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An Evaluation of Western Whiteface Lamb Loss on the Range

R.R. Redden, S.H. Cox, M.R. Rubio, and T.T. Ross.

Department of Animal and Range Sciences, New Mexico State University, Las Cruces, NM 88003

ABSTRACT: The objective of the three year study at the New Mexico State University Corona Range and Livestock Research Center was to identify the periods at which reproductive wastage is greatest. Western Whiteface Ewes were randomly divided into four similar pastures in 2003, 2004, and 2005. Rams were randomly applied to each treatment at a rate of less than 25 ewes per ram for a breeding season of 34 to 40 d. In 2005, ovulation rates were measured in eight randomly selected ewes from each pasture via mid-ventral laparotomies 28 d after the breeding season began. Each year, one week before expected lambing half of the ewes from each pasture were randomly selected and brought in the corrals to be shed lambed in order to estimate the number of lambs born per ewe. Lambs born to the shed lambing ewes were ear tagged, weighed, and returned to their original pasture within 24 h of birth. Approximately 55 d after onset of lambing, lambs were docked, castrated, weighed, and ear tagged (pasture born lambs). Lambs were weaned at about 150 d after lambing began and all lamb IDs' and weights were recorded. Across all pastures and years potential lamb survival averaged 134, 121, and 113 percent of ewes exposed to rams for birth (shed lambing), marking, and weaning rates, respectively. Shed lamb survivability at birth was greater ($P < 0.001$) than shed lamb survivability at marking and weaning. Lamb survivability was similar from marking to weaning for both pasture ($P > 0.5$) and shed lambs ($P > 0.10$). Ovulation rates (1.75 CLs per ewe) were greater ($P < 0.01$) than birth, marking, and weaning rates for 2005. Assuming ovulation rates represent potential lambs, combining prenatal and pre-marking lamb loss a total of 31 percent potential lambs were absent at weaning.

Keywords: sheep, western white face, reproductive wastage, lamb survivability

Introduction

Willingham et al. (1986) conducted a 10 year study with Rambouillet sheep on Texas rangelands and showed 152, 118, 117, 103, and 101 percent ovulation, viable embryos (> 20 d post breeding), lambing, marking, and weaning rates, respectively. Their greatest reproductive losses were from ovulation to presence of viable embryos and from lambing to marking.

Reasons for early reproductive loss can include fertilization failure, embryonic death, and failure to maintain the corpus luteum. Willingham et al. (1986) also showed that 95.1 % of ewes were pregnant at greater than 20 days post mating, which alludes to the fact that most early reproductive failures are due to the inability of the embryo to survive. Moreover, Kleemann et al. (1990) stated that high ovulating ewes have higher percentages of embryonic mortalities than single ovulating ewes. Improving survival of embryos in sheep has been successfully accomplished by the administration of progesterone post mating (Parr et al., 1987, Kleemann et al., 1991, and Nephew et al., 1994) but uneconomic for a range operation.

The second area of high concern for range reproductive loss is the time between lambing and marking. Rowland et al. (1992) showed that 8.2 to 12.2 % of lambs die within 24 hours of parturition and 85 % of the lambs lost were born to ewes having two or more lambs. Moreover, the leading causes of perinatal lamb loss were starvation, dystocia, stillbirth, and infectious disease.

Since the major income for sheep producers depends on the pounds of weaned lamb, knowing what time period that reproductive loss is the greatest could be very beneficial to the New Mexico sheep producer.

Material and Methods

In 2003, 2004, and 2005, Western white face ewes (n=102, 110, and 216, respectively) were divided equally into four pastures at the Corona Range and Livestock Research Center. Each pasture consists of approximately 223 ha and was comparable in forage production. Suffolk or Rambouillet sires were randomly assigned to each pasture (three rams per pasture) and ewes were exposed to the rams for 34-40 days.

One week prior to the onset of lambing (day 0 is onset of lambing) half the ewes from each pasture were randomly selected to be penned and lambed in confinement (shed). Birth weights were recorded and lambs were ear tagged for identification purposes. Within 24 h post parturition, these ewes and lambs were returned to their original pastures. Birth weights and type of birth were recorded from the confinement lambed group. On day 55 (marking), all the lambs were ear tagged, docked, males castrated, and body weights recorded. On day 150 (weaning), all lambs were weaned and body weights were recorded.

In 2005, surgical laporotomies were conducted twenty days into the breeding season on eight ewes from each pasture to estimate ovulation rates. All procedures were approved by the NMSU, Institutional Animal Care and Use Committee (2004-028).

Data were analyzed as a completely random design to test the effects of lamb survivability among periods of production (PROC GLM of SAS; SAS Inst., Inc. Cary, NC).

Results and Discussion

Confinement lambing data pooled over three years showed 134, 111, and 101 percent lambs alive per ewe exposed to rams for birth, marking, and weaning, respectively. Lamb survival was greater ($P < 0.05$) at birth than marking or weaning and no difference ($P > 0.10$) between marking and weaning was detected (Table 1). Ewes showed very few instances of dystocia and/or lambs dead upon arrival, suggesting that the greatest lamb loss was due to starvation and predation. Pasture born birth rates were not collected but 131 and 126 percent lambs per ewe were present at marking and weaning, respectively. Similarly, no difference ($P > 0.5$) was detected for lamb survival between marking and weaning (Table 1). All sheep were guarded by livestock guard dogs to minimize predation, yet confirmed coyote kills (2005) were found.

Assuming ewes had similar lambing rates, pasture born lambs had greater ($P < 0.05$) lamb survivability at marking than did confinement born lambs at marking. Higher marking survival rates for the pasture born lambs carried over to greater ($P < 0.05$) weaning rates for the pasture born lambs as compared to confinement born lambs. We attribute this depression in lamb survivability to human interaction with flight prone ewes during the return of ewes and lambs to pasture after birth.

In 2005, lamb crop percentages were determined to be 175, 124, 110, and 103 lambs per ewe exposed for ovulation, birth, marking, and weaning, respectively (Table 1). Assuming ovulation rate represents potential lambs, ovulation rates were greater ($P < 0.05$) than birth, marking, and weaning rates in both shed and pasture born groups.

Similar to Willingham et al. (1986), range lamb loss is greatest from ovulation to birth. Secondly birth to marking lamb loss was high, which may have been increased by human involvement during the bonding period. Rowland et al. (1992) stated that most perinatal lamb loss occurred 24 h after parturition, and starvation attributed for most of this lamb loss.

Implications

Our data clearly shows that the greatest reproductive wastage occurs from ovulation to birth and from birth to marking. Outside of proper nutrition, little is known to efficiently improve range lamb survival between ovulation and birth. However, good animal husbandry may improve lamb survivability between lambing and marking.

Literature Cited

Kleemann, D. O., S. K. Walker, J. R. W. Walkley, D. H. Smith, R. J. Grimson, and R. F. Seamark. 1991. Fertilization and embryo loss in booroola merino X south australian merino ewes: Effect of the F gene. Theriogenology. 33:487-497.

Nephew, K. P., H. Cardenas, K. E. McClure, T. L. Ott, F. W. Bazer, and W. F. Pope. 1994. Effects of administration of human chorionic gonadotropin or progesterone before maternal recognition of pregnancy on blastocyst development and pregnancy in sheep. J. Anim. Sci. 72:453-458.

Parr, R. A., I. F. Davis, R. J. Fairclough, and M. A. Miles. 1987. Overfeeding during early pregnancy reduces peripheral progesterone concentration and pregnancy rate in sheep. J. Reprod. Fert. 80:317-320.

Redden, R. R., S. H. Cox, and T. T. Ross. 2005. Breeding Suffolk rams to Western whiteface ewes on New Mexico rangelands increased weaning weights of lambs. Proc. West. Sec. Amer. Soc. Anim. Sci. In Press.

Rowland, J. P., M. D. Salman, C. V. Kimberling, D. J. Schweitzer, and T. J. Keefe. 1992. Epidemiologic factors involved in perinatal lamb mortality on four range sheep operations. Amer. J. Vet. Res. 53:262-267.

Willingham, T., M. Shelton, and P. Thompson. 1986. An assessment of reproductive wastage in sheep. Theriogenology, 26:179-188

Table 1. Range lamb survivability (lambs present per ewe exposed to rams) when born to Western whiteface ewes in the pasture or confinement setting and reared on central New Mexico rangelands.[1,2]

	Shed Lambing					Pasture Lambing		
Year	Ovulation	Birth	Marking	Weaning	SE	Marking	Weaning	SE
2003		138	118	109		145	139	
2004		139	116	105		128	117	
2005	175[a]	124[b]	99[c]	92[c]	5.3	120[b]	113[b]	5.3
Avg[3]		**134[a]**	**111[b]**	**101[b]**	**4.5**	**131**	**126**	**6.6**

[1] Ewes were divided into four pastures and pasture was the experimental unit.
[2] Births were recorded from the shed born lambs, and half of each pasture was shed lambed. Ewes and shed born lambs were returned to their pasture on the day of birth (d 0), all lambs were marked on d 55, and weaned on d 150.
[3] Means were averaged from pastures and years as replications to evaluate lamb survivability (n=9).
[abc] Row means (% lamb survivability) with different superscripts differ ($P < 0.05$).