merges data for the years 1995 through 1997 for the purpose of comparing breed, lambing time and system. Table 8 merges lambing times to compare breed and system. Table 9 merges breed types

and lambing time to make a comparison of systems. Table 10 merges breed type and system to compare lambing times for the MI systems and further compares that to the LI system. Table 11 merges systems and lambing time to compare breeds. The HI control group data is not incorporated in any of the merged data sets.

JANUARY LAMBING MAY LAMBING

	<u>1995-1996</u>		<u>1997</u>		<u>1995-1996</u>			<u>1997</u>		
	RXR	RXR	RXR	RXR	RXR	RXR	RXR	RXR	RXR	RXR
Breed Type										
Rearing Type	IN	OUT	IN	OUT	IN	OUT	PAST	IN	OUT	PAST
Ewe Age @ Lambing in Months	23	23	38	38	27	27	27	42	42	42
Ewes Exposed	60	59	38	39	54	58	55	32	34	33
Ewes Lambing	52	56	35	37	51	55	51	26	26	28
Lambs Born	89	91	62	65	85	86	63	32	33	28
Lambs Weaned	72	77	53	45	58	57	51	24	30	28
	1.20	1.31	1.39	1.15	1.07	.98	.93	.75	.88	.85

R=RAMBOUILLET M= MONTADALE

PAST=PASTURE

IN=CONFINEMENT REARING

OUT=BARN AND LOT REARING

*NO RECORD

*ULTRASOUND UTILIZED TO DIAGNOSE DRY EWES ('96)

Table 2. Reproductive performance of Montadale-Rambouillet cross ewes under five different rearing strategies.

JANUARY LAMBING MAY LAMBING

	<u>1995-1996</u>		<u>1997</u>		<u>1995-1996</u>			<u>1997</u>		
	MXR	MXR	MXR	MXR	MXR	MXR	MXR	MXR	MXR	MXR
Breed Type										
Rearing Type	IN	OUT	IN	OUT	IN	OUT	PAST	IN	OUT	PAST
Ewe Age @ Lambing in Months	23	23	38	38	27	27	27	42	42	42
Ewes Exposed	56	53	49	41	53	53	50	36	33	40

Ewes Lambing	48	47	42	37	52	52	47	32	30	38
Lambs Born	67	67	66	58	66	68	53	38	47	42
Lambs Weaned	55	56	56	42	50	52	47	31	39	41
Lambs Weaned For Ewe Exposed	.98	1.06	1.24	1.02	.94	.98	.94	.86	1.18	1.03

R=RAMBOUILLET

M= MONTADALE

PAST=PASTURE

IN=CONFINEMENT REARING

OUT=BARN AND LOT REARING

*NO RECORD

*ULTRASOUND UTILIZED TO DIAGNOSE DRY EWES ('96)

Table 3. Performance of lambs born of Rambouillet ewes reared on five different strategies.

JANUARY LAMBING MAY LAMBING

Breed Type	<u>1995-1996</u>		<u>1997</u>		<u>1995-1996</u>			<u>1997</u>		
	RXR	RXR	RXR	RXR	RXR	RXR	RXR	RXR	RXR	RXR
Rearing Type	IN	OUT	IN	OUT	IN	OUT	PAST	IN	OUT	PAST
Wean Wt (Ibs.)	46.02	48.30	45.43	48.19	29.57	32.93	39.13	34.04	36.30	41.75
Wean Age Days	66.11	64.29	72.70	73.95	48.22	48.10	47.10	49.58	51.06	50.30
Wean Wt Corrected to 60 Days (lbs)	42.0	45.1	37.5	39.1	36.8	40.3	50.7	41.2	42.7	49.8
Pounds Lamb Weaned Per Ewe Exposed @ 60 Days	50.4	59.1	52.1	45.0	39.4	39.6	47.53	30.9	37.8	42.3

R=RAMBOUILLET

M= MONTADALE

Wean Age In Bold Print Calculated From Average Of Other Similar Groups.

Table 4. Performance of lambs born of Montadale-Rambouillet cross ewes reared on five different strategies.

JANUARY LAMBING MAY LAMBING

	<u>1995-1996</u>		<u>1997</u>		<u>1995-1996</u>			<u>1997</u>		
	MXR	MXR	MXR	MXR	MXR	MXR	MXR	MXR	MXR	MXR
Breed Type										
Rearing Type	IN	OUT	IN	OUT	IN	OUT	PAST	IN	OUT	PAST
Wean WT (lbs.)	47.54	50.24	43.14	50.71	29.06	34.15	42.74	37.5	38.3	35.5
Wean Age Days	61.75	67.37	70.94	74.74	47.48	49.82	49.68	37.0	53.2	46.0
Wean Wt	46.2	44.7	36.5	40.7	36.7	41.1	51.6	60.8	43.2	46.3
Corrected to 60 Days (lbs)										
Pounds Lamb Weaned Per Ewe Exposed @ 60 Days	45.3	47.4	45.2	41.5	34.5	40.3	48.5	52.3	51.0	47.6

R=RAMBOUILLET

M= MONTADALE

Wean Age In Bold Print Calculated From Average Of Other Similar Groups.

Table 5. Reproductive performance of Rambouillet ewes HI on an accelerated lambing strategy.

BREED TYPE RXR

	<u>1995</u>	<u>1996</u>	<u>1997</u>
	JAN/SEPT	JAN/SEPT	JAN/SEPT
LAMBING TIME			
REARING TYPE	IN/OUT	IN/OUT	IN/OUT
EWE AGE @ LAMBING TIME MONTHS	16/24	16/24	16/24
TOTAL EWES	98	121	93
EWES LAMBING	63/59	89/67	78/61
DRY EWES (BOTH LAMBINGS)	14	8	6
LAMBS BORN	81/88	114/90	113/69
LAMBS WEANED	64/76	90/86	79/55
% REARED OF THOSE BORN	79/86	79/95	

R=RAMBOUILLET

IN = CONFINEMENT REARING

Table 6. Performance of lambs born of Rambouillet ewes HI on an Accelerated lambing strategy.

BREED TYPE RXR

	<u>1995</u>	<u>1996</u>	<u>1997</u>
LAMBING TIME	JAN/SEPT	JAN/SEPT	JAN/SEPT
WEAN WEIGHT (LBS)	39.29/42.91	44.7/32.68	41.62/41.62
WEAN AGE (DAYS)	64.35/65.22	62.9/56.18	66.74/63.63
WEAN WT CORRECTED TO 60 DAYS (LBS)	36.6/39.6	42.6/34.9	37.42/39.24
TOTAL LBS OF LAMB PRODUCED PER EWE @ 60 DAYS (LBS)	56.57	56.49	54.99

R=RAMBOUILLET

* = EXTREMELY WET CONDITIONS IN LOTS

Table 7. Merged data for the years 1995 - 1997 for the purpose of comparing breed, lambing time and system.

JANUARY LAMBING MAY LAMBING

Breed Type	MXR	MXR	RXR	RXR	MXR	MXR	MXR	RXR	RXR	RXR
Rearing Type	IN	OUT	IN	OUT	IN	OUT	PAST	IN	OUT	PAST
Ewes Exposed	105	94	98	97	97	86	86	86	92	88
Ewes Lambing	90	84	87	93	84	82	85	77	81	79
Lambs Born	133	125	151	156	104	113	93	117	119	92
Lambs Born/	1.26	1.33	1.54	1.61	1.17	1.31	1.02	1.36	1.29	1.05
Ewes Exposed										
Lambs Weaned	111	98	125	116	81	91	88	82	87	79

Lambs	1.06	1.04	1.28	1.20	.91	1.06	.97	.85	.95	.90
Weaned/ Ewes Exposed										

Table 8. Merged lambing times to compare breed and system.

BREED TYPE AND SYSTEMS

Breed Type	MXR	MXR	MXR	RXR	RXR	RXR
Rearing Type	IN	OUT	PAST	IN	OUT	PAST
Ewes Exposed	194	186	89	184	189	88
Ewes Lambing	174	166	85	164	174	79
Lambs Born	237	238	95	268	275	92
Lambs Weaned	161	150	88	207	209	79
Lambs Weaned/ Ewe Exposed	.83	.81	.99	1.13	1.11	.90

Table 9. Merged breed types and lambing time to make a comparison of systems.

LAMBING SYSTEMS

	IN	OUT	PAST
Ewes Exposed	378	378	179
Ewes Lambing	338	345	164
Lambs Born	505	508	187
Lambs Weaned	399	406	167
Lambs Weaned/ Ewe Exposed	1.06	1.07	.93

Table 10. Merged breed type and system to compare lambing times for the MI systems and further compares that to the LI system.

LAMBING TIME AND SYSTEM

		<u>MI</u>	<u>LI</u>
	JAN (IN& OUT)	MAY (IN & OUT)	MAY (PAST)
Ewes Exposed	395	353	179
Ewes Lambing	354	324	164
Lambs Born	575	453	187
Lambs Weaned	450	341	167
Lambs Weaned/	1.14	.97	.93
Ewe Exposed			

Table 11. Merged systems and lambing time to compare breeds. The HI control group data is not incorporated in any of the merged data sets.

BREEDS

	MXR	RXR
Ewes Exposed	465	462
Ewes Lambing	425	417
Lambs Born	570	635
Lambs Weaned	469	495
Lambs Weaned/	1.01	1.07
Ewe Exposed		

Summary

Environmentally the need is to control leafy spurge with reduced reliance on herbicide exists. This research is needed to preserve the role of the sheep industry in North Dakota agriculture and to improve the economic viability of impacted beef producers.

References

Leistritz, F.L., D.E. Bangsrud and J.A. Leith. 1994. Economic Impact of Leafy Spurge in North Dakota. Leafy Spurge News Vol XVI Issue 1.

National Agricultural Statistics Service 1993. Sheep and Lamb Inventory. USDA, Washington, D.C.

Nudell, D.J., Where Will My Business Records Take Me. 35th Annual Western Dakota Sheep Day

Progress Report.