

## Production, Management and the Environment: Small Ruminant

**M325 Feedlot performance and carcass traits of hairsheep lambs treated with a  $\beta$ -adrenergic agonist during summer.** J. V. Velázquez-Morales, F. D. Álvarez-Valenzuela, N. G. Torrentera-Olivera, J. Rodríguez-García, U. Macías-Cruz, A. Correa-Calderón, and L. Avendaño-Reyes\*, *Instituto de Ciencias Agrícolas, Universidad Autónoma de Baja California, Ejido Nuevo Leon, Valle de Mexicali, Baja California, Mexico.*

The objective of this study was to determine the effect of feeding the  $\beta$ -agonist zilpaterol hydrochloride to female lambs on growth traits and carcass characteristics during hot ambient temperatures. Twenty female lambs from hairsheep crossbreeds with an average initial BW of  $32.2 \pm 0.58$  kg were used in a 33 d feeding study. The lambs were blocked by initial BW and assigned individually to 20 pens in a closed calf rearing unit provided with fans during summer. Data were analyzed under a completely randomized block design. Treatments were: 1) Control (C: no  $\beta$ -agonist in the diet), comprising a formulation of wheat grain, molasses, alfalfa hay, soybean meal, wheat straw, and a mineral supplement; and 2) a treated group supplemented (as fed basis) with 10 mg of zilpaterol hydrochloride (ZH; Zilmax, Intervet, Mexico City, Mexico) per head per day. The ZH feed additive was mixed into 100 gr of wheat grain and was offered daily in the morning before offering the finishing diet. Climatic conditions during the study revealed a severe heat stress conditions, with an average ITH of 88.2 units during the study. Lambs fed ZH had similar ( $P > 0.05$ ) feedlot performance (daily weight gain, final weight, fed intake, feed conversion, and gain:feed ratio) than control lambs. The  $\beta$ -agonist increased hot and chilled carcass weights, with carcasses from ZH lambs being 13% and 12% heavier ( $P < 0.01$ ) than carcasses from C lambs respectively. Dressing percentage was higher in ZH lambs (53.8%;  $P < 0.01$ ) than in C lambs (46%). The rib-eye area was larger ( $P < 0.05$ ) in ZH lambs (18.9 cm<sup>2</sup>) than in C lambs (15.5 cm<sup>2</sup>), as well as carcass conformation (7.0 vs 6.0 units for ZH and C lambs, respectively). There was no difference ( $P > 0.05$ ) in carcass length, fat thickness, kidney, pelvic and heart fat, and shear force between ZH and C lambs. Hide and head weights, as well as weight of several internal organs (heart, lungs, liver, kidneys, small intestine, and rumen, omasum and abomasum) did not differ between treatments ( $P > 0.05$ ). Even though the severe hot ambient conditions observed during the study, some carcass traits were improved in hairsheep female lambs supplemented with zilpaterol hydrochloride.

**Key Words:** female lambs, zilpaterol hydrochloride, heat stress

**M326 Genetic factors affecting survival rate and litter size of Pelibuey ewes under two times of weaning in northwestern Mexico.** U. Macías-Cruz<sup>1</sup>, F. D. Álvarez-Valenzuela<sup>1</sup>, A. Correa-Calderón<sup>1</sup>, L. Molina-Ramírez<sup>2</sup>, and L. Avendaño-Reyes\*<sup>1</sup>, <sup>1</sup>*Instituto de Ciencias Agrícolas, Universidad Autónoma de Baja California, Ejido Nuevo León, Valle de Mexicali, Baja California, México,* <sup>2</sup>*Centro de Bachillerato Tecnológico Agropecuario No. 41, Poblado Benito Juárez, Valle de Mexicali, Baja California, México.*

The aim of this study was to evaluate the effect of sire breed, type of birth and lambing year on some traits of Pelibuey ewe productivity in 2 times of weaning. As part of a hairsheep crossbreeding program between Pelibuey (Pb) ewes and Dorper (Dr), Katahdin (Ka) and Pb rams, data from 250 ewes lambing during 2003 and 2008 were used to characterize Pb ewe productivity with breeds specialized in mutton production. Response variables were litter size, and survival rate at 0 (lambing), 30, 60 and/or 90 d post-lambing per ewe lambing. Weaning time at 60

d occurred from 2003 to 2005, and weaning time at 90 d from 2005 to 2008. The information was divided based on weaning time, 60 or 90 d. Two models based on a factorial design, which included fixed effects of lambing year, type of birth (1, 2, or > 3) sire breed (3) and double interactions among them were performed. For 60 d weaning time, sire breed did not influence ( $P > 0.05$ ) litter size or survival rate at lambing; but at 30 and 60 d post-lambing, survival rate was greater ( $P < 0.01$ ) in litter of ewes mated by Ka sires ( $0.96 \pm 0.05$  and  $0.95 \pm 0.05$ ) than those mated by Pb sires ( $0.78 \pm 0.05$  and  $0.68 \pm 0.06$ ). Ewes with multiple lambing ( $P < 0.05$ ) had higher litter size ( $3.20 \pm 0.06$ ,  $2.44 \pm 0.12$  and  $2.18 \pm 0.14$  lambs/ewe lambing at 0, 30 and 60 d, respectively) but lower survival rate ( $0.78 \pm 0.05$  and  $0.70 \pm 0.05$  at 30 and 60 d, respectively) than those ewes with single or twin lambing during all pre-weaning period. For 90 d weaning time, there was higher ( $P < 0.05$ ) litter size at 30, 60 and 90 d in ewes with multiple lambing and mated by Dr or Ka sires than all other ewes. At 30, 60 and 90 d, ewes with multiple lambing had the lowest ( $P < 0.05$ ) survival rate than those of single or twin lambing. Survival rates at weaning time (60 and 90 d) were affected ( $P < 0.05$ ) by lambing year in both models. Collectively, these results suggest that survival rate and litter size of Pb ewes could be improved through crossbreeding schemes including Dr or Ka. Type of lambing had a marked influence on survival rate and litter size.

**Key Words:** hair sheep, ewe lambing, weaning

**M327 Artificial insemination in reindeer using frozen-thawed semen.** M. P. Shipka\*<sup>1</sup>, J. E. Rowell<sup>1</sup>, and S. Bychawski<sup>2</sup>, <sup>1</sup>*University of Alaska Fairbanks, Fairbanks,* <sup>2</sup>*Optimum Genetics, Regina, Saskatchewan, Canada.*

Traditional practices of extensive reindeer ranching on the Seward Peninsula, Alaska, are being modified to accommodate a rapidly changing environment. Holding reindeer in large enclosures during vulnerable times of the year (breeding and calving season) is a practice being tried by some herders. Enclosing reindeer, even temporarily, requires the adoption of management strategies more typical of traditional agriculture. However, such strategies need to be modified to cope with the extreme logistics imposed by an arctic environment. Artificial insemination has been proposed as an alternative to maintaining rutting bulls in enclosures. Our objective was to evaluate the practicality of using AI in the Alaska reindeer industry. Semen was collected from a 15 mo-old reindeer bull in Saskatchewan, Canada, processed to a final dilution of  $3.5 \times 10^7$  sperm per 0.5cc straw, frozen and shipped to Alaska. Sperm motility was 70% (fresh) and 45% (thawed) with 68% normal sperm. We applied a white-tailed deer AI protocol to 8 nulliparous, 2.5 yr-old captive reindeer at the UAF Agricultural and Forestry Experiment Station. The female reindeer were synchronized with CIDR-b, modified to fit the smaller reindeer vagina, using a 2 CIDR, 14 d schedule. At removal of the second CIDR, the females received 200 IU PMSG I.M. (either PG 600, n = 4; or PMSG, Sigma Chemicals, n = 4). At the time of breeding, one female's vagina was too small to accommodate the speculum and she was dropped from the study. The remaining 7 females exhibited signs of estrus (copious, clear mucus) at insemination. Intra-cervical insemination took place 55 h after CIDR removal. PSPB assay of serum collected 11 wks post-insemination indicated 1 pregnant female, 1 female possibly undergoing pregnancy loss and 5 open females. Options for increasing pregnancy rate within the context of the logistics imposed by an arctic reindeer industry require further research.

**Key Words:** reindeer, artificial insemination

**M328 Constant long artificial days increase milk production in Alpine goats in northern Mexico.** R. Rodríguez-Martínez<sup>\*1</sup>, C. A. Meza-Herrera<sup>2</sup>, M. A. De Santiago-Miramontes<sup>1</sup>, M. Mellado<sup>3</sup>, and F. G. Véliz<sup>1</sup>, <sup>1</sup>Universidad Autónoma Agraria Antonio Narro, Torreón, Coahuila, Mexico, <sup>2</sup>Universidad Autónoma Chapingo, Unidad Regional Universitaria de Zonas Áridas, Bermejillo, Durango, México, <sup>3</sup>Universidad Autónoma Agraria Antonio Narro, Buenavista, Saltillo, Coahuila.

The aim of this study was to determine if the use of an artificial long-day photoperiod scheme during winter and spring improves milk production in Alpine goat raised in Northern Mexico. Alpine multiparous goats (n = 40) were randomly assigned to one of 2 experimental groups: Control Group (CG; n = 21), exposed to natural photoperiod variations of the region during the whole experimental period (10 h and 19 min in the winter solstice), and the Experimental Group (EG; n = 19), subject, from December 28th to may 12th, to a constant long day photic treatment (16 h light/8 h dark). Both groups were fed 300 g concentrate/animal/day, and alfalfa hay ad libitum. From the beginning of the trial (d 0 = 13 ± 0.6 postpartum days) up to d 14 (weaning of kids). Milk yield was daily recorded and data were analyzed by means of 2 factors ANOVA (time and treatment) followed by Student's *t*-test, to find differences between experimental groups. Milk yield did not differ ( $P > 0.05$ ) between groups. However, from 28 d to 112 d, 20% increase of milk yield was observed in the EG-group ( $3.3 \pm 0.1$  vs.  $2.6 \pm 0.04$  L/day/animal EG vs. CG;  $P < 0.02$ ). These results show that, during winter and at the beginning of spring, exposure to a long day artificial photoperiod scheme induced an increase in milk production in Alpine goats raised in northern Mexico. Further studies are required to evaluate the effect of a long-day photoperiodic scheme upon milk production during the prepartum period as well as how this photoperiodic treatment could affect the hormonal reproductive status in goats.

**Key Words:** milk yield, milk composition, photoperiod

**M329 Blood selenium levels in mule deer in eastern Washington.** E. López-Pérez<sup>\*1</sup>, L. A Shipley<sup>2</sup>, and W. Myers<sup>3</sup>, <sup>1</sup>Universidad Autónoma Chapingo, México, <sup>2</sup>Washington State University, Pullman, <sup>3</sup>Washington Department of Fish and Wildlife.

Mule deer have been declining in the western United States over the last few decades, including eastern and north-central Washington. Because eastern Washington is naturally deficient in selenium (Se), Se deficiencies can affect the productivity of ungulates, and little is known about the natural concentration of Se in mule deer, we examined the range and spatial distribution of the concentration Se in mule deer across eastern Washington. We captured 115 female mule deer by net-gunning from a helicopter in 2002–2003 in 7 study areas ranging from shrub-steppe to montane coniferous forests. We collected 10 mL of whole blood from each animal by jugular venipuncture, and determined the concentration of Se in the blood using neutron activation. Individual blood Se concentration varied over 4 orders of magnitude, ranging from 0.000084 to 0.497 ppm. Study area means varied from a low of  $0.04 \pm 0.02$  in 2 shrub steppe habitats to a high of  $0.090 \pm 0.02$  and  $0.125 \pm 0.01$  in 2 montane habitats ( $F = 2.47$ ,  $P < 0.01$ , Table 1). Surprisingly, patterns of blood Se did not correspond with soil Se values, which are lower in the more northern and western montane habitats. These values are low when compared with livestock standards of  $>0.1$  ppm which may indicate a potential for Se deficiency. On the other hand, mule deer, may have a lower Se requirement than do livestock and are adapted for soil and plant conditions in northeastern Washington.

**Table 1.** Blood selenium levels (ppm) in mule deer does from north central eastern Washington

Study areas	Habitat	Spring n	Spring blood	Winter blood
			Se content (ppm)	Se content (ppm)
Chelan	Montane forest	22	0.062±0.012	18 0.124±0.012
Flagstaff	Montane forest			5 0.076±0.028
Okanogan	Montane forest	5	0.094±0.023	4 0.088±0.025
Vulcan	Montane forest	9	0.060±0.006	7 0.060±0.012
Coffee pot	Shrub-steppe			12 0.048±0.015
Revere	Shrub-steppe			13 0.061±0.010
Colville	Shrub-steppe	6	0.047±0.021	17 0.060±0.012

**Key Words:** deer, selenium, blood

**M330 Breeding performance of rams in two Wyoming producer flocks.** B. M. Alexander<sup>\*1</sup>, N. Cockett<sup>2</sup>, T. L. Hadfield<sup>2</sup>, and G. E. Moss<sup>1</sup>, <sup>1</sup>University of Wyoming, Laramie, <sup>2</sup>Utah State University, Logan.

Poor mating behavior results in increased ram costs, extended lambing seasons, and decreased genetic progress from sires with desired production traits. Producers recognize the importance of ram libido; however, time, labor, and facility constraints generally limit its routine evaluation. Although approximately 23% of all rams were predicted to exhibit poor-mating behaviors, breeding performance of individual rams in multi-sire flocks typical of Wyoming range operations has not been determined. Therefore, goals of the current experiment were to determine the incidence of low- and high sexually performing rams and numbers of lambs sired by each ram in 2 representative range flocks. All rams successfully passed breeding soundness evaluations conducted before the onset of the breeding season. Blood samples were collected from all rams, and approximately one-third of the lambs and their dams for paternal genotyping using microsatellite markers. Assuming each ram had equal opportunity to mate with ewes in estrus, number of lambs expected to be sired by each ram was established by calculating 99% confidence intervals for the mean in each flock. In flock one, sires (n = 24) for 290 lambs (80% of lamb samples) were successfully identified. Of those rams, 7 (29%) sired less than, 11 (46%) equal to, and 6 (25%) sired more lambs than predicted (siring 6.9, 47.6, and 45.5% of the sampled lambs, respectively) based on the 99% confidence interval. In the second flock, sires (n = 13) for 170 lambs (85% of lamb samples) were successfully identified. Similar to flock one, 3 (23%) rams sired less than, 7 (54%) equal to, and 3 (23%) sired more lambs than predicted siring 8.2, 54.4, and 39.4% of the sampled lambs, respectively. These data emphasize the importance of identifying and eliminating poor-sexually performing rams to reduce sire costs. In addition, the identification and use of high-sexually performing rams with desired genetic traits is a requisite to the timely incorporation of those traits into a flock.

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**Key Words:** ram, parental genotyping, breeding performance

**M331 Breaking resistance of lamb ears according to ear tag insertion position and sheep breed.** G. Caja<sup>\*1</sup>, H. Xuriguera<sup>2</sup>, M. A. Rojas-Olivares<sup>1</sup>, S. González-Martín<sup>2</sup>, A. A. K. Salama<sup>1</sup>, S. Carné<sup>1</sup>, and J. J. Ghirardi<sup>1</sup>, <sup>1</sup>Universitat Autònoma de Barcelona, Bellaterra, Barcelona, Spain, <sup>2</sup>Universitat de Barcelona, Barcelona, Spain.

A total of 167 lamb ears tagged with official plastic ear tags were obtained after harvesting in a commercial slaughterhouse and used to study the resistance to breakage when submitted to tensile forces

under laboratory conditions. Ears were washed (cold and warm water) and classified according to breed (Lacaune,  $n = 26$ ; Manchega,  $n = 45$ ; Ripollesa,  $n = 60$ ; other,  $n = 36$ ), side (left, right), ear tag insertion position (distal, central, proximal) and preservation method (fresh, 1-7 d in a refrigerator, 2 to 4 wk in a freezer). Breaking force was measured by submitting the ears to a tensile test using a computer-controlled universal testing machine (PCM Mecmesin, Horsham, UK). Ears were locked to a fixed clamp at the insertion base and ear tags fixed to a mobile clamp to be tested by pulling the ear tag at a constant displacement rate (500 mm/min) until the ears broke. On average, ears measured  $107 \pm 1$  mm long and  $51 \pm 0.4$  mm wide, have ear tags adequately inserted (12% distal, 40% central and 24% proximal) and broke longitudinally at  $191$

$\pm 5$  N ( $9.8$  N = 1 kgf). No ear tags broke or opened during the test. Ear breaking force varied quadratically ( $R^2 = 0.999$ ,  $P < 0.001$ ) according to ear tag insertion position (distal,  $93 \pm 6$ ; central,  $188 \pm 5$ ; proximal,  $251 \pm 8$  N) and by breed (Lacaune,  $205 \pm 11$ ; Manchega,  $193 \pm 8$ ; Ripollesa,  $233 \pm 8$ ; other,  $107 \pm 6$  N), but did not vary according to side or short-term preservation method ( $P > 0.05$ ). Freezing reduced the force to break the ears ( $P < 0.01$ ). In conclusion, ear tag position was a key factor for ear breakage. New ear tag design, taking into account ear resistance may improve sheep welfare and ear tag retention rate for long-term identification.

**Key Words:** identification, eartag, sheep