Endocrine responses to ergot alkaloids, reputed agents of fescue toxicosis, were examined in six Holstein cows (499 kg; SD = 29) nursing their calves. Estrus detection was done twice daily. Weekly plasma progesterone concentrations confirmed estrus dates. Each cow received one i.v. infusion of saline (SAL), ergonovine maleate (9.5 mg; EM), or ergotamine tartrate (9.5 mg; ET) per estrous cycle (15 to 16 d after estrus) and all treatments during the study. Blood was sampled every 20 min for 5 h; treatments given after 1 h. Air temperature (26°C) and respiration rate (RR) were recorded hourly. Treatment was timed relative to estrus (P = .06) and plasma concentrations of progactin (PRL; P = .13), luteinizing hormone (LH; P = .02), and 13,14-dihydro-15-keto-prostaglandin F2α (PGFM; P < .001), but not folliculin stimulating hormone (P = .81). Saline did not affect any trait in this study. Concentrations of PRL decreased (P < .01) from 6.56 ng/mL before ET to < 3.54 ng/mL during the second and third hours after ET, respectively. Concentrations of LH declined (P < .01) from 56 ng/mL before EM to 50 ng/mL during the third hour after EM. Mean RR and PGFM concentrations were not affected by EM. Administration of ET significantly altered RR, PRL, LH, and PGFM (table). A higher proportion (P < .03) of cows had increased PGFM concentrations after ET (5/6, 83.3%) than after SAL (1/6, 16.7%). Peak PGFM response was higher (P < .03) after ET and EM (20.7 and 14.5 pg/mL, respectively) than after SAL (3.2 pg/mL). Ergot alkaloids may modify concentrations of blood constituents important for reproductive function of cows during the late luteal phase of the estrus cycle.

<table>
<thead>
<tr>
<th>Hour</th>
<th>RR, breaths/15 s</th>
<th>PRL, ng/mL</th>
<th>LH, pg/mL</th>
<th>PGFM, pg/mL</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>10.5</td>
<td>5.87</td>
<td>0.57</td>
<td>50.9</td>
</tr>
<tr>
<td>2</td>
<td>11.8</td>
<td>2.03</td>
<td>0.56</td>
<td>55.5</td>
</tr>
<tr>
<td>3</td>
<td>15.3</td>
<td>1.65</td>
<td>0.54</td>
<td>57.4</td>
</tr>
<tr>
<td>4</td>
<td>17.2</td>
<td>1.34</td>
<td>0.63</td>
<td>49.9</td>
</tr>
<tr>
<td>5</td>
<td>17.4</td>
<td>1.45</td>
<td>0.73</td>
<td>60.6</td>
</tr>
</tbody>
</table>

LS Means within row differ from Hour 1 pretreatment mean (P < .01).

Key Words: Cows, Ergot Alkaloids, Hormones

In Exp. 2, seven Angus steers (294 kg) received one i.v. infusion of saline (SAL), ergonovine maleate (7 mg; EM), or ergotamine tartrate (7 mg; ET) per week and all treatments during the study. Blood was sampled every 30 min for 5 h; treatments given after 1 h. Treatment × time affected plasma cortisol (P < .01) and triiodothyronine (P = .14), triiodothyronine concentrations were not affected by SAL or EM. Cortisol concentrations were higher (P < .01) each hour after ET (≥ 59 ng/mL) than before ET (19 ng/mL). Concentrations of T3 were not affected by SAL. Plasma T3 increased (P < .01) from 1.12 ng/mL before EM to 1.35 ng/mL during the first 2 h after EM and from 1.21 ng/mL before ET to 1.41 ng/mL during the first hour after ET. Treatment × time tended (P = .18) to affect thyroxine (T4) concentrations. Concentrations of T4 were not affected by SAL or EM. Plasma T4 concentrations before ET were lower (P < .01) than after ET (63.5 vs 74.4 ng/mL). In Exp. 2, six Holstein cows (499 kg) nursing calves received one i.v. infusion of SAL, EM (9.5 mg), or ET (9.5 mg) per estrous cycle and all treatments during the study. Blood was sampled every 40 min for 5 h; treatments given after 1 h. Treatment × time affected plasma cortisol (P < .01), T3 (P = .14), and T4 (P = .07) concentrations. Cortisol concentrations were not affected by SAL or EM. Cortisol concentrations were higher (P < .01) during the first 2 h after ET (64 ng/mL) than after ET (27 ng/mL). Concentrations of T3 were similar before SAL and ET (8.4 and 8.3 ng/mL) but were higher (P < .01) after ET than after SAL (91 vs 81 ng/mL). Concentrations of T4 were not affected by SAL. Concentrations of T4 during the first and second 2 h (38 ng/mL) after EM were higher (P < .01) than before EM (30 ng/mL). Plasma T3 during the first and second 2 h (≥ 42 ng/mL) after ET were higher (P < .01) than before ET (36 ng/mL). Ergot alkaloids may alter plasma concentrations of hormones important for metabolic and thermoregulatory functions of cattle.

Key Words: Cattle, Ergot Alkaloids, Cortisol, Thyroid Hormones

Fumonisins are the most ubiquitous mycotoxins produced mainly by Fusarium moniliforme and Fusarium proliferatum, in corn and corn-based feeds and foods. Fumonisin mycotoxicoses are well documented in horses and swine but limited information is available for ruminants. In a 112 d feeding trial, eight yearling Angora goats(15 ± 2.1 kg BW) were assigned randomly to 2 treatments (4 goats per treatment): 0 mg of fumonisin B1 (FB1) (control) and 50 mg of FB1/kg of feed (treated). The base diet contained 62% corn, 22% cottonseed hulls, 9.25% soybean meal(10.7% CP, 98 Mcal NE/kg). Fumonisin containing culture material (2,326 mg FB1/kg) was added to the diet to achieve the desired FB1 level. Feed consumption was recorded daily throughout the experiment and BW were measured on d - 1, 21, 56, 84, and 112. A digestibility trial was conducted during the last 7 d of the experiment. At the end of the trial, all goats were euthanized and liver, kidney and heart samples were analyzed for sphingolipid concentrations (free sphingo sine (So), free sphinganine (Sa), and Sa/So ratios). No differences (P >.05) were found for DMI (587 vs 529 g/d), DM digestibility(76 vs 77 %), OM digestibility (76 vs 78 %), NDF digestibility (23 vs 39 %), ADF digestibility (7 vs 24 %), water intake (1487 vs 961 ml/d) or N retention (2.48 vs 2.43 g/d) between control and treated groups. Average daily gain tended to be lower in treated animals (48.6 vs 29.4 g/d; P = .14). Free So, Sa and Sa/So ratios were elevated (P < .05) in treated goats. Liver, kidney and heart were affected (P < .05) except that the Sa/So ratio was not different for heart. Among tissues, liver sphingolipid concentrations were more sensitive to fumonisin exposure than kidney and heart tissues. Goats exposed to FB1 (50 mg/kg diet) exhibit elevated levels of free sphingoid bases. Exposure to FB1 had little effect on feed intake, feed digestibility and average daily gain.

Key Words: Goats, Fumonisin, Sphingolipid

In 1992, FDA issued a policy statement clarifying its role in the regulation of GMPs. The FDA also initiated a voluntary consultation procedure where the GMP developer consults with FDA about safety and regulatory issues prior to marketing. Typically, the developer makes an initial oral presentation, followed by submission of a summary of the safety and nutritional assessment of the GMP to FDA. Twenty five consultations involving eight different crops, including both human foods, such as tomatoes, and traditional animal feedstuffs, like corn, soybeans, cotton, and canola, have been completed. The primary focus for feedstuffs has been insect resistance and plant tolerance to herbicides. Developers have provided information on the identity and function of the expression products of the gene, as well as the characteristics of the plant trait, such as gossypol in cottonseed meal and erucic acid and glucosinolates in canola meal. For the consultations completed to date, all nutrient and toxin analyses indicate that GMP composition is not materially different from non-modified plant varieties.

Key Words: Biotechnology, Feed composition
298 Effects of vitamin A injection on the response to superovulation in beef cattle. B. S. Brown, C. S. Whisnant*, and B. K. Reed, Texas Tech University, Lubbock.

The objective of this study was to determine the effects of vitamin A injections on total number of oocytes, number of transferable embryos, and percent transferable embryos in superovulated beef cows. Injections of 1 million units of vitamin A to cows at the start of superovulation in beef cattle. B. K. Reed, Texas Tech University, Lubbock. treatment. Treatments in 4 blocks. Oocytes were aspirated from abattoir 299 The effects of antibiotics on bovine embryo development in vitro. S. Wang*, G. R. Holyoak, G. Liu, J. Dan, and T. D. Bunch, Utah State University, Logan.

The effects of antibiotics (amphotericin B, penicillin G and streptomycin) on bovine embryo development in vitro was investigated using a randomized complete block design with 3 treatments in 4 blocks. Oocytes were aspirated from abattoir ovaries and procedures for in vitro maturation (IVM), in vitro fertilization (IVF), and in vitro culture (IVC) followed Bavister et al. (Theriogenology 37: 127-146, 1992), except antibiotics were added to the IVC medium according to treatment. Treatments (TRT) consisted of: TRT1, 100 IU penicillin G (Sigma, P4687) and 100 μg streptomycin (Sigma, S1277) per ml IVC medium and TRT2, 100 IU penicillin G, 100 μg streptomycin and 0.25 μg amphotericin B (Gibco, 15240-039) per ml IVC medium. The Control IVC medium did not contain antibiotics. Cleavage rates were determined at 45 h after fertilization. Embryonic development was evaluated on day 8 of culture. The data were analyzed by ANOVA. The percentage of cleaved ova were 87.3 (178/204), 90.9 (168/185) and 88.2 (163/185) for TRT1, TRT2 and Control, respectively. The percentages of morula production were 26.8 and 21.5 for TRT1, TRT2 and Control, respectively. The percentages of blastocyst production were 12.9, 14.5 and 15.6 for TRT1, TRT2 and Control, respectively. There were no significant differences (P>0.05) in cleavage rates, morula and blastocyst production between treatments. There were no significant differences (P>0.05) in the rates of degenerated embryos after day 8 in culture, which were 31.4%, 28.3% and 33.2% for TRT1, TRT2 and Control, respectively. We conclude that amphotericin B, penicillin G and streptomycin have no apparent detrimental effect on early embryo development and therefore can be used against potential contamination during in vitro embryo culture.

Key Words: Amphotericin B, Penicillin G, Streptomycin, In vitro fertilization, Bovine

300 Endothelin response to tall fescue alkaloid stimul- us of bovine endothelial cells. J. R. Strickland*, J. W. Oliver*, E. M. Bailey, J. B. Taylor1, and J. Nordsyke1, 1New Mexico State University, Las Cruces and 2University of Tennessee, Knoxville.

Alkaloids, particularly ergot alkaloids found in tall fescue (Festuca arundinacea), are known to cause vasoconstriction. Endothelin (ET), produced by endothelial cells (EC), is a potent vasoconstrictor. Therefore, the hypothesis that endothelin secretion would increase due to alkaloid treatment of endothelial cells in vitro was tested. Two trials were conducted to determine the effects of 24-hour alkaloid exposure on ET secretion by bovine EC in vitro. In both trials, EC were seeded (5000 cells/swell) into 96-well culture plates and grown to confluency (~48 hr) and then treated (24 hr). Trial 1 (n=8) treatments were a-ergocryptine (AE), ergovaline (EV), ergonovine (EG), N-acetyl loline (NAL), and N-formyl loline (NFL) at 0, 10-4, 10-5, 10-6, and 10-7 M. Trial 2 (n=8) included all treatments of trial 1 however, dose response curves included 10-3, 10-2 and 10-1 M. Controls for both trials were culture medium containing respective alkaloid carriers. An enzyme immunoassay was used to measure ET accumulation in culture medium. Both, EV and AE inhibited (18 to 100% inhibition; P<0.05) ET secretion regardless of concentration in both trials. Additionally, EG was inhibitory (13 to 34% inhibition; P<0.05) at concentrations of 10-4, 10-5, 10-6, and 10-7 M. Likewise, NFL was inhibitory (16 to 33% inhibition; P<0.05) only at 10-4, 10-5, and 10-6 M. N-Acetyl loline did not exhibit consistent effects in either trial. These results do not support the hypothesis that the alkaloids would increase endothelial cell secretion of endothelin in vitro. Possible explanations for the current findings may include activation of cellular inflammatory second messenger systems and/or negative feed back regulation by endothelin in the culture medium (i.e., build up of endothelin in culture medium may cause activation of inhibitory pathways for endothelin production).

Key Words: Endothelin, Cattle, Tall fescue, Alkaloid
302 Ingestion of snakeweed (Gutierrezia spp.) does not alter serum progesterone concentration in beef cows and ewes. T. T. Ross, M. C. Whitehead, S. L. Slate, and J. R. Strickland, New Mexico State University, Las Cruces.

Snakeweed (Gutierrezia spp.) has been shown to cause reproductive failure in livestock grazing native rangelands infested with the plant. Three experiments were conducted to determine the effects of ingested fresh-frozen snakeweed (SW) on serum progesterone concentrations in cattle and sheep. Two experiments were conducted using 9 crossbred beef cows. Cows were assigned to one of three dietary treatments: control, grass hay only (1.3% BW); hay-corn (.63 kg/day); and hay-oat (.80 kg of a 42% CP supplement/day). Cows consumed these diets for 68 d after which SW (10% of diet DM) was added to their diets for an additional 68 d. Estral activity was monitored throughout the experiments via ultrasonography of ovaries. The second cow experiment was conducted similarly. Dietary treatments did not alter (P > .50) estral cyclicity in either trial. Also, serum progesterone was not influenced (P > .30) by either dietary treatments on SW ingestion. For this comparison, progesterone was measured during a synchronized estrous cycle. During this time, area under the progesterone curve was similar (P > .50) between groups. A third experiment was conducted in ovariectomized ewes to determine if ingestion of SW altered progesterone clearance. Ewes (8) were assigned to either SW or no SW. Ewes were forced fed SW for 31 d and then pair-fed with control ewes for 22 d, a period in which progesterone (i.v.) was administered and serial blood collection was initiated (via jugular catheter) with the first sample collected 1 min post dosing and continued at 2-min intervals for 20 min and then 5 min intervals through 40 min. Distribution (61 vs. 67.5 ng/ml-1·min-1) and elimination (.034 vs .036 ng/ml-1·min-1) of progesterone was similar (P > .1) between no SW and SW, respectively. Contrary to our previous work, dietary snakeweed did not influence progesterone concentrations in cattle nor progesterone clearance in ewes.

Key Words: Beef cattle, Sheep, Progesterone, Toxicity


Biogenic amines (such as putrescine, spermidine, and spermine) have diverse roles in cell metabolism and growth. Addition of raw soybeans to starter pig diets causes impaired growth and feed efficiency, partially through alterations in biogenic amine metabolism. The objective of this study was to determine the effect of adding poultry by-product meal (PM), a feed ingredient rich in metabolites, to starter pig diets containing raw soybeans. Growing pigs, initial weight 10.8 kg, were fed diets containing 0, 5, 10 or 15% raw soybeans with either 0 or 15% PM for 21 days. Feed intake, gain/feed ratio, total weight gain, and daily gains decreased linearly (P < 0.0001) as the level of raw soybeans in the diets increased. This was observed both for pigs consuming diets with either 0% or 15% PM. Inclusion of PM into diets containing either 10 or 15% raw soybean resulted in reduced feed intakes, body weight gains and gain/feed ratios (P < 0.0001) compared to pigs fed similar diets with 0% PM. Feed intake was not reduced by the inclusion of PM into diets containing 5% raw soybeans, however body weight gain and gain/feed ratio were reduced by the inclusion of PM in the 5% raw soybean diets (P < 0.01). Diets containing 15% PM and raw soybeans had a 3 fold increase in putrescine concentrations compared to diets containing 0% PM and raw soybeans (45 mg/kg compared to 15 mg/kg) and higher tyramine concentrations (20 mg/kg compared to 0 mg/kg) whereas spermine and spermidine concentrations were similar among all diets. It can be concluded that addition of PM to diets containing raw soybeans caused a greater reduction in performance than raw soybeans alone. The reductions in performance may be related to altered biogenic amine metabolism; possibly due to increased dietary biogenic amine concentrations. (Supported by NSERC and OMAFRA).

Key Words: Pigs, Biogenic Amines, Raw Soybeans

304 Blood and digestive parameters in goats inoculated with dihydroxypropyridine (DHP) -degrading bacteria (Synergistes jonesii). M. Smuts-Ayers2*, R. Puchala1, and T. Sahlu1, 2E (Kika) de la Garza Institute of Goat Research, Langston, Oklahoma, USA and 2ARC-Animal Nutrition and Products Institute, Irene, South Africa.

The objectives of this experiment were to determine the physiological differences between adult Angora goats (n = 5) inoculated (INOC) with the DHP-degrading bacteria (Synergistes jonesii) and goats (n = 4) that had not been inoculated (CON), where both groups were consuming a 100% Leucaena leucocephala (Leucaena) diet ad libitum. The INOC group were inoculated with S. jonesii bacteria in ruminal fluid obtained from steers grazing leucaena. Ruminal fluid (200 mL/goat) was transferred to each goat via intraruminal infusion. As soon as the establishment of S. jonesii was positively confirmed, a digestibility trial was carried out. Blood, urine and ruminal fluid samples were also obtained daily. Five days after S. jonesii inoculation, no differences (P > .05) were noted in DM digested as a percentage of intake (CON 40.5%, INOC 37.7%, SEM 2.16) or in N retention as a percentage of that digested (CON 90.5%, INOC 91.5%, SEM 2.59) between the two groups. Ruminal propionate levels were higher (P < .05) in the INOC group compared to the CON group. This may substantiate claims that DHP may influence ruminal metabolism. Plasma glucose (CON 3.11; INOC 3.31 mg/dL), urea-N (CON 15.2; INOC 14.8 mg/dL), NEFA (CON 350; INOC 348 mg/L), and total protein (CON 68.1, INOC 66.5 g/L) concentrations were not (P > .05) affected by S. jonesii inoculation. However, concentrations of NEFA, bilirubin, iron, lactate, and enzyme (lactate dehydrogenase, creatine kinase, and gamma glutamyltransferase) concentrations of both the CON and INOC groups were higher than the norm expected for goats. Furthermore, the CON group exhibited insulin, thyroxine, phenylalanine, threonine, hemoglobin, leucocyte, lymphocyte, and packed cell volume concentrations higher (P < .10) than those observed for the INOC group. Plasma methionine (12.9 vs. 15.7 mg%) concentrations of the CON animals were lower (P < .05) than those of the INOC group. These results suggest that DHP may not affect digestive function but instead may disrupt metabolic processes.

Key Words: Leucaena leucocephala, Synergistes jonesii, Angora goats