

## Swine Species

**W356 Nutritional value of sticky coffee hull silage on starting pigs diets.** I. Moreira\*<sup>1</sup>, P. L. O. Carvalho<sup>1</sup>, D. Paiano<sup>2</sup>, L. M. Peñuela Sierra<sup>3</sup>, L. M. Piano<sup>1</sup>, and M. E. O. Girola<sup>1</sup>, <sup>1</sup>*Universidade Estadual de Maringá, Maringá, Paraná, Brazil*, <sup>2</sup>*Universidade Estadual de Mato Grosso do Sul, Aquidauana, MS, Brazil*, <sup>3</sup>*Universidad Del Tolima, Ibagué, Tolima, Colombia*.

These experiments were conducted to study the use of sticky coffee hull (SCH) silage (SCHS) on starting pigs feeding. SCH (caffeine = 0.59%; tannin = 0.82%, as-fed-basis) is a by-product obtained from coffee processing (conversion the raw fruit of the coffee plant (cherry) into the commodity green coffee) and may represent an environmental threat. In Brazil there is a great supply of this cheap by-product. SCH was ground (4 mm screen-opening diameters) before ensilaging. There were at least 30 days of ensilage period before using it. Chemical composition (as-fed-basis) of SCHS is: DM= 66.48%; CP= 6.79%; GE= 2,753 kcal/kg; CF= 10.48%; ADF= 15.97%; NDF= 19.23%; hemicelulose= 3.26%; lignin= 3.77 %; ash= 4.587%; Ca= 0.20 %; P= 0.07%. Experiment I consisted of a digestibility trial using 15 piglets (Initial BW= 20.78±2.86 kg). In the Experiment II, 60 piglets (BW = 15.52±2.19 to 32.52±3.51 kg) were used in a performance study. Piglets were allotted to treatments with six replicates of two pigs per replicate in a randomized complete block design. Treatments consisted of a corn-soybean meal basal diet (0%) and four diets with sticky coffee hull (4, 8, 12, and 16%). Experimental diets were formulated to meet the same nutrients levels (NRC, 1998). From Experiment I it was obtained: Digestibility coefficient of energy of SCHS= 57.49%, which means 1,583 kcal of DE/kg (as-fed-basis). Performance data (Experiment II) were, respectively for 0, 4, 8, 12 and 16 % of SCHS inclusion: DFI = 1.345, 1.359, 1.304, 1.222 and 1.264 kg; DWG = 0.665, 0.671, 0.643, 0.592 and 0.640 kg; F: G ratio: 2.027, 2.031, 2.028, 2.056 and 1.976. The regression analysis indicates no effects (P≥0.05) of sticky coffee hull silage inclusion on piglet performance (DFI, DWG and F: G ratio). The results indicated 1,583 kcal of DE/kg of SCHS and suggest that it is feasible to use up to 16% of sticky coffee hull silage on starting piglet diet.

Financial support: CNPq (Brazil).

**Key Words:** By-Product, Digestibility, Performance

**W357 Use of sticky coffee hull silage on growing pigs feeding.** I. Moreira\*<sup>1</sup>, P. L. O. Carvalho<sup>1</sup>, D. Paiano<sup>2</sup>, G. C. Oliveira<sup>1</sup>, I. S. Kuroda Júnior<sup>1</sup>, and F. L. Mourinho<sup>1</sup>, <sup>1</sup>*Universidade Estadual de Maringá, Maringá, Paraná, Brazil*, <sup>2</sup>*Universidade Estadual de Mato Grosso do Sul, Aquidauana, Mato Grosso do Sul, Brazil*.

Two experiments were carried out to evaluate nutritional value of sticky coffee hull (SCH) silage (SCHS) on growing pigs feeding. SCH (caffeine = 0.59%; tannin = 0.82%, as-fed-basis) is a by-product obtained from coffee processing (conversion the raw fruit of the coffee plant (cherry) into the commodity green coffee) and may represent an environmental threat. In Brazil there is a great supply of this cheap by-product. SCH was ground (4 mm screen-opening diameters) before ensilaging. There were at least 30 days of ensilage period before using it. Chemical composition (as-fed-basis) of SCHS is: DM= 63.71%; CP= 6.56%; GE= 2,708 kcal/kg; CF= 10.14%; ADF= 15.55%; NDF=

18.62%; hemicelulose= 3.07%; lignin= 3.64%; ash= 4.37%; Ca= 0.20%; P= 0.07%. Experiment I consisted of a digestibility trial using 15 pigs (Initial BW= 43.09±4.12 kg). In the Experiment II, 60 pigs (BW = 32.52±3.21 to 59.58±4.01 kg) were used in a performance study. Pigs were allotted to treatments with six replicates of two pigs per replicate in a randomized complete block design. Treatments consisted of a corn-soybean meal basal diet (0%) and four diets with sticky coffee hull (4, 8, 12, and 16%). Experimental diets were formulated to achieve the same nutrients levels (NRC, 1998). From Experiment I it was obtained: Digestibility coefficient of energy of SCHS = 49.87%, which means 1,351 kcal of DE/kg (as-fed-basis). Performance data (Experiment II) were, respectively for 0, 4, 8, 12 and 16% of SCHS inclusion: DFI = 1.919, 1.834, 1.831, 1.742 and 1.703 kg; DWG = 0.823, 0.744, 0.775, 0.764 and 0.738 kg; F: G ratio: 2.340, 2.456, 2.361, 2.274 and 2.312. No effects (P≥0.05) of sticky coffee hull silage inclusion on piglet performance (DFI, DWG and F: G ratio) were showed by regression analysis. It can be concluded that using up to 16% of sticky coffee hull silage (1,351 kcal of DE/kg) on growing piglet diet is feasible.

Financial support: CNPq (Brazil)

**Key Words:** By-Product, Digestibility, Performance

**W358 Evaluating varied periods of water deprivation on body weight and feed intake in 50 to 70 kg pigs.** A. D. Quant\*, M. D. Lindemann, G. L. Cromwell, H. J. Monegue, J. S. Monegue, and B. G. Kim, *University of Kentucky, Lexington*.

Water deprivation can occur in swine production for various reasons (e.g., transport, water line breakage or freeze, power outage, etc.). A study was conducted to examine short and long-term effects of various water deprivation periods on pig performance. Crossbred pigs (n = 80; initial BW: 59.07 ± 3.93 kg) were blocked by gender and BW and allotted to 5 treatments with 4 replications of 4 pigs/pen. Pigs were weighed and observed twice daily for 5 d during and following the period of deprivation (0, 10, 13, 24, and 48 h deprivation), then weighed weekly for 7 wk. Minimum and maximum ambient temperatures during deprivation were 20.51 and 22.25°C. Pigs were allowed ad libitum access to water (except during deprivation) and feed for the entire experimental period. Backfat depth and longissimus muscle depth were measured by ultrasonography at the conclusion of the experiment. As duration of water deprivation increased, BW loss during deprivation increased (0.00, 1.22, 1.85, 2.56, and 4.06 kg) linearly (P < 0.01) and quadratically (P < 0.01). Body weight gain in the first 24 h immediately following water restoration increased (0.88, 2.41, 2.93, 4.01, and 5.74 kg) linearly (P < 0.01) and quadratically (P < 0.05) as water deprivation increased. Feed intake 24 h post deprivation was not affected by treatment (2.76, 2.74, 2.74, 2.72, and 2.93 kg; P = 0.73). During the 5-d observation period, BW gain decreased linearly (4.49, 3.89, 3.72, 3.52, and 2.95 kg; P < 0.01) as deprivation time increased, but 7-wk BW gain was not affected by treatment (49.66, 49.89, 50.37, 49.46, and 51.85 kg; P = 0.61). The length of water deprivation had no effect on backfat depth (17.44, 17.94, 16.38, 17.31, and 18.69 mm; P = 0.59) or longissimus muscle depth (56.63, 60.81, 59.25, 58.06, and 58.44 mm; P = 0.73). Therefore, based on growth performance and carcass characteristics, we conclude that water deprivation in grower pigs for durations less than 48 h

results in no detrimental effects to the pigs. The BW changes associated with the period of deprivation would seem to be largely those of dehydration, rehydration, and gut fill.

**Key Words:** Pigs, Water Deprivation

**W359 Evaluation of pigs raised on two types of pasture-based and a confined grow-finish systems for production efficiency.** K. Nadarajah\*, D. L. Kuhlers, and W. F. Owsley, *Auburn University, Auburn, AL.*

Two independent grow-finish (G-F) trials with 2 pasture-based stocking systems (rotational (RP) and continuous (CP)) along with a confined (CF) system each with 2 replicates were conducted in spring and fall of 2004, to evaluate production efficiency of pigs. Each pasture based G-F stocking system utilized 0.2 hectares of electrical fenced plot with shade, and feed and water available *ad libitum*. In the CP system, pigs for a replicate had access to entire 0.2 hectares; however, a replicate for pigs in the RP system had access to one-fourth of the 0.2 hectares paddock, and remained in it for 2 wk and were rotated to next sub paddock. Each pen in the CF was about 12.5 m<sup>2</sup>. A replicate is the experimental unit that consisted of 8 feeder pigs for a total of 48 pigs/trial. Pigs were evaluated for growth rate, feed efficiency, hot carcass wt and incidence of parasitic infestation (liver scores 1- 6: <10 spots with incremental increase of 10, where 6 =>50 spots; lung scores 0-5: no damage with increasing increments of 20%, where 5 => 80% damage). Growth performance data of pigs (off test wt, ADG, and hot carcass wt) were analyzed using a mixed model fitting the effects of covariate for initial entry wt and trial, system, sex and their interactions as fixed effects and replicate nested within trial and system as a random effect. Differences ( $P < 0.05$ ) for trial, system and sex were observed for all growth performance traits. Initial entry wt influenced off test wt and hot carcass wt ( $P < 0.001$ ). Compared to RP and CP systems, pigs from CF systems grew faster (ADG: 0.67 and 0.66 vs. 0.78 kg;  $P = 0.06$ ), and were heavier at off test (108 and 107 vs. 122 kg;  $P = 0.02$ ) and for hot carcass wt (81 and 81 vs. 93 kg;  $P = 0.02$ ). There was no difference in growth rate of pigs between the RP and CP systems. Difference between trials for growth performance may have been due to effect of season. Pen G:F for pigs in the CF system was more efficient than RP and CP systems (0.30 vs. 0.26 and 0.28;  $P < 0.05$ ). Liver and lung scores did not differ between trials or systems. Pigs on sustainable outdoor pasture environments were equally healthy as in CF.

**Key Words:** Pigs, Pasture, Growth

**W360 An analysis of the effect of age and weaning status on gastrointestinal characteristics and microbiota of young pigs.** J. C. Miguel\*, P. J. Laski, R. I. Mackie, and J. E. Pettigrew, *University of Illinois, Urbana.*

A 3 wk experiment was conducted to evaluate the effect of age and weaning status on gastrointestinal characteristics and microbiota of young pigs. Thirty pigs were weaned at 21.2 d of age and 5.95 kg BW and allotted to one of three euthanasia dates. Six pigs were euthanized at weaning and the remaining 24 pigs were separated into two groups of 12 pigs and euthanized on d 7 or 21 post-wean. At euthanasia, tissue

segments were taken from the small intestine for morphology. The stomach, small intestine, cecum, and large intestine were emptied and wet weights recorded. Luminal contents and mucosal scrapings from the pars esophagea, fundus, jejunum, ileum, proximal colon, and distal colon were collected for genomic DNA isolation. The variable 3 (V3) region of 16S rDNA was amplified by PCR and denaturing gradient gel electrophoresis (DGGE) was utilized to generate microbial profiles. Bands generated following PCR-DGGE were enumerated and Sorenson's pairwise similarity coefficients ( $C_s$ ) were analyzed. Pigs at 7 d post-wean had reduced ( $P < 0.05$ ) villus height in the duodenum and ileum and a smaller ( $P < 0.05$ ) villus height: crypt depth and villus cross-sectional area in all 3 segments. Pigs at wean had a smaller ( $P < 0.05$ ) crypt depth in all 3 segments. As the pigs aged, there was an increase ( $P < 0.01$ ) in digestive organ weight as a percent of body weight. Analysis of PCR-DGGE band numbers indicated differences ( $P < 0.05$ ) among age groups but no consistent pattern according to age or weaning status. Pigs at wean had more bands in jejunal luminal contents and mucosa and fewer band numbers in distal colonic luminal contents compared to pigs at 7 and 21 d post-wean. Comparisons of microbial diversity indicated similarity among pigs within age groups was greater ( $P < 0.05$ ) than between age groups ( $P < 0.05$ ), signifying age-dependent alterations in microbial banding patterns. Age and weaning status appear to influence the gastrointestinal environment of young pigs.

**Key Words:** Pigs, GastrointesFinal, 16S rDNA PCR-DGGE

**W361 Effect of bacitracin supplementation on lactation management, neonatal piglet performance, and subsequent reproductive performance of sows.** F. B. Turner\*<sup>1</sup>, L. M. Thompson<sup>1</sup>, K. J. Kinney<sup>1</sup>, S. E. Shute<sup>1</sup>, W. L. Flowers<sup>1</sup>, R. A. Schlutz<sup>2</sup>, and B. Pratte<sup>3</sup>, <sup>1</sup>North Carolina State University, Raleigh, <sup>2</sup>Avoca Veterinary Clinic, Avoca, IA, <sup>3</sup>Alpharma Animal Health Division, Fort Lee, NJ.

A study was conducted to examine the effect of supplementation of bacitracin in sow diets on lactation management and neonatal growth and mortality of piglets on a 2400-head commercial sow farm with a yearly average of 24 pigs per sows per year. There were no clinical signs of clostridial enteritis at the onset of the study. Females were housed in pens of 8 to 10 animals during gestation and moved into individual farrowing crates by day 112 of gestation. Sows (n=130 per treatment) were randomly assigned to receive feed supplemented with either 0 or 250 grams of BMD<sup>®</sup>/ton from day 100 of gestation through weaning. Piglets (n= 2767) received ear tags and were weighed within 2 days of birth and at weaning. Weaning age decisions were made by farm personnel independent of the study. Fecal samples from a subset of sows (n=30 per treatment) indicated that BMD<sup>®</sup> significantly reduced ( $P < 0.05$ ) the clostridial load. No differences ( $P > 0.30$ ) were observed in neonatal mortality or piglet weight within 2 days of birth. The proportion of litters in which piglets were crossfostered during lactation was lower ( $P < 0.05$ ) in BMD<sup>®</sup> than control sows. Crossfostering tended to reduce ( $P < 0.08$ ) the growth of piglets in a litter independent of treatment. There was no difference ( $P > 0.12$ ) in unadjusted weaning weights of piglets between treatments. However, piglets nursing sows receiving BMD<sup>®</sup> were weaned an average of 2.3 days earlier ( $P < 0.05$ ) than piglets nursing control sows which resulted in a higher ( $P < 0.05$ ) weight per day of age during lactation. This was particularly evident for piglets whose weight at 2 days of age was less than 1.3 kg. Subsequent reproductive performance of sows was not affected by treatment ( $P > 0.25$ ). In summary, supplementation of

gestation and lactation diets with bacitracin decreased the need for crossfostering and improved neonatal growth of piglets.

**Key Words:** Bacitracin, Lactation, Swine

**W362 Comparing histopathological scores and exterior data for phenotyping pigs to address leg weakness.** C. Rudolph, E. Tholen, M. Mielenz, G. Breves\*, K. Schellander, and H. Sauerwein, *University of Bonn, Bonn, Germany.*

Leg weakness is one of the most serious problems in the pig industry. Herein we aimed to establish a classification modus from a histological evaluation of four joint cartilage surfaces in pigs and to relate the findings to exterior data. From 139 pigs of a F2 crossing of pietrain (Pi) x Duroc (Du) and Du x Pi, the stance in angle and position of fore- and hind legs was assessed and linearly scored (1 to 5, 3 is optimal). After slaughter, femur and humerus were dissected, each the distal and the proximal ends were cut into longitudinal slabs and histological sections were prepared from the joint surfaces. Two sections per joint surface were microscopically evaluated whereby the following criteria were recorded and then classified: Score 1: no pathohistological alterations, only marginally rough surface or weakly eosinophilic matrix or fibrillation; score 2: marginal histopathological alterations comprising fibrillation and hyperplasia and minor vascularization of the joint cartilage; score 3: severe alterations of the surface structures and the deeper layers; score 4: massive alterations of the cartilage including necrotic or ossified areas. All joints were accordingly scored and summarized for each animal. Data of exterior and histology were linked by the procedure FREQ of the SAS programme. According to their exterior data, only 12.2% of the pigs had consistently optimal scorings. By histology, no animal was without any aberrations; 15.5% of the animals had large-scale changes on each of the joints assessed. Significant ( $p \leq 0.055$ ) analogies with medium contingency factors ( $c = 0.23$  to  $0.32$ ) were found between individual exterior and histology data, e.g. between the exterior scores for hindleg stance and the histological scores from proximal and distal femur joint surface. Consideration of histological traits thus extends the repertoire available to characterize alterations associated with leg weakness and can therefore be used as an additional tool when aiming to comprehensively phenotype animals for genetic approaches.

**Key Words:** Pig, Leg Weakness, Histology

**W363 A novel freezing-thawing device for porcine semen using a detachable catheter.** G. Rocha-Chavez<sup>1</sup>, M. A. Pinto-Jacobo\*<sup>2,1</sup>, L. Pinal-Suazo<sup>1</sup>, and J. G. Michel-Parra<sup>1</sup>, <sup>1</sup>CUSUR Univ de Guadalajara, Cd Guzman Jalisco Mexico, <sup>2</sup>URPJ, Guadalajara Jalisco Mexico.

Current freezing protocols for porcine semen require at least 2 billion spermatozoa packed in either several 0.5 cc straws, or one maxi straw of 5cc. Thawing protocols require the use of a minimum of 50 ml of extender for re-suspension of semen under a strictly controlled procedure. The objective of this study was to determine motility readings of thawed semen packed either in traditional .5 cc straws or in a novel separable intrauterine device. The sperm-rich fraction of

three boars of known fertility was collected using the gloved hand technique. The semen was pooled, diluted 1:1 centrifuged (900g for 15 min) and the supernatant was resuspended in freezing extender and packed in either five straws of 0.5 cc (treatment 1) or two special maxi tubes (treatment 2). Maxi tubes are plastic tubes 37 cm long, 4 mm inside diameter and 0.7 mm wall thickness. For each treatment, a minimum of 2 billion spermatozoa per dose was used independently of the volume used for freezing. After gradual thawing, semen of treatment one was resuspended in a 27°C extender whereas semen on maxi tubes (treatment two) was thawed directly in a 27°C water bath and the two tubes were coupled using the pre designed steel connector. A special tip was connected in one end of the device and semen was forced out using isothermal extender at the other end. Semen was recovered in a prewarmed test tube and motility readings were made at 37°C using videorecording technology on both treatments. Ten replicates were made for each treatment and all readings were made in triplicate. Readings of  $38 \pm 7.3$  and  $42 \pm 8.5$  % on motility were found for treatment one and two respectively with no significant differences ( $p < 0.05$ ). It was concluded that after-thaw motility is the same for both treatments; however, the device can easily be used for direct deposition of semen at the uterine lumen of the sow using the right technique. Further in vivo studies are needed to validate the usefulness of the technique under field conditions.

**Key Words:** Frozen, Semen, Detachable

**W364 Analysis of the association of factors associated with stillbirth in breeding sows.** S. S. Anil\*, L. Anil, J. Deen, S. K. Baidoo, and R. D. Walker, *University of Minnesota, St. Paul.*

The number of pigs weaned per litter and the number of pigs weaned per sow per year are adversely affected by a high stillborn rate and therefore it is important to analyze the risk factors associated with stillbirth in swine breeding herds. The objective of the present study was to analyze the association of the parity of the sow (categorized into  $\leq 3$  or  $\geq 4$ ), number of piglets born alive, number of mummies (0 or  $\geq 1$ ), litter birth weight, gestation length (categorized into  $\leq 115$  or  $\geq 115$  days) and farrowing induction (induced or not induced) with stillbirth (0 or  $\geq 1$ ) using logistic regression analysis (Proc logistic, SAS V 9.1). Data on 5290 parity records of sows were collected from the PigCHAMP database of the swine research unit of the University of Minnesota, Waseca, MN. Results indicated that the risk of having stillborn piglets was lower ( $P \leq 0.05$ ) among sows of parity  $\leq 3$  compared to higher parity sows (Odds ratio, OR = 0.57). As litter birth weight increased the likelihood of having stillborn piglets decreased (OR 0.957,  $P \leq 0.05$ ). Sows with no mummies were 29% less ( $P \leq 0.05$ ) likely to have stillborn piglets. A higher number of piglets born alive and a gestation length of  $\leq 115$  days increased ( $P \leq 0.05$ ) the risk of having stillborn piglets (OR 1.056 and 1.204 respectively). Sows that were not induced for farrowing had a higher ( $P \leq 0.05$ ) risk of having stillborn piglets (OR 1.327). Results indicated that the factors associated with higher still births include, higher parity sows, sows that farrow in  $\leq 115$  days of gestation and sows that were not induced. These sows required special attention in order to minimize the risk of stillbirth.

**Key Words:** Stillbirth, Sows

**W365 Influence of sex and terminal sire line on fresh meat quality, fatty acid profile of backfat, and ham weight losses during ripening of Iberian pigs reared under intensive production systems.** M. P. Serrano<sup>1</sup>, D. G. Valencia<sup>1</sup>, R. Lázaro<sup>1</sup>, A. Fuentetaja<sup>2</sup>, and G. G. Mateos\*<sup>1</sup>, <sup>1</sup>Universidad Politécnica de Madrid, Spain, <sup>2</sup>Copese, Segovia, Spain.

Iberian (IB) pig is a native breed of Spain originally reared under free range conditions and sacrificed at 160 to 180 kg BW. Quality of cured products from IB pigs is high but productivity is low. During ripening of hams (15 d salting, 60 d postsalting, 31 d drying, and 639 d cellar phase), lipid changes occur and as a consequence the aroma and flavour of the products are improved. We studied the influence of sex (EF, gilts; CM, barrows) and terminal sire line (DD, Danish Duroc; SD, Spanish Duroc; RIB, Retinto Iberian) on fresh meat quality, fatty acid (FA) profile of backfat (BF), and ham weight losses during ripening in 180 pigs sacrificed at 145 kg BW. The female line used was pure RIB in all cases. Treatments were arranged factorially (2 x 3) with five replicates (six pigs) per treatment. Meat samples were taken at m. *Longissimus dorsi*. Samples of BF were taken at tail insertion from the two Duroc sire lines, but no samples were taken from the RIB sire line. Meat from CM had more lightness (42.1 vs. 40.0;  $P < 0.05$ ) and more fat (8.6 vs. 6.1%;  $P < 0.01$ ) but less protein (21.5 vs. 22.1%;  $P < 0.01$ ) than meat from EF. No differences were detected between Duroc sire lines for any trait studied. Meat from RIB sired pigs was redder (11.3 vs. 7.8;  $P < 0.001$ ) and had more intensive colour ( $P < 0.01$ ) than meat from Duroc sired pigs. Also, meat from pure RIB pigs had more fat (8.8 vs. 6.8%;  $P < 0.05$ ) and less protein (21.0 vs. 22.1%;  $P < 0.001$ ) than meat from Duroc sired pigs. Treatment did not affect FA profile of BF. Weight losses during ripening were lower for CM than for EF (32.2 vs. 33.1%;  $P < 0.01$ ) but were not affected by sire line. We conclude that entire females are an alternative to castrated females for production of Iberian pig and that Danish Duroc can be successfully used as sire line for this type of production.

**Key Words:** Iberian Pig, Duroc Pig, Quality

**W366 Influence of gender on growth and carcass quality of pigs slaughtered at the same age destined to the production of high quality dry-cured hams.** M. A. Latorre<sup>1</sup>, L. Ariño<sup>2</sup>, E. García<sup>3</sup>, and R. Lázaro\*<sup>4</sup>, <sup>1</sup>Centro de Investigación y Tecnología Agroalimentaria de Aragón, Zaragoza, Spain, <sup>2</sup>Integraciones Porcinas S.L., Teruel, Spain, <sup>3</sup>Jamones y Embutidos Alto Mijares S.L., Teruel, Spain, <sup>4</sup>Universidad Politécnica de Madrid, Spain.

High quality dry-cured hams under the protection and designation of Teruel hams trademark are produced from heavy pigs in a specific area of Spain. For Teruel ham production the fat at Gluteus medius level should be at least 20 mm because lower fat levels impair the ripening process and ham quality. A total of 300 Landrace\*Large White sows was crossed with Duroc boars. Forty hybrid pigs, with an average age of 182 d (50% castrated males with 110.1 kg BW and 50% entire females with 104.1 kg BW), were chosen at random. They were fed a commercial wheat, barley, and soybean meal diet containing 2,430 kcal NE/kg and 0.80% total lysine until slaughter age at 210 d. The effects of gender (castrates and females) on growth and carcass quality of pigs destined to the production of Teruel hams were studied. Each treatment was replicated twenty times (one pig per replicate). No effect of gender on average daily gain, carcass weight or dressing percentage was detected ( $P > 0.05$ ). Castrates had more backfat (29.3 vs. 24.2 mm)

and fat at Gluteus medius muscle (28.5 vs. 22.8 mm) than females ( $P < 0.001$ ). In consequence, the percentage of carcasses with a Gluteus medius fat depth equal or greater than 20 mm was higher in castrates than in females (100 vs. 77.8%;  $P < 0.05$ ). Gender did not influence carcass length nor pH or temperature at 45 min postmortem ( $P > 0.05$ ). The weight of trimmed primal cuts (loins+shoulders+hams) was not affected by gender ( $P > 0.05$ ), but the trimmed primal cut yield was higher in females than in castrates (46.9 vs. 44.5%;  $P < 0.001$ ). It is concluded that castrated males are more adequate than entire females when sacrificed at the same age for the production of Teruel hams.

**Key Words:** Gender, Teruel Ham, Pigs

**W367 Influence of slaughter weight on performance and carcass quality of pigs destined to the production of high quality dry-cured hams.** M. A. Latorre<sup>1</sup>, L. Ariño<sup>2</sup>, E. García<sup>3</sup>, and G. G. Mateos\*<sup>4</sup>, <sup>1</sup>Centro de Investigación y Tecnología Agroalimentaria de Aragón, Zaragoza, Spain, <sup>2</sup>Integraciones Porcinas S.L. Teruel, Spain, <sup>3</sup>Jamones y Embutidos Alto Mijares S.L., Teruel, Spain, <sup>4</sup>Universidad Politécnica de Madrid, Spain.

High quality dry-cured hams under the designation of Teruel hams trademark are produced from heavy pigs in a specific area of Spain. For Teruel ham production the fat at Gluteus medius level should be at least 20 mm because lower fat levels impair the ripening process and ham quality. Two hundred (Landrace x Large White) x Duroc pigs, 50% castrated males and 50% entire females, with an average weight of 107 kg were used to study the effect of slaughter weight (SW; 120, 125, 130, 135 or 140 kg BW) on performance and carcass quality of pigs destined to the production of Teruel hams. Each treatment was replicated four times (ten pigs penned together). Animals were fed a commercial wheat, barley, and soybean meal diet containing 2,430 kcal NE/kg and 0.80% total lysine. Average daily gain and average daily feed intake were not affected by SW ( $P > 0.05$ ), but feed conversion increased linearly ( $P < 0.05$ ) at a rate of 0.08 kg for every 10 kg of BW increase. A linear relationship between SW and dressing percentage, backfat depth, and fat over the Gluteus medius muscle was detected suggesting increases by 0.5 percentage unit, 2.1 mm, and 2.0 mm, respectively, for every 10 kg extra BW at slaughter ( $P < 0.001$ ). Weight of trimmed loins, shoulders, and hams increased with weight ( $P < 0.001$ ). However, trimmed shoulder yield was not affected by SW ( $P > 0.05$ ). Also, there was a linear relationship between SW and trimmed loin and ham yields ( $P < 0.001$ ), indicating 0.17 kg and 0.30 kg decreases, respectively, for every 10 kg increase in SW. It is concluded that an increase in slaughter weight impaired productive performance of pigs, but might improve carcass quality. Slaughtering at more than 125 kg BW might help to optimize carcass characteristics of pigs destined to production of Teruel hams.

**Key Words:** Slaughter Weight, Teruel Ham, Pigs

**W368 Change of characteristics of rib eye with cut section of pork using computer image analysis.** M. Oishi\*, Y. Furumoto, S. Hidaka, and K. Kuchida, *Obihiro University of A & VM, Obihiro, Hokkaido, Japan.*

The objective of this study was to determine how shape, color and marbling change with the cut section of pork loin. Rib loins

between 4-5th and the last rib of 6 barrows and 6 gilts of 3-way crossbred([Landrace × Large White] × Duroc) were cut into 18 slices with 2.5cm interval. Slice 1 was for 4-5th rib and slice 18 was for the last rib. High quality digital images of each section were taken by a mirror type camera for carcass cross section. For each section, nine traits were measured using an image analysis software (i.e., rib-eye area, fat area ratio, index of overall marbling coarseness, minor-major axis ratio, complexity of rib-eye shape, and RGBY values for rib eye color). At the same time, rib eye color (L\*, a\* and b\* value) was measured with a colorimeter, and then the crude fat contents in rib eye was determined by chemical analysis for each slice. Correlation coefficients between Y and L\* value, between the crude fat and fat area ratio were 0.825 and 0.740, respectively. The sections were classified into six positions by three slices backward from the front (e.g.,

position 1 = slices 1-3, position 6 = slices 16-18). Analysis of variance was performed by the SAS program for the image analysis traits as dependent variables and positions as fixed effects. Least square means (LSM) of the minor-major axis ratio for positions 1-6 were 0.62, 0.61, 0.58, 0.57, 0.49 and 0.39, respectively. Those of the fat area ratio were 3.80, 2.78, 2.13, 2.48, 2.50 and 3.24. Corresponding LSM of Y values were 121.59, 116.23, 112.06, 113.95, 115.19, and 117.72. From these results, rib-eye shape became flat toward the last position. Also the fat area ratio decreased in middle positions and then increased toward the last position. Marbling coarseness had the same trend with the fat area ratio. Brightness of rib eye was decreased in middle positions and then increased toward the last position.

**Key Words:** Pork, Image Analysis, Loin

## Teaching/Undergraduate & Graduate Education

**W369 Evaluation of Mississippi State University equine curriculum.** M. Nicodemus\* and K. Slater, *Mississippi State University, Mississippi State.*

With the growth of the equine industry, the demand for more university equine programs is increasing. Faculty has a challenge of trying to address the needs of the equine student as they prepare for jobs in a very diverse equine industry. To better develop a curriculum that meets the needs of the equine student, a survey was given to students (n=78) currently enrolled in equine classes at Mississippi State University. Questions addressed the students' background and interests concerning horses. The majority (74%) of students were Animal & Dairy Sciences majors with a science concentration with only 15% pursuing an equine management/production concentration. The majority of students had participated in or attended a horse show or clinic (69%) and had owned or family members had owned a horse (83%). 68% were planning on pursuing a career in the equine industry with 61% of those students choosing a veterinary career. Horse Science ranked first (41%) in equine classes that the students were currently taking or had taken followed by Equine Conformation & Performance Evaluation (20%). The majority (68%) of students indicated that they were taking equine classes because the classes "fulfilled a degree requirement" and the students "enjoyed horses", while 15% were taking classes just because they "enjoyed horses". Horse Science (17%) and Advanced Horsemanship (17%) were ranked as students' favorite equine classes in which both have a hands-on component. Equine Behavior & Training ranked the highest (23%) in equine classes the students wanted to take in the future followed by Western Equitation (19%) and Equine Reproduction (19%). Riding classes ranked the highest (58%) for recommended equine classes to add to the curriculum followed by an advanced horse science (35%). Overall, a hands-on component to the equine classes was a motivation for students taking an equine class. Laboratory components have been recently added to several of the equine classes to meet students' needs. Additionally, both Equine Reproduction and Advanced Horsemanship are only offered as a special topics class, but with favorable responses from this survey, these classes are currently being added to the curriculum.

**Key Words:** Horse Science, Teaching

**W370 Development of an animal science managerial mentoring program.** J. S. Pendergraft and B. T. Gutierrez\*, *Sul Ross State University, Alpine, TX.*

The main goal of this project was to develop a managerial mentoring program for incoming animal science students. A model was developed to create a realistic workplace experience for animal science students outside of the classroom. The equine science program was divided into four specialized managerial areas: stables, nutrition lab, reproduction lab, and exercise physiology lab. One manager position with several specialized assistant manager positions were created. Additional staff positions were created under each assistant manager's area of responsibility. The equine science coordinator interviewed and hired the barn manager who in turn interviewed and hired the assistant managers. All hiring of positions were supervised by the equine science coordinator. All manager positions were renewable each year and staff positions were renewed each semester allowing for more diversity in a student's experience. A mentoring program for incoming equine science students was incorporated into the managerial model. The manager and assistant managers were responsible for mentoring their staff. Each incoming equine science student participating in the mentoring program committed 30 hours to each specialized area. Students successfully completing the mentoring program could choose to continue for a second semester of mentoring to gain more experience or apply for a mentoring position. During the first semester of the managerial mentoring program in the fall of 2006 three students participated as mentees. Two of these students are continuing the mentoring program during their second semester. One mentee chose to become a mentor during her second semester. The head manager/mentor obtained employment after graduation as a mare manager for a Thoroughbred farm in New Zealand. Eight new students entered the mentoring program during the spring of 2007. The main outcome from the Hispanic Serving Institute grant project was the development of a managerial mentoring model that can be used for any livestock program. The impact from this model was students were able to gain viable realistic workplace experience for the development of life skills that will be desired by future employees. Project progress can be found at: <http://faculty.sulross.edu/jeffp/Equine/HSI.htm>.

**Key Words:** Experiential Learning, Mentoring