JOURNAL OF THE NACAA

ISSN 2158-9429

VOLUME 5, ISSUE 2 - DECEMBER, 2012

Editor: Donald A. Llewellyn

FLUSHING EWES IMPROVES THE NUMBER OF OFFSPRING IN A COMMERCIAL RANGE MANAGEMENT OPERATION

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ABSTRACT

We examined the effect of flushing ewes (feeding extra protein and energy just prior to breeding to increase ovulation) on a rangeland operation near Lyman, WY. Rambouillet, Rambouillet x Finn, and commercial wool sheep were supplemented in two studies. In study one, ewes and rams were fed 1.11 lbs/day of supplement in an open-range setting for 35 days, beginning a week before breeding. Lambing rate was determined at docking. In study two, a pen study, ewes were fed grass hay and supplement at the same rate as range ewes. Lambing rate was determined at birth. Supplementation can increase lambing rate and profits.

INTRODUCTION

Ewes in poor body condition and/or malnourished often have lower ovulation and pregnancy rates than ewes in good body condition and on a good plane of nutrition (Gunn and Doney, 1975). Poor or severe lack of nutrition is a primary cause of embryo loss (Smith, 1991).

Flushing or supplementing ewes just prior to, and during the breeding season can improve the ovulation rate of ewes. Stewart and Oldham (1986) observed that feeding lupin grain to ewes for as little as four days in the final stages of estrous increased the frequency of twin ovulations by 20 to 30%. Flushing can increase ovulation rate, boost sperm production, and reduce embryo loss in early gestation (Martin et al., 2004).

Many producers try to minimize the cost of supplemental feed because it is often their greatest expense (Martin et al., 2004). The strategic use of nutritional supplements can improve both production and profitability. Supplements should complement forage available on rangeland. This study was designed to observe the effect of flushing ewes on a commercial sheep operation on rangeland in Wyoming.

MATERIALS AND METHODS

The study was conducted on 420,000 acres of sagebrush-steppe rangeland at Larson Livestock Inc. near Lyman, WY. At the time of the study, in the fall of 2009, the operation ran about 6,500 breeding ewes and replacements. The ranch has a poor lamb survival rate (typically between 70 to 75 percent), which is calculated when the lambs are docked and castrated.

Animals: Rambouillet, Rambouillet x Finn crossbreds, and commercial wool sheep were used in this study. A band of 1600 mature ewes from Larson Livestock was selected for supplementation. This group was further divided into two groups; Group 1 contained 326 ewes that were fenced on rangeland and Group 2 contained 1264 ewes that were on open range and moved daily by a herder. Ewes were paint branded in late fall to designate treatment group and removed from other sheep. Remaining bands were divided into smaller groups ranging from 250 to 550 animals and fenced on rangeland for the fall and winter. A herder did not move groups of ewes that were fenced on rangeland. During the breeding season the ratio of rams to ewes was one ram for 25 ewes.

Pelleted Supplement: Composition of the supplement is presented in Table 1. Supplement was pelleted for ease of distribution and to reduce waste when fed on the ground. Subsamples of the pelleted supplement were collected at the beginning of the study from randomly selected bags of pelleted feed. Subsamples were ground thru a one mm screen and composited for analysis. Dairyland Laboratories, Inc. analyzed the supplement for mineral content, dry matter, organic matter, neutral detergent fiber, and crude protein (Table 2).

Feed	Supplement (%)
Alfalfa meal	10.00
Barley	68.00
Wheat	12.05
Canola meal	1.30
Molasses	5.00

Urea	1.35
Limestone	2.00
Monocalcium phosphate	0.25
Bovatec	0.05

Table 1. Percentage of feed ingredients in supplement

Chemical component	% as fed	% dry matter
Dry matter	92.7	100.0
Organic matter	88.2	95.1
Crude protein	17.2	18.6
Neutral detergent fiber	15.2	16.4
Total digestible nutrients	69.9	75.4
Net energy-maintenance	77.2	83.3
Net energy-gain	50.7	54.7
Fat	2.0	2.2
Ash	4.5	4.9
Calcium	0.34	0.37
Phosphorus	0.39	0.42

Table 2. Chemical composition of supplement

Range Study: The range study was initiated on November 23, 2009. The initial amount of supplement fed to ewes was 0.40 lb/hd/day and was gradually increased to 1.3 lb/hd/day by the end of the breeding season. Pellets were fed on the ground and distributed so that every animal had a chance to consume at least 0.5 lb/hd/d of supplement during the trial. Supplement was offered for 35 days from November 23 to December 28, 2009. Both ewes and rams were supplemented for one week before rams were turned out with ewes. Supplement was fed in the morning. Lambing rate is difficult to determine on rangeland so the number of lambs per flock was determined when lambs were gathered for castration, docking and vaccination the following spring. This is the normal practice for Larson Livestock.

Small-Scale Study Lambing Rate: Lambing rate for ewes lambing on rangeland is difficult to calculate, thus a small-scale study was conducted to determine the average lambing rate for ewes from Larsen Livestock under more controlled conditions. Fifty ewes were randomly selected from the bands as they were divided into groups and paint branded for the range study.

Ewes were moved to a fenced area and randomly divided into two groups of 25. Each morning, half the ewes received the supplement at the same rate as the range ewes. The other half did not receive any supplement. Water, native grass hay, and salt were provided during the study. Ewes were penned in an area with shelter and protection from predators. The number of lambs born for each ewe was determined at lambing.

Economic Analysis: Costs related to flushing were compared (Table 3). Price of feed was obtained from several local feed mills. Commodity feed prices reflect their cost as of November 2009 (Table 2). The price of lambs was set at $115.57/cwt, which was the average price per head paid for slaughter lambs at Fort Collins, CO in 2009.

Feed	%	Price ($/ton)	Price[1]
Wheat	12.05	192.00	23.12
Barley	68.00	140.00	95.20
Canola	1.30	240.00	3.12
Alfalfa meal	10.00	190.00	19.00
Urea	1.35	600.00	8.10
Molasses	5.00	180.00	9.00
Moncalcium phosphate	0.25	280.00	0.60
Limestone	2.00	30.00	0.50
Bovatec[2]	0.05	300.00	6.00
Processing	N/A	N/A	98.00
Total cost/ton	N/A	N/A	262.66

Table 3. Cost of supplement ($/ton)

[1]Price ($) of each feed ingredient per ton of supplement

[2]Bovatec is expressed as $/50 lb

RESULTS AND DISCUSSION

Small-Scale Lambing Rate Study: Over the 35 days, ewes received 1.11 lb/day of supplement or 39 pounds of supplement during the study. Lambing rate increased 37% for ewes receiving supplement compared to those not receiving supplement (Table 4). One ewe from the group not receiving supplement died during the study: the cause of death could not be determined.

Treatment	Number of ewes	Number of lambs	Lambing rate
Flushed ewes	25	28	112%
Control ewes	24	18	75%

Table 4. Lambing rate for small-scale pen study

Range Study: Since this study took place on the range, it was impossible to assess the number of lambs that died prior to docking or their cause of death. As a result, we used survival rate at the time of docking to compare the two groups.

On average, supplementation increased lamb survival rate from 78% (without supplement) to 90% (with supplement) on the range. Lamb survival rate ranged from 72% to 86% for ewes not receiving supplement (Table 5). Lamb survival rate ranged from 88% to 91% for ewes receiving supplement (Table 6), an average increase of 10.7% for lambs from ewes that were supplemented on range.

Location	Number of ewes	Number of lambs	% of lambs/ewe at docking
Westburn Well	560	403	72.0%
Monger Knoll	533	439	82.4%
Carter Bridge	448	353	78.8%
Beacher Knoll	372	318	85.5%
Stolen War	233	175	75.1%
Average			78.7%

Table 5. Lamb survival rates for ewes not receiving supplement

Location	Number of ewes	Number of lambs	% of lambs/ewe at docking
Moving Flock	1264	1145	90.6%
Barrel springs	326	288	88.3%
Average			89.5%

Table 6. Lamb survival rates for ewes receiving supplement

Economic Analysis: In 2009, to break even on the supplement costs, lamb survival rate needed to be at least 84% to cover the price of supplement eaten by ewes. If the average lamb survival rate (89.5%) was applied to all ewes in the study, an additional 233 lambs would have been sold. If the weight of lambs at sale was 90 lbs and a selling price was $1.15/lb, the additional revenue gained by flushing ewes due to increased lamb sales would have been $13,050. In 2011, the economic analysis was re-evaluated as both grain and lamb prices had increased (Table 7). The same ration increased to $451.41/ton, but lamb prices had increased to $2.05/lb. In this scenario, the additional revenue gained by flushing ewes due to increased lamb sales was $23,985. In 2012, grain prices were still high, but lamb prices had fallen. The cost of the ration had decreased slightly to $444.22/ton and lamb prices had fallen to $1.10/lb. In this case, the additional revenue gained by flushing ewes due to increased lamb sales was $3,798. However, one large producer in the area reported recently that he received just $0.83/lb for his lambs. At $0.83/lb, the producer would have lost $1,277 due to supplementation.

Feed	Price[1] 11/09	Price[1] 09/11	Price[1] 09/12
Wheat	192.00	350.00	280.00
Barley	140.00	308.00	280.00
Canola	240.00	300.00	433.00
Alfala meal	190.00	305.00	320.00

Feed	Price[1] 11/09	Price[1] 09/11	Price[1] 09/12
Urea	600.00	630.00	630.00
Molasses	180.00	485.00	540.00
Limestone	30.00	48.00	60.00
Monocalcium phosphate	200.00	271.00	700.00
Bovatec[2]	300.00	300.00	300.00
Processing costs	98.00	125.00	138.00

Table 7. Increase in feed prices from 2009 to 2012
[1]Price base per US ton/ 2000 lbs
[2]Bovatec expressed as $/50 lb bag

The profitability of flushing will obviously depend on both lamb and grain prices. Asking for help formulating a ration from a local feed mill will enable producers to check on the nutrient content and price of feed ingredients, prior to formulating the ration. For example, in 2009 molasses was $180 a ton but by 2011 and 2012 it was $485 and $540 a ton, respectively. Molasses could have been replaced with a less expensive feed without reducing the energy content of the feed. Unfortunately, regardless of ingredients, formulating a pelleted ration is expensive. Processing costs add a hundred dollars per ton or more to the cost of a supplement.

Producers may be able to cut costs by shortening the supplementation period or feeding less processed feeds. Hulet et al. (1962) flushed ewes with 0.7 lbs of oats for 17 days prior to breeding. Flushing increased lambing rate, birth rate, and pounds of lambs weaned. Continuing to supplement ewes for another 17 days during the first days of breeding did not increase production but doubled supplementation costs. Supplementing for 34 days during breeding actually caused a decline in production. Ocak, Cam and Kuran (2006) found that supplementing ewes with either 58 g or 113 g of protein for 17 days either prior to or during breeding increased lambing rate from 1.09 to 1.32 lambs/ewe. Supplementing them for 34 days, 17 days before and 17 days after breeding began, did not increase lambing rate.

Feeding ewes additional nutrients to improve lambing rate likely needs to be done daily. Lambing rate did not increase when ewes were supplemented twice a week with alfalfa pellets at a rate of 5 lbs/ewe/week for 34 days (17 days before and the first 17 days of breeding) compared to lambs that received no supplement (Torell et al., 1975).

Ewes in good body condition may not benefit from flushing. Ewes in high body condition (BCS 3.8) (BCS range from 1-very thin to 5-fat) had similar lambing and conception rates as ewes in lower body condition (BCS 2.7) when both were fed alfalfa pellets at 1.5% of maintenance for 21 days prior to breeding (West, Meyer and Nawaz, 1991). In either case, the lambing rate was the same for both groups of ewes (1.7 lambs/ewe). However, better body condition may affect conception rate. In another study by West, Meyer and Nawaz (1991) ewes with a BCS of 3.9 had lower conception rates (79%) than ewes in lower body condition (BSC 1.7) that were flushed with alfalfa pellets at 1.5% of maintenance for 21 days prior to breeding (94%). The litter size for ewes in high body condition was higher (2.15 lambs/ewe) than for ewes in lower body condition (1.82 lambs/ewe).

Feeding an excess of nutrients immediately after conception does not improve embryo survival. Embryo survival was greatest in ewes fed a maintenance diet compared to ewes fed either 200% or 25% of maintenance from day 2 to day 16 after mating. Body condition score did not affect embryo survival (Cummings et al., 1975).

CONCLUSIONS

Flushing ewes increased lamb survival rate both on rangeland and in the control pen study. In general, flushing improved profits in 2009 for Larson Livestock Inc. Whether or not flushing is economical for other range operations will depend on the cost of the supplement, the increase in lambing rate, and the price received for lambs. Ways to reduce the cost of supplementation may include reducing the length of time ewes receive supplement, and feeding low-cost alternatives where appropriate. Using supplementation effectively also depends on the body condition of ewes, because animals with a BSC higher than 3.5 may not require supplementation. Producers may also increase numbers of lambs at sale through selective culling, improved herd health, and reduced predation.

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