

DEX. During the period of 12-h sampling, plasma leptin and insulin peaked each afternoon and decreased each morning. This pattern of secretion appeared to be diurnal but may have been related to the feeding of concentrate only in the morning. Concentrations of IGF-1 were altered ( $P < 0.01$ ) by treatment, being lower on d 3, 4, 5, and greater on d 14 in the DEX group. In Exp. 2, concentrations of leptin in response to DEX were greater ( $P < 0.01$ ) in mares and geldings relative to stallions. Body condition score, FT over the withers, and sex best fit ( $R^2 = 0.65$ ) the stepwise regression model for pre-DEX leptin concentrations. Body condition score, FT over the back, and sex best fit ( $R^2 = 0.75$ ) the stepwise regression model for maximum leptin response after DEX. In conclusion, stallions responded to multiple injections of DEX with increased leptin, insulin, and glucose concentrations. Further, estimates of fatness (BCS and FT) correlate with resting as well as DEX-stimulated leptin concentrations, however the low leptin concentrations in stallions are not fully explained by their degree of fatness.

**Key Words:** Horse, Sex, Leptin

**39 Feeding supranutritional concentrations of vitamin D<sub>3</sub> and restricting dietary phosphorus effects on pork quality.** T.R. Bonner\*, C.R. Kerth, W.F. Owsley, W.R. Jones, and L.T. Frobish, *Auburn University*.

Yorkshire-cross pigs ( $n = 50$ ) were assigned to one of five experimental finishing diets to determine the effects of high levels of vitamin D<sub>3</sub> with or without phosphorus fed for 10 or 50 days prior to slaughter on carcass and meat quality traits. The diets were 1) a standard finishing (SF) diet which served as the control (CON); 2) a SF diet with 32,000 IU/kg supplemental vitamin D<sub>3</sub> fed for 50 days prior to slaughter (50); 3) a SF diet with 32,000 IU/kg supplemental vitamin D<sub>3</sub> fed for 10 days prior to slaughter (10); 4) a SF diet with 32,000 IU/kg supplemental vitamin D<sub>3</sub> without supplemental phosphorus fed for 50 days prior to slaughter (50-P); and 5) a SF diet with 32,000 IU/kg supplemental vitamin D<sub>3</sub> without supplemental phosphorus fed for 10 days prior to slaughter (10-P). Animals fed the 50-P diet tended to have a lower pH across all times (0.5, 1, 2, 3, 4, and 24 h) postmortem compared to CON and 50 diet ( $P = 0.10$ ). Diets did not affect objective color, marbling, or firmness/wetness scores measured at the 10th rib in the longissimus muscle ( $P > 0.05$ ). There were no differences among diets for hot carcass weight; fat thickness along the mid-line measured at the first rib, last rib, and last lumbar vertebrae; muscle score; and loin eye area measured at the 10th rib ( $P > 0.05$ ). Hunter color measurements taken at the 10th rib on the longissimus muscle did not differ ( $P > 0.05$ ) among diets. Percent drip loss was not different among diets at 7 days or 10 days postmortem ( $P > 0.05$ ). These data indicate that feeding high levels of vitamin D<sub>3</sub> and restricting phosphorus may lower pH values in pigs fed these diets for 50 days but do not affect other pork quality measures.

**Key Words:** Vitamin D<sub>3</sub>, Pork Quality, Phosphorus

**40 Timing effects of second GnRH administration on AI pregnancy rate in an Ovsynch protocol in postpartum crossbred beef cattle.** H.K. Baitis\*<sup>1</sup>, W.D. Whittier<sup>1</sup>, A. Garcia<sup>1</sup>, and J.M. DeJarnette<sup>2</sup>, <sup>1</sup>*Large Animal Clinical Science, Virginia Polytechnic Institute and State University, Blacksburg, VA*, <sup>2</sup>*Select Sires Inc., Plain City, OH 43064*.

Fixed-time artificial insemination (TAI) after GnRH-PGF<sub>2</sub>α-GnRH treatments (Ovsynch) is a protocol used to achieve acceptable pregnancy rates in cattle without estrus detection. However, up to 30% of

the synchronized animals display premature estrus. The objective of this experiment was to determine if varying the interval from PGF<sub>2</sub>α to the second GnRH administration in an Ovsynch protocol would alter conception rates in crossbred beef cows. Postpartum beef cows ( $n = 310$ ) were subjected to the synchronization programs. Cows were managed in commercial cow/calf operations at four locations. Cows were injected (im) with 50 μg of GnRH on day 0 and PGF<sub>2</sub>α (25 mg dinoprost) on day 7. Animals were randomly allotted to receive a second dose of GnRH either 36 h ( $n = 155$ ) or 48 h ( $n = 154$ ) following PGF<sub>2</sub>α administration and were artificially inseminated 12-16 h later without estrous detection. Data were analyzed using Chi square and Proc GLM (SAS) procedures. Pregnancy rates were 48% and 47% when GnRH was administered 36 or 48 h respectively. There was no significant effect of the timing of second GnRH administration on pregnancy rates as determined by trans-rectal ultrasonography 72-77 d post TAI ( $p = .95$ ). However, there was a significant difference in pregnancy rates associated with location ( $p > 0.001$ ). In conclusion, a second GnRH can be administered 36 or 48 h following PGF<sub>2</sub>α in an Ovsynch synchronization protocol without detrimental effects on pregnancy rates. If estrous detection were employed, a 36 h interval from PGF<sub>2</sub>α to second GnRH injection would be expected to decrease the number of cows requiring premature insemination.

**Key Words:** Synchronization, GnRH, Postpartum

**41 Estrus Induction and Synchronization in Seasonally Anestrous Does in south Texas.** M. A. Lerma\*<sup>1</sup> and R. L. Stanko<sup>1,2</sup>, <sup>1</sup>*Texas A&M University-Kingsville, Kingsville, TX*, <sup>2</sup>*Texas A&M University Agricultural Research Station, Beeville, TX*.

Meat goats are considered seasonal breeders showing increased breeding activity as day length decreases. The ability to induce does to exhibit estrous cycles year-round should result in increased meat goat production. The objective of this experiment was to induce and synchronize estrus in seasonally anestrous Spanish (S) and Boer X Spanish (BX) does. The experiment began at time of summer solstice (June 21), was conducted in Kingsville, TX (27.4° N), and utilized S ( $n = 22$ ) and BX ( $n = 26$ ) does. Does were bled weekly to determine estrous cyclicity for 3 wk prior to initiation of the experiment. On d 0, does were blocked by age, breed, and production status, and allocated to one of four 14-d treatments. Treatments were: 1) .25 mg/hd/d of Melengesterol Acetate (MGA  $n = 12$ ), 2) male exposure (ME  $n = 12$ ), 3) MGA and ME (MGA+ME,  $n = 12$ ), and 4) no MGA or ME (CON,  $n = 12$ ). On d 15, MGA and MGA+ME does, and ME and CON does, were combined into two separate groups. Two fertile bucks equipped with marking harnesses were introduced into each group for a 40-d breeding season. During the breeding season estrus behavior was monitored daily. Does were bled twice weekly for serum progesterone (P<sub>4</sub>) determination, from d 15 to 65. Mean number of d to first elevated P<sub>4</sub> was greater ( $P < .05$ ) in CON does (12.3 ± .9) compared to all other does (MGA 7.6 ± .6, MGA+ME 7.0 ± 0.0, ME 7.0 ± 0.0). Mean number of d to conception were greater ( $P = .05$ ) for CON (20.4 ± 3.1) compared to MGA (11.4 ± 3.1) and MGA+ME (11.7 ± 2.02), but similar ( $P > .1$ ) to ME (19.5 ± 2.7). Pregnancy rates (100%, 83%, 100%, 100%) were similar ( $P > .1$ ) between MGA, MGA+ME, ME, and CON does, respectively. Does which consumed MGA (MGA and MGA+ME) had fewer d ( $P < .001$ ) to estrus than does which did not consume MGA (3.0 ± .2 vs. 10 ± 0.7, respectively). Independently, MGA and ME are effective methods to induce estrous cyclicity in anestrous does. Synchronized estrus, as a result of feeding MGA, may increase production through a concentrated kidding season and uniform kid crop.

**Key Words:** Goat, Melangesterol Acetate, Seasonality

## Meats

**42 Color stability of summer sausage displayed in light of varying intensity.** A.M. Jydegaard<sup>2</sup>, P.L. Dawson<sup>1</sup>, H.J.S. Nielsen<sup>2</sup>, and J.C. Acton\*<sup>1</sup>, <sup>1</sup>*Clemson University*, <sup>2</sup>*The Technical University of Denmark*.

Four light intensities ranging from 61.3 to 294.8 ft-c were evaluated for effects on surface color attributes of slices of summer sausage vacuum-packaged in a high oxygen transmission rate film. Color attributes in the CIE L\*a\*b\* and CIE L\*C\*h\* color spaces were determined. During display at 21C, CIE C\* (chroma) and CIE a\* (redness) decreased ( $P < 0.001$ ) and CIE h\* (hue) increased ( $P < 0.001$ ) with increasing dis-

play time in all lighting intensities. Plotting first order rate constants of the color attributes against the reciprocal of light intensity indicated an Arrhenius-type reaction rate fit. This finding confirmed that the Arrhenius concept for reaction dependency on temperature is also valid for dependency on light intensity, another form of energy affecting surface color stability of summer sausage.

**Key Words:** Surface Color, Sausage, Light Intensity

**43 Effect of rumen-protected conjugated linoleic acid (CLA) or linoleic acid on leptin and CLA content of bovine adipose depots.** M.H. Gillis<sup>\*1</sup>, S.K. Duckett<sup>1</sup>, J.R. Sackmann<sup>1</sup>, and D.H. Keisler<sup>2</sup>, <sup>1</sup>University of Georgia, Athens, <sup>2</sup>University of Missouri, Columbia.

Thirty-six Angus-cross heifers (366 kg) were used to determine effects of dietary lipid sources on serum and adipose tissue leptin levels and fatty acid composition of intramuscular (IM), perianal (PA), and subcutaneous (SQ) lipid depots. Lipid was supplied to diets as either corn oil or rumen-protected conjugated linoleic acid (CLA) salt for two specific treatment periods of either 32 or 60 d. Following an initial feeding period of 56 d, heifers were fed one of three dietary treatments: 1) basal ration containing 88% concentrate and 12% grass hay (CON), 2) basal ration plus 4% corn oil (OIL), or 3) basal ration plus 2% rumen-protected CLA salt (CLA), containing 31% CLA-60. Circulating leptin levels were not affected ( $P > 0.05$ ) by dietary treatment at any time during the trial. However, leptin concentration in adipose tissue was greater ( $P < 0.05$ ) for heifers fed OIL compared to either CON or CLA diets, which were similar ( $P > 0.05$ ). The cis-9, trans-11 CLA isomer and total CLA content was lowest ( $P < 0.05$ ) in IM adipose tissue compared to PA and SQ, which did not differ ( $P > 0.05$ ). The trans-10, cis-12 CLA concentration was highest ( $P < 0.05$ ) for animals fed CLA and OIL diets for 60 d and lowest ( $P < 0.05$ ) for CON, regardless of time on dietary treatment. CLA supplemented heifers had greater ( $P < 0.05$ ) total CLA content than either CON or OIL fed. Adipose tissue concentration of C18:1 trans-11 was lower ( $P < 0.05$ ) for CON than OIL or CLA, which were similar ( $P > 0.05$ ). Percentages of C18:1 trans-10 were lowest ( $P < 0.05$ ) in IM lipid compared to PA and SQ, which did not differ ( $P > 0.05$ ). The ratio of cis-9, trans-11 to C18:1 trans-11 was higher ( $P < 0.05$ ) for animals fed 60 d compared to 32 d, but did not differ ( $P > 0.05$ ) between adipose depots. Feeding rumen-protected CLA increased total CLA isomers by 22%. IM lipid contained the lowest ( $P < 0.05$ ) percentage of cis-9, trans-11 CLA, total CLA, C18:1 cis-9, C18:1 trans-10, and C18:1 trans-11. Based upon cis-9, trans-11 to C18:1 trans-11 ratio in duodenal digesta of steers fed similar diets and tissue ratio for this study, we estimate the percentage of cis-9, trans-11 resulting from desaturation of C18:1 trans-11 in adipose tissue at approximately 86%.

**Key Words:** CLA, Leptin, Beef Cattle

**44 Carcass characteristics, fat color, and tenderness of beef finished on concentrate or forage.** C.R. Kerth<sup>\*</sup>, Auburn University.

Charlais-Angus crossbred steers were fed one of three finishing diets to determine the effects of concentrate-finishing and forage-finishing on carcass characteristics, trimmed and untrimmed fat color, and loin and rib cooking losses and Warner-Bratzler shear force (WBSF) values. When the steers ( $n = 30$ ) reached about 340 kg, they were randomly assigned to finishing systems consisting of rye grass only for 178 d (RG), rye grass for 125 days followed by 98 days of a high-concentrate, feedlot-type diet (RGC), or a high-concentrate diet for 82 days (CON). Steers from the RGC and CON groups were slaughtered when estimated backfat thickness reached 1.0 cm and steers from the RG group were slaughtered when the amount of rye grass present was not sufficient to maintain the animals. Steers finished on RG had lower ( $P < 0.01$ ) hot carcass weight, actual 12th rib fat thickness, adjusted 12th rib fat thickness, ribeye area, and kidney, pelvic and heart fat compared to steers finished

on either RGC or CON, which did not differ ( $P > 0.10$ ). Finishing system did not affect ( $P > 0.2$ ) marbling, which averaged high slight in all three treatments. Subcutaneous rib and loin fat color (measured by L\*, a\*, and b\*) in all three finishing systems was more white, and less red and yellow when the fat was trimmed to 0.3 cm compared to the untrimmed fat ( $P < 0.01$ ). Regardless of trim level, RGC steers had fat that was more yellow than fat from CON steers but less yellow than fat from RG steers (as measured by b\*,  $P < 0.05$ ). Longissimus muscle cooking losses were not affected ( $P > 0.7$ ) by finishing system in either the rib or loin. Loin longissimus muscle WBSF values from RGC and CON systems were similar ( $P > 0.10$ ) and both were lower ( $P < 0.05$ ) compared to longissimus muscle from RG steers. Warner-Bratzler shear values of longissimus muscle from the rib section did not differ among the three finishing systems ( $P > 0.05$ ). These data indicate that steers finished on rye grass have similar quality grades as steers finished on grain, but have more yellow fat and muscle that may be less tender.

**Key Words:** Grass-fed Beef, Fat Color, Tenderness

**45 Effects of biological type and forage feeding on carcass characteristics, fatty acid profiles, and sensory attributes of beef cattle.** R. T. Baublits<sup>\*1</sup>, A. H. Brown, Jr.<sup>1</sup>, F. W. Pohlman<sup>1</sup>, C. J. Richards<sup>4</sup>, H. D. Loveday<sup>4</sup>, D. O. Onks<sup>3</sup>, Z. B. Johnson<sup>1</sup>, C. A. Wells<sup>2</sup>, R. E. Morrow<sup>2</sup>, and B. A. Sandelin<sup>1</sup>, <sup>1</sup>University of Arkansas, Fayetteville, AR, <sup>2</sup>National Center for Appropriate Technology, Fayetteville, AR, <sup>3</sup>University of Tennessee, Springhill, TN, <sup>4</sup>University of Tennessee, Knoxville, TN.

The effects of biological type across different forage-based feeding systems were analyzed to determine differences in carcass quality, chemical composition, and sensory attributes. Small-framed/intermediate-maturing (SI), medium-framed/intermediate-maturing (MI), and large-framed/intermediate-maturing (LI) calves ( $n = 53$ ) were randomly chosen and stratified across either orchardgrass/clover pasture with soyhull supplementation (O), fescue grass/clover pasture with soyhull supplementation (F), or fescue grass pasture overseeded with wheat and millet with no supplementation for the control (C). Effects for hot carcass weight showed that the F and O cattle were heavier ( $P < 0.05$ ) than C. The F and O cattle had larger ( $P < 0.05$ ) loin eye areas than C, but did not differ ( $P > 0.05$ ). Control cattle (C) had less ( $P < 0.05$ ) back fat and lower ( $P < 0.05$ ) quality grades than F or O cattle, whereas F and O cattle did not differ ( $P > 0.05$ ). The LI cattle were heavier ( $P < 0.05$ ) and had larger ( $P < 0.05$ ) loin eyes than SI, whereas SI, MI, and LI did not differ ( $P > 0.05$ ) in terms of back fat or quality grade. The C carcasses had higher ( $P < 0.05$ ) adipose L\* values, lower ( $P < 0.05$ ) adipose a\* values, and lower ( $P < 0.05$ ) adipose b\* values than F or O. Percent total lipid was lower ( $P < 0.05$ ), and percent moisture was higher ( $P < 0.05$ ) for C compared to F and O. No differences were exhibited between biological types for percent total lipids or percent moisture ( $P > 0.05$ ). The C steaks contained higher ( $P < 0.05$ ) linolenic acid concentrations than F or O, and there were no differences ( $P > 0.05$ ) between treatments for conjugated linolenic acid. Sensory evaluation revealed no differences ( $P > 0.05$ ) between treatments or biological types for sensory characteristics. These results suggest that biological type may not influence quality grade for cattle supplemented with soyhulls on forage, and that supplementation can improve carcass quality without drastically altering the fatty acid profile of grass-fed cattle.

**Key Words:** Biological Type, Beef Cattle, Forage Feeding

## Physiology

**46 Some hematological and biochemical alterations of experimentally infected rabbits by *Pasteurella multocida*.** Osama Abd-Alla<sup>\*1</sup>, Hesham El-Shewy<sup>1</sup>, Hamdy Fetaih<sup>2</sup>, and Fatma Yousef<sup>3</sup>, <sup>1</sup>Department of Clinical Pathology, College of Vet Med, Suez Canal Univ, Ismailia, EGYPT, <sup>2</sup>Department of Pathology, College of Vet Med, Suez Canal Univ, Ismailia, EGYPT, <sup>3</sup>Animal Health Institute, Giza, Egypt.

New Zealand rabbits (1 to 1.5 kg BW) were assigned to 5 groups of 5 rabbits each. First group was kept as control, and the other 4 groups were inoculated intranasally by 0.8, 0.4, 0.2, or 0.1 ml  $\times 10^7$  CFU/mL/rabbit of *Pasteurella multocida*, respectively. Infected groups were examined after 2, 4, 7, and 21 d. Depression, sneezing, conjunctivitis, loss of appetite, and nervousness were noticed in all infected animals. At 2 and 4

d after infection, thrombocytopenia ( $175 \pm 8.8$  and  $137 \pm 4.1$  vs  $329 \pm 3.8 \times 10^3$ /mL), leukopenia ( $6.1 \pm 0.39$  and  $7.1 \pm 0.11$  vs  $9.3 \pm 0.25 \times 10^3$ /mL); ( $P < 0.01$ ), and normocytic, normochromic anemia were observed. At 7 and 21 d postinfection, thrombocytosis ( $383 \pm 19.2$  and  $687 \pm 46.4 \times 10^3$ /mL vs  $329 \pm 3.8 \times 10^3$ /mL), leucocytosis ( $10.7 \pm 0.34$  and  $10.65 \pm 0.45 \times 10^4$ /mL vs  $9.3 \pm 0.25 \times 10^3$ /mL); ( $P < 0.01$ ) mainly due to neutrophilia; and microcytic, hypochromic anemia were observed. Serum biochemical analysis of all infected groups showed elevation ( $P < 0.01$ ) of transaminases; AST ( $82 \pm 1.4$ ,  $86 \pm 1.7$ ,  $125 \pm 10.9$  and  $54.5 \pm 1.6$  vs  $51 \pm 4.2$  U/I) and ALT ( $124 \pm 1.8$ ,  $79 \pm 1.8$ ,  $95 \pm 5.2$  and  $66.8 \pm 2.1$  vs  $64 \pm 1.8$  U/I), respectively with hyperbilirubinemia and hypoglycemia. Also, there were decreased ( $P < 0.01$ ) albumin/globulin ratios ( $1.89 \pm 0.11$ ,  $1.79 \pm 0.12$ ,  $0.93 \pm 0.15$  and  $0.87 \pm 0.15$  vs  $3.2$