W356 Diurnal pH of the first compartment stomach of alpacas fed alfalfa or grass hay supplemented with oats, corn, and corn/oats/barley. B. Harris*[1], T. F. Robinson[1], and N. I. Bott[2], [1]*Brigham Young University, Provo,* [2]*Bott Veterinary Services and Consulting, Elk Ridge, UT.*

The purpose of this study was to determine the diurnal pH variation of the first compartment stomach (C1) of alpacas (vicugna pacos) fed grass hay (G) or alfalfa hay (A) and acute addition of grain supplements; oats (O), ground corn (C) or corn/oats/barley (COB). Three male (+3 yrs, 65 kg BW) were fitted with a C1 fistula, housed in metabolism crates and fed ad libitum grass hay or alfalfa hay and water. The treatments (TRT) included the addition of 454 g of O, C or COB to G (GO, GC, GCOB) or to A (AO, AC, ACOB). The alpacas were acclimated to A and each grain TRT was randomly administered followed by a 30 d acclimation period to G followed by the random administration of each grain so that each grain TRT was represented during each 3-d collection period. A pH probe was calibrated, fitted through the fistula plug and positioned at the anterior, ventral portion of C1 one day prior to beginning of data collection. Treatment periods included d1 to d7 diurnal pH collection of A or G. Grain TRT pH data were collected during d8-10, d 15 to 17 and d 22 to 24. Diurnal patterns for a 24-hour period are an average of the 3-d collection period. Dry matter intake (DMI) was 1415, 1142, 1146, and 1192 g for A, AO, AC and ACOB; and 1331, 1207, 1206, and 1260 for G, GO, GC and GCOB. Only A DMI was different from the alfalfa + grain treatments ($P < 0.05$). Overall pH was 6.87, 6.78, 6.78 and 6.56 for A, AO, AC and ACOB; and 6.95, 6.89, 6.76 and 6.83 for G, GO, GC and GCOB. Alfalfa pH was more acidic than G ($P < 0.05$) and was more basic than AO and AC which are more basic than ACOB ($P < 0.05$). All G TRT were different from each other ($P<0.05$). Diurnal pH patterns for each TRT showed a decrease in pH followed by a return. As indicated by overall pH, the COB pattern decreased the lowest before return. The alpaca C1 has a very effective buffering system, but acute intake of highly fermentable feeds does have a dramatic effect on pH. Support was provided by Brigham Young University and The Camelid Center.

Key Words: alpaca, compartment 1, pH

W357 Effect of castration on performance and carcass traits of crossbreed lamb on different time on feed. M. R. Mazon*[1], P. R. Leme[1], L. S. Oliveira[1], R. F. Carvalho[2], C. A. Zotti[1], L. E. Zanoni[1], D. M. C. Pesce[2], and S. da Luz e Silva[1], [1]*Faculdade de Zootecnia e Engenharia de Alimentos (FZEA/USP), Pirassununga, São Paulo, Brazil,* [2]*Pontifícia Universidade Católica de Minas Gerais (PUC Minas), Poços de Caldas, Minas Gerais, Brazil.*

The use of non-castrated (NC) males for meat production has been an increased practice because they grow fast, utilize feed more efficiently and show high-yielding and leaner carcasses than castrated males (CM). To evaluate the performance and carcass traits of CM or NC crossbreed lambs slaughtered after different time on feed, 48 Dorper × Santa Ines males (32 ± 5.04 kg BW, 90 d old) were individually allotted in pens according to initial BW (block) and fed a diet with 75% whole corn grain, 20% of pelleted protein and mineral mix and 5% of coast cross hay. After 14 d of adaptation period 24 animals were Burdizzo castrated. Feed and orts were registered daily for DMI and feed efficiency (FE) determinations. Animals were weighed at the beginning of the trial and every 14 d. Two CM died during the trial due to urolithiasis problems. Animals were slaughtered after 36 or 78 d of feeding (half of each sex) for hot carcass weight (HCW) and *Longissimus* muscle area (LMA) and backfat thickness (BFT) at 12th rib level determinations. There was no significant sex x age interaction for any trait. BW at slaughter was greater for NC (52.2kg) than CM (46.8kg; $P = 0.005$). Non-castrated also had greater ADG (0.34 vs 0.27 kg/day; $P = 0.001$), DMI (1.2 vs 1.1 kg;$P = 0.007$) and FE (0.30 vs 0.25 kg ADG/kg DMI;$P < 0.006$), HCW (24.8 vs 22.7; $P = 0.030$), LMA (18.0 vs 16.1cm ^{2}; $P = 0.018$) with no difference in BFT (3.4 mm). Animals fed for 36 d had smaller HCW (21.2 vs 26.3 kg; $P < 0.001$), LMA (16.0 vs 18.2 cm ^{2}; $P = 0.005$) and BFT (2.9 vs 4.0 mm; $P = 0.030$) than those fed 78 d, as expected. Animals slaughtered after 78 d of feeding were heavier (54.2 vs 44.9 kg; $P < 0.001$) and had smaller ADG (0.33 vs 0.28 kg/day; $P = 0.019$) than those slaughtered at 36 d. DMI (mean = 1.15 kg DM/day) did not differ between time on feed but animals fed for 78 d had higher FE than those fed for 36 d (0.25 vs 0.29 kg ADG/kg DMI; $P = 0.020$. Non-castrated crossbreed lambs could be finished with a better performance and appropriate degree of fatness when fed high concentrate diets for short periods.

Key Words: feedlot, high concentrate, sheep

W358 Efficacy of novel feed products to reduce locoweed toxicity in wether lambs. F. A. Allataifeh*[1], C. A. Loest[1], M. N. Sawalhah[1], L. N. Tracey[1], J. Browne-Silva[1], J. B. Taylor[2], and D. M. Hallford[1], [1]*New Mexico State University, Las Cruces,* [2]*USDA-ARS, Dubois, ID.*

Locoweed may result in impaired performance and possibly death when consumed by livestock. Novel products are needed that increase the tolerance of livestock to swainsonine, the toxicant in locoweed. The objective was to determine the efficacy of proprietary feed products to reduce locoweed toxicity in sheep. Wether lambs (n = 40; 39 ± 0.4 kg BW) were housed individually and fed 620 g/d of alfalfa hay and 100 g/d of corn-based feed in equal portions twice daily for 20 d. Lambs were equally divided into 4 BW blocks, and within block were randomly assigned to 1 of 5 treatments (randomized complete block design). Treatments were: no locoweed or feed products (CON); 20 g/d of locoweed (LOCO); 20 g/d of locoweed and 50 g/d of feed product 1 (AK1); 20 g/d of locoweed and 50 g/d of feed product 2 (AK2); 20 g/d of locoweed and 50 g/d of feed product 3 (AK3). Locoweed and feed products replaced alfalfa hay in the basal diet. Serum (from venous blood) was collected on d 0, 3, 6, 9, 12, 15, 18, and 20, and rumen fluid samples were collected on d 9 and 20. Swainsonine was detected in serum and rumen fluid of lambs fed LOCO, AK1, AK2, and AK3, but was not detected in lambs fed CON. Serum swainsonine of lambs fed LOCO, AK1, AK2, and AK3 increased ($P < 0.05$) from d 0 to d 3, and remained elevated for the remainder of the study. Serum alkaline phosphatase was greater ($P < 0.05$) in lambs fed treatments with locoweed than CON, and was less ($P < 0.05$) in lambs fed AK3 than LOCO. Serum thyroid hormones (T3 and T4), serum total iron, and serum transferrin saturation were lower ($P < 0.05$) in lambs fed treatments with locoweed than CON. Serum thyroid hormones (T3 and T4) were also lower in lambs fed AK1 than CON. Serum insulin was lower ($P < 0.05$) in lambs fed AK2 than LOCO. Serum total iron binding capacity, urea N, NEFA, and rumen fluid pH, ammonia, and total VFA were not different ($P \geq 0.10$) among treatments. In locoweed-fed treatments, rumen fluid swainsonine was not different ($P \geq 0.10$) for lambs fed AK1, AK2, or AK3 than LOCO. The results suggest that the novel feed products evaluated in the current study did not reduce symptoms of subclinical toxicity in wether lambs consuming locoweed. Authors acknowledge A. Temple and Agri-King, Inc.

Key Words: locoweed, serum, sheep

W359 Swainsonine excretion, nutrient digestibility, and nitrogen retention of lambs fed alfalfa hay, locoweed, and novel feed additives. F. A. Allataifeh,* C. A. Loest, M. N. Sawalhah, F. Castillo, A. F. Cibils, and E. J. Scholljegerdes, *New Mexico State University, Las Cruces.*

Novel products are needed that could reduce locoweed toxicity, alleviate impaired performance, and prevent possible death when consumed by livestock. This study evaluated the effect of 3 feed additives (Agri-King) on swainsonine intake and excretion, nutrient digestibility, and N retention of 40 wether lambs (39.2 ± 0.38 kg initial BW). Lambs were blocked by initial BW and assigned to 5 dietary treatments in a randomized complete block design (4 blocks). Treatments were a control diet (86% alfalfa hay and 14% corn-based supplement) fed to lambs at 1.8% of BW (as fed) for 20 d (CON), CON with 20 g/d locoweed replacing alfalfa hay (LOCO), LOCO with 50 g/d of feed additive 1 replacing alfalfa hay (AK1), LOCO with 50 g/d of feed additive 2 replacing alfalfa hay (AK2), and LOCO with 50 g/d of feed additive 3 replacing alfalfa hay (AK3). Lambs were housed individually for 14 d in pens and then for 6 d in metabolism crates for total fecal and urine collections. Statistical analysis used the mixed procedure of SAS with lamb as the experimental unit. Intake, fecal, and urinary swainsonine were greater ($P < 0.05$) for LOCO, AK1, AK2, and AK3 than CON. Intake of swainsonine was lower ($P < 0.05$) for AK3 than LOCO, fecal swainsonine was lower ($P < 0.05$) for AK1 than LOCO, and urinary swainsonine was lower ($P < 0.05$) for AK1 and AK2 than LOCO. Treatments did not affect ($P \geq 0.20$) DM intake, fecal DM, or DM digestibility. Nitrogen intake was lower ($P < 0.05$) for AK1, AK2, and AK3 than for CON and LOCO, but fecal N and urine N was not affected ($P \geq 0.11$) by treatments. Nitrogen digestibility was not different ($P = 0.26$) among treatments, but N retention was lower ($P < 0.05$) for AK1 and AK3 than CON. In summary, lamb consumption of locoweed with the feed additives evaluated in the current study does not significantly affect DM and N digestibility. Lower fecal and urinary swainsonine in lambs receiving AK1 indicated that it may affect metabolism of swainsonine in sheep. Authors acknowledge A. Temple and Agri-King Inc.

Key Words: swainsonine, nitrogen retention, sheep

W360 The serosal-to-mucosal urea flux across the cervine ruminal epithelium is not affected by mucosal ammonia or phloretin. M. E. Walpole*[1], G. B. Penner[1], M. Woodburry[2], and T. Mutsvangwa[1], *[1]Department of Animal and Poultry Science, University of Saskatchewan, Saskatoon, Saskatchewan, Canada, [2]Department of Large Animal Clinical Services, University of Saskatchewan, Saskatoon, Saskatchewan, Canada.*

Urea transporter (UT) proteins are involved in the movement of urea across the gastrointestinal tract in ruminants. Few studies with domesticated ruminants indicates that increasing ruminal ammonia concentration has inhibitory effects on urea transfer from blood into the rumen, but the exact mechanisms involved have not been elucidated. The effect of mucosal ammonia concentration on the serosal-to-mucosal flux of urea ($J_{sm\text{-}urea}$) was examined. Five white-tail deer (*Odocoileus virginianus*) bucks were killed and ruminal epithelial tissue was collected and mounted in Ussing chambers under short-circuit conditions. To simulate in vivo physiological conditions, the serosal buffer contained 1 m*M* of urea and was adjusted to a pH of 7.4, while the mucosal buffer lacked urea and pH was adjusted to 6.2. Treatments were control (no ammonia), 6.65 m*M* ammonia (as $[NH_4]_2CO_3$), and ammonia with phloretin (1 m*M*; a UT inhibitor). Fluxes of urea ($J_{sm\text{-}urea}$) and mannitol ($J_{sm\text{-}mannitol}$) were measured in parallel using ^{14}C-labelled urea (26 kBq/mL) and ^{3}H- labelled mannitol (74 kBq/mL), respectively, with $J_{sm\text{-}mannitol}$ being used as an indicator of paracellular transport. Ruminal ammonia and blood urea nitrogen concentrations averaged 12.3 and 34.4 mg/dL, respectively. The additions of ammonia or phloretin had no effect on tissue conductance (G_t) or short-circuit current (I_{sc}). Both $J_{sm\text{-}urea}$ and $J_{sm\text{-}mannitol}$ were not inhibited ($P > 0.05$) by mucosal ammonia or the serosal addition of phloretin. The $J_{sm\text{-}urea}$ and $J_{sm\text{-}mannitol}$ were highly correlated ($R^2 = 0.88$; $P < 0.001$), thus suggesting that $J_{sm\text{-}urea}$ was mediated via para-cellular pathways. Ruminal ammonia concentration was not correlated with $J_{sm\text{-}urea}$; however, blood urea nitrogen concentration was negatively correlated with $J_{sm\text{-}urea}$ ($R^2 = 0.81$; $P = 0.038$). We conclude that, because of the significant correlation between $J_{sm\text{-}urea}$ and $J_{sm\text{-}mannitol}$ and the lack of inhibitory action for phloretin, a known inhibitor of UT, urea flux across the ruminal epithelium in white-tail deer is likely via para-cellular routes.

Key Words: ammonia, rumen, urea transporter