

were correlated ( $r=.68$ ;  $P<.001$ ), but not backfat measurements. Live grades were higher ( $P<.05$ ) in B- than K-sired kids. Results suggest similar growth performance between sire breeds, but increased deposition of backfat in B-sired kids.

**Key Words:** Meat Goats, Growth, Carcass

**110 Performance, blood metabolites and visceral organ mass and composition in growing castrated dairy goats.** A. Carmichael, B. Kouakou, S. Gelaye, G. Kannan, and T.H. Terrill, *Fort Valley State University, Fort Valley, GA.*

Growing castrated dairy goats ( $n = 20$ ;  $BW = 30 \pm 6.8$  kg) were used in an 82-d experiment to assess effects of protein and energy levels on performance and splanchnic tissue mass and composition. Animals were individually housed in elevated pens ( $1.2 \times 1.2$  M), stratified by BW and randomly assigned to 4 dietary treatments. Diets were formulated to provide either 2.5 Mcal /kg DM DE and 12% CP (low energy low protein = LELP), 2.5 Mcal /kg DM DE and 18% CP (low energy high protein = LEHP), 2.9 Mcal /kg DM DE and 12% CP (high energy low protein = HELP), or 2.9 Mcal /kg DM DE and 18% CP (high energy high protein = HEHP). The low and high energy diets contain 3 and 15% poultry fat, respectively. At the end of the experiment, single blood samples were collected by jugular venipuncture, and then animals were weighed and sacrificed. After evisceration, digestive tract segments were tied at junctions, separated, and weighed with and without digesta. Weight of liver and other organs of the abdominal and thoracic cavities were also recorded. Blood samples were analyzed for glucose, NEFA and BUN. Liver samples, intestinal and reticulo-rumen mucosa samples were analyzed for DM, protein, DNA and RNA. Data were analyzed using GLM procedure of SAS. Goats fed low energy diets consumed more feed than those fed high energy diets. Body weight gains were higher for animals fed the low than the high energy diets. Blood glucose and NEFA were similar among treatments, but BUN tended to be greater ( $P = 0.08$ ) in high than in low energy diets-fed animals. There were no differences in organ or digestive tract segment weights. Small intestine weights (full or empty), as percent of slaughter weight, were lower for animal fed low energy (1.8 and 2.0 or 1.4 and 1.5 for LELP and LEHP full or empty, respectively) as compared to high energy (2.9 and 2.5 or 1.9 and 1.9 for HELP and HEHP full or empty, respectively) diets. Liver DNA tended ( $P = 0.07$ ) to be lower (12.5 mg/g of fresh tissue) for LEHP than for animals fed the other diets (15, 17 and 19 mg/g of fresh tissue for LELP, HEHP and HELP, respectively). Small intestinal

mucosa DM contents were higher ( $P < 0.05$ ) in animals fed low than high energy diets. Splanchnic tissue weights are not affected in growing goats when fed diets differing in the proportion of energy coming from poultry fat.

**Key Words:** Goats, Dietary Energy, Splanchnic

**111 Growth and carcass characteristics in lambs from three hair sheep breeds raised on pasture and hay-based diets.** S. Wildeus\*<sup>1</sup>, H. N. Zerby<sup>2</sup>, K. E. Turner<sup>3</sup>, and J. R. Collins<sup>1</sup>, <sup>1</sup>Virginia State University, Petersburg, VA, <sup>2</sup>The Ohio State University, Columbus, OH, <sup>3</sup>Appalachian Farming Systems Research Center, USDA, ARS, Beaver, WV.

This experiment evaluated the use of forage-based diets for hair sheep lamb production. Barbados Blackbelly (BB), Katahdin (KA), and St. Croix (SC) ewe and wether lambs ( $n=36$ , 100 d of age) were allocated to a pasture or pen feeding group stratified by breed and sex in May. Pasture animals were maintained as one group on a native, predominantly tall fescue pasture (1.5 ha; 12-17% CP, 66-69% NDF, 36-38% ADF), subdivided for rotational grazing. Pen animals were allocated to 6 pens stratified by breed and separated by sex, and offered *ad lib* chopped alfalfa hay (16.6% CP, 60.3% NDF, 45.2% ADF). Both groups were supplemented with a corn/soybean mixture (16.5% CP) at .75% of BW. After 168 d on trial animals were slaughtered. Data were analyzed for effects of breed, nutritional treatment, and sex. ADG was higher ( $P<.05$ ) in pen (77 g/d) than on pasture (67 g/d), and higher ( $P<.01$ ) in KA (84 g/d) and SC (75 g/d) than BB (56 g/d). Starting and final BW were higher ( $P<.01$ ) in KA (31.4 and 45.5 kg, respectively) than SC (22.5 and 31.4 kg) and BB (24.5 and 31.0 kg). Dressing percent (overall 48.0%) was not affected ( $P>.1$ ) by breed or treatment. Backfat was higher ( $P<.05$ ) in pen (.45 cm) than pasture (.27 cm), and higher ( $P<.05$ ) in KA (.50 cm) than BB (.23 cm) and SC (.36 cm). Ribeye area was larger ( $P<.01$ ) in KA (10.9 cm<sup>2</sup>) than BB (8.3 cm<sup>2</sup>) and SC (7.1 cm<sup>2</sup>), but not after adjustment for carcass weight. Body wall thickness and quality score were also higher ( $P<.05$ ) in KA (1.57 cm and 10.3, respectively) than SC (1.33 cm and 9.6) and BB (1.08 cm and 9.3). Hair sheep lambs achieved moderate rates of gain on high forage diets with limited supplementation, with some differences between breeds. The carcasses produced were too small for the traditional lamb market, but acceptable for ethnic niche markets.

**Key Words:** Hair Sheep, Growth, Carcass Characteristics

## Teaching and Undergraduate Education

**112 A service learning approach to teaching companion animal management.** K. M. Downs\*, J. G. Gentry, and J. E. Mehlhorn, *Middle Tennessee State University.*

As a content supplement, a service learning model was incorporated into a senior-level Companion Animals course in the animal sciences at MTSU. This course was developed in response to a change in student demographics and the need for a broad based species knowledge, with enrollment (mean = 27) increasing by 39.3% from first to current offering (3 semesters). The service learning application was designed to stimulate interest in community development activities among the undergraduate student in this course by highlighting companion animal specific organizations which perform a service to the local, regional, or national community. As traditional lecture supplements, demonstrations by a therapy dog organization, law enforcement search and rescue group, drug seizure division, and K-9 attack unit are scheduled throughout the semester. Students are required (20% of final grade) to complete a team project whereby they must identify, interview, and report upon a companion animal related service organization. An incentive based university wide donation drive to support the local county animal services by providing needed supplies has also been incorporated into the class structure. Qualitative evaluation of the service learning program was conducted using retention, attendance, and course evaluation data. Over three semesters, retention was 87.5, 71.4, and 100.0%, respectively. While only randomly maintained, attendance has remained high (86.3%). Based on course evaluations, 87.5% of students completing the course are highly satisfied with their learning experiences. Service learning is an innovative approach to supplement the learning experiences of undergraduate students and foster an appreciation for community-based service. Students become active participants in their

education and foster a sense of gratification in making a difference in the community.

**Key Words:** Teaching, Service Learning, Companion Animals

**113 Relationships among prematriculation academic indicators and collegiate success.** C. F. Rosenkrans, Jr.\* and J. A. May, *University of Arkansas, Fayetteville.*

Universities are being scrutinized for the success of their students. Those successes are based on student retention, grade point average (GPA), and graduation rate. Accurate methods of determining the likelihood of a student's success at a university are needed so that students requiring additional assistance can be helped before it is academically too late. This study was a retrospective evaluation of new freshman students ( $n = 120$ ) who matriculated at the University of Arkansas in the fall of 1994, 1995, and 1996, and enrolled in the Introductory Animal and Poultry Sciences course (AGRI 1003). Student high school GPA (HSGPA) and composite ACT score were related to the student's grade in AGRI 1003, graduation status, and the time in months to graduation. The ACT score was correlated ( $r > 0.32$ ;  $P < 0.001$ ) with HSGPA and AGRI 1003 grade. The HSGPA ( $r = 0.58$ ;  $P < 0.001$ ) was correlated AGRI 1003 grade. Student ACT score, HSGPA, and AGRI 1003 grade were all negatively correlated ( $r < -0.38$ ;  $P < 0.01$ ) with the number of months to student graduation. Student's chosen major was not ( $P > 0.3$ ) a source of variation for HSGPA, ACT score, graduation rates, or months to graduation. Students who earned an A letter grade in AGRI 1003 had the highest ( $P < 0.01$ ) HSGPA, and ACT score, and least ( $P < 0.01$ ) amount of time to graduation. Only 56 (47 %) of the new freshmen

enrolled in AGRI 1003 graduated within six years. Those students who did graduate had a higher ( $P < 0.01$ ) HSGPA than non-graduates (3.4 vs. 3.16, respectively); however, ACT score (mean = 21.4) was not different ( $P > 0.25$ ) for graduates and non-graduates. These data support

previous reports that HSGPA is the best single-quantitative predictor of student graduation rates.

**Key Words:** New Freshman, Graduation Rate, High School GPA

## Undergraduate Research Paper Competition

**114 Evaluation of nutraceutical effects on pig immunity: effects of Promax.** Leslie Dabovich<sup>\*1</sup>, Lindsey Hulbert<sup>1</sup>, Anthony Rudine<sup>1</sup>, Sungwoo Kim<sup>1</sup>, Fei Ji<sup>1</sup>, and John McGlone<sup>1</sup>, <sup>1</sup>*Pork Industry Institute, Dept Animal and Food Science, Texas Tech University.*

Non-traditional feed ingredients may have effects on pig immunity and health. One possible nutraceutical is Promax (Promax<sup>®</sup>, HumaTech, Inc., Houston, TX) which is a natural, carbon-mineral feed supplement that is mined and minimally processed. Carbon compounds include humic acid, fulvic acid, and other organic compounds and minerals, including bioavailable iron and other trace minerals. In this study we evaluated the effects of Promax formula against a standard corn-soybean meal diet. In study 1, treatments included a control, 46162, and 48162, each added at 5% of the diet from weaning (21 d) to market. In study 2, treatments included a control, 4600, and 5600 each added at 5% of the diet from weaning (21 d) to market. Each study involved 8 replicate pens per treatment with each pen containing 8 pigs (192 pigs per study). Immune measures were collected during the late nursery period in study 1 and during the finishing period in study 2. Immune measures included total number of white blood cells (WBC), differential counts, red blood cell numbers, hemoglobin, hematocrit, lymphocyte proliferation under phytohemagglutinin mitogen, and neutrophil chemokinesis and chemotaxis. In study 1, nursery pigs fed 46162 had elevated ( $P < 0.01$ ) neutrophil chemotaxis compared with pigs fed control or 48162 (82.2, 184.5, 119.5, SE<sub>p</sub>=17.2, control, 46162, and 48162, respectively). During study 2, pigs were inadvertently exposed to erysipelas during the early grower phase. All pigs had stimulated immune measures compared with study 1 pigs (e.g., WBC were increased 48%). Immune measures were not different among treatments. However, mortality was influenced by treatment (9.4, 9.4, and 4.7% for control, 4600 and 5600, respectively). In conclusion, Promax has nutraceutical properties in that it stimulates neutrophil activity which may protect against bacterial pathogens and reduce mortality during acute bacterial infections.

**Key Words:** Pigs, Immunity, Nutraceutical

**115 Use of betamethasone to advance fetal maturation in mares with high-risk pregnancies.** G. L. Olsen<sup>\*1</sup>, D. L. Christiansen<sup>1</sup>, J. Smith<sup>1</sup>, R. Hopper<sup>1</sup>, M. LeBlanc<sup>2</sup>, and P. L. Ryan<sup>1</sup>, <sup>1</sup>*Mississippi State University, Mississippi State, MS*, <sup>2</sup>*Rood and Riddle Equine Hospital, Lexington, KY.*

Induction of parturition is often utilized in the high-risk (HR) pregnant mare to secure a viable foal if a history of dystocia or a concurrent, life-threatening condition is present. However, induction of parturition can be problematic because equids exhibit variable gestation lengths and final fetal maturation occurs late in gestation. The incidence of fetal loss in HR pregnancies could be reduced if fetal maturation were advanced to facilitate pre-term delivery. In humans, fetal maturation can be accelerated successfully with dexamethasone (DEX) or betamethasone (BMS). DEX is only effective in equids when injected intrafetally, which can lead to abortion. Therefore, the objective of this study was to ascertain whether fetal maturation could be advanced by maternal injection with BMS at minimal risk to dam and fetus. Quarterhorse mares ( $n = 13$ ) received (i.m.) either 12 mg (low dose, LD,  $n = 3$ ), 24 or 30 mg (high dose, HD,  $n = 5$ ) BMS or saline (SAL,  $n = 5$ ) at 305, 306 and 307 d of gestation. Delivery was clinically induced (20 IU oxytocin) on d 320 in five mares (two LD and three HD). Foal serum samples at 0, 24 and 48 h were analyzed for cortisol, P4, T4 and T3 concentrations. Foal birth and placental weights and blood cell counts at 0 h were determinants of foal maturity. Of the five BMS-treated mares induced, two foals survived while three were euthanized within 48 h due to negative outcome of induction. Consequently, mare data was analyzed as saline non-induced (SAL,  $n = 5$ ), treated non-induced (TNI,  $n = 3$ ) and treated induced (TI,  $n = 5$ ). Serum cortisol was undetectable in four of five TI foals while P4 values were greater ( $12.5 \pm 3.1$  ng/ml,  $P < 0.2$ ) at 0 h compared to SAL and TNI foals ( $9.1 \pm 1.9$ ,  $8.7 \pm 1.7$  ng/ml, respectively). White blood cell counts at 0 h were greater in TI than TNI ( $P$

$< 0.05$ ) and SAL ( $P < 0.1$ ) foals. Birth weight was greater ( $P < 0.2$ ) in SAL compared to TNI and TI foals (55.8, 49.8 and 46.6 kg, respectively) while placental weight was greater in TI compared to TNI and SAL foals (6.4, 4.3 and 5.5 kg, respectively). SAL and TNI treated mares foaled at term without complications, with BMS treatment advancing delivery by 7-14 days in TNI mares. In conclusion, maternal BMS treatment did not accelerate fetal maturation adequately to successfully induce pre-term delivery of foals.

**Key Words:** Equine, Fetal Maturation, Betamethasone

**116 Rearing pigs indoors or outdoors: effects on pig growth, and behavior.** Anthony Rudine<sup>\*1</sup>, Leslie Dabovich<sup>1</sup>, Lindsey Hulbert<sup>1</sup>, Jeff Dailey<sup>2</sup>, Julie Morrow<sup>2</sup>, and John McGlone<sup>1</sup>, <sup>1</sup>*Pork Industry Institute, Dept Animal and Food Science, Texas Tech University*, <sup>2</sup>*Livestock Issues Research Unit, USDA-ARS.*

Pig performance, health and behavior may be influenced by the production system. A conventional indoor system was compared with an outdoor system for system effects on pig growth, performance, and behavior. Contemporary litters were born indoors in standard farrowing crates with woven wire flooring or outdoors on alfalfa pasture in the spring and summer months. Indoor pigs were weaned into a conventional nursery with slatted flooring or outdoors into pastures with alfalfa and a straw-bedded hut. After weaning, pigs were kept with 2 littermates per pen. A total of 6 replicate pens were evaluated per treatment. Pig dominance order was determined by a feed competition test during the post-weaning period. Pig behavior was recorded for 24 h using a scan sample technique which included walking, standing, sitting, feeding, waterer manipulation (apparent drinking), rooting, oral-nasal-facial chewing/manipulating (ONF), and lying down behaviors. Performance data were analyzed as a randomized complete block design with effects of production system, dominance status (dominant or submissive) and their interaction. Behavior data were analyzed as a randomized complete block design with a split plot over time. Pig performance measures (ADG, feed intake, feed:gain ratio) were not different ( $P > 0.10$ ) among treatments. Indoor and outdoor pigs were similarly inactive during the evening, but they differed in the level and distribution of active behaviors. The production system by time effect was significant ( $P < 0.05$ ) for walking, drinking, ONF, and lying down. Outdoor born and reared pigs were more active overall and showed increased walking, ONF, and reduced lying compared with pigs born and reared indoors. Indoor pigs expressed more apparent drinking during most times of the day. In conclusion, pigs born and reared indoors and outdoors had generally similar performance but very different behavioral profiles.

**Key Words:** Pig, Environment, Behavior

**117 Toxicity in mares consuming *C. paspali*-infected dallisgrass hay.** M.A. Seitz<sup>\*1</sup>, B.J. Rude<sup>1</sup>, N.M. Filipov<sup>2</sup>, and P.L. Ryan<sup>1,2</sup>, <sup>1</sup>*Mississippi State University, Mississippi State, MS*, <sup>2</sup>*College of Veterinary Medicine, Mississippi State, MS.*

Livestock consuming dallisgrass (DG, *Paspalum dilatatum*) infected with the fungus *Claviceps paspali* often develop the condition known as dallisgrass staggers (DGS). Sclerotia produced by *C. paspali* contain the mycotoxin paspalanine, a GABA receptor antagonist that induces symptoms common to DGS such as tremors, ataxia, recumbency, and hyper-excitability. Although symptoms of DGS are well documented, its etiology in the equine species is poorly understood. Thus, the objective of this study sought to examine the affects of *C. paspali*-infected DG hay consumption on the endocrine, hematological and immune parameters of exposed horses. To this end, 12 non-pregnant Quarterhorse mares were given *ad libitum* access to one of four dietary treatment groups: 1) 14 d non-infected hay; 2) 7 d non-infected hay followed by 7 d infected hay; 3) 7 d infected hay followed by 7 d non-infected hay; 4) 14 d infected hay. Mares were randomly re-assigned and the design repeated following a 16 d interval on bermudagrass pasture. Diets were supplemented with