probably caused by consumption of antibody containing colostrum and maintenance of maternal antibodies. Results of this study suggest that factors other than direct contact of kids with their dams i.e. ingestion of infected colostrum and milk could be means of CAEV transmission. Therefore, the risk of indirect contact in the dissemination of CAEV should be taken into account in control and eradication programs.

Key Words: Caprine Arthritis Encepahlitis Virus, Goats, Colostrum

T33 Identification of Cydectin targets in *C. elegans*. M. Worku*, O. Alexander, and P. Matterson, *North Carolina Agricultural and Technical State University*, *Greensboro*.

Model systems such as the free living nematode *Caenorhabditis elegans* (*C. elegans*) are being used to identify drug targets. With the availability of the genome sequence it can be used to study the function and expression of drug target genes on a global scale. Macrocyclic lactones are chemical compounds that represent the main treatment for parasitic diseases of animals. The objective of this study was to evaluate the effect of cydectin on global gene expression in *C. elegans* to identify drug targets that may contribute to the development of anit-helminthic resistance. Nematodes were grown and exposed to 7 ml of a sub-lethal dose of Cydectin (Quest®Gel), (0.016 mg/ml in sterile water) and washed in PBS. Controls were exposed to PBS. RNA was isolated using RNeasy (Qiagen) kits. RNA integrity and size distribution was checked on a bioanalyzer. Total *C. elegans* array chips (Washington State University) were used for expression profiling. A dye swap system was used (N= 6 slides). Data acquired using Jaguar analysis software was analyzed using Magic tool. Differential gene expression was observed. Twenty up or down regulated genes/array slide (200 total) were selected. Four fold differences were used to select genes common to five slides used. Exposure to Cydectin resulted in increased transcription, (3.06 ug in controls, 4.89 ug treated). In addition to genes with unknown function we have identified two genes that may be the site of action of cydectin, PtP3 and unc-11. Unc-11 is a highly conserved gene that functions to regulate the neuronal network that controls the pharynx. PtP3 is a phosphatase which may be important in post transcriptional modification. Further studies are needed to define the pathways of action. Characterization of these genes may contribute to the understanding of the molecular basis for drug resistance and genetic diversity of nematodes.

Key Words: *C. elegans*, Nematode, Drug Target

T34 Composition of amino acids in typical Chinese herbs is not unique among feeds of plant origin. X. Wu*[1], X. F. Kong[1], Y. L. Yin[1], F. G. Yin[1], P. Zhang[1], H. J. Liu[1], F. F. Xing[1], Q. H. He[1], T. J. Li[1], R. L. Huang[1], and G. Y. Wu[1,2], [1]*Institute of Subtropical Agriculture, The Chinese Academy of Sciences*, *Changsha, Hunan, China*, [2]*Texas A&M University*, *College Station*.

As an initial step to define the mechanisms responsible for the beneficial effects of typical Chinese herbs on health and growth performance of swine and poultry, we determined concentrations of CP and amino acids in *Astragalus membranaceus, Acanthopanax senticosus, Salvia miltiorrhiza bunge, Crataegus pinnatifida Bge, and Salvia miltiorrhiza Bge*. Ten representative samples for each herb were hydrolyzed in 6 N HCl under nitrogen at 110°C for 24 h and the resultant amino acids were determined using an automatic amino acid analyzer. Results are expressed on the DM basis. Concentrations of CP in these five Chinese herbals were 14.1%, 13.9%, 3.06%, 2.06%, and 6.28%, respectively. Concentrations of total amino acids in *Astragalus membranaceus, Acanthopanax senticosus, Salvia miltiorrhiza bunge, Crataegus pinnatifida Bge, and Salvia miltiorrhiza Bge* were 10.6%, 2.84%, 3.43%, 3.99%, and 7.02%, respectively. Concentrations of Arg, Lys, Glu+Gln, branched-chain amino acids, and Asp+Asn in *Astragalus membranaceus* were 0.64%, 1.08%, 1.37%, 1.49%, and 1.64%, respectively. Concentrations of Arg, Lys, Glu+Gln, branched-chain amino acids, and Asp+Asn in *Salvia miltiorrhiza Bge* were 0.77%, 0.36%, 1.05%, 1.10%, and 0.64%, respectively. The composition of amino acids in the Chinese herbs is largely similar to that in feeds of plant origin. These results indicate that typical Chinese herbs are not unique in the composition of protein-precursor amino acids among plants. Other components in the herbs are likely major active components that beneficially regulate intestinal barrier integrity, nutrient metabolism, immune function, health, and growth in animals. (Supported by NSFC and CAS)

Key Words: Chinese Herbs, Amino Acids, Nutritive Value

Beef Species

T35 Effects of season and bull breed of semen on pregnancy rate in beef cattle. K. Kreausukon[1], S. Teepatimakorn[2], P. Vinitchaikul*[1], P. Yamsakul[1], and W. Suriyasathaporn[1], [1]*Chiang Mai University*, *Muang, Chiang Mai, Thailand*, [2]*Chiangmai Artificial Insemination Research and Biotechnology Center*, *Muang, Chiang Mai, Thailand*.

The objectives of this study were to identify the factors associated with conception risk in beef cattle. Data of artificial insemination of beef cows during September 2003 to October 2004 recorded by AI center were used. The data included bull breed of semen, date of artificial insemination, and results of pregnancy check. Season included winter (Nov-Feb), summer (Mar-May), and rainy (Jun-Oct). Bull breed of semen included Charolais (CHA) and American Brahman (AB). The generalized estimating equation (GEE) was used to analyze the effect of season and bull breed of semen on pregnancy rate. The final data included 2,823 observations. Overall pregnancy rate was 79.14%. The pregnancy rates for winter, summer, and rainy seasons were 82.5, 83.2, and 74.4%, respectively, and the rates for CHA and AB were 78.5 and 83.1%, respectively. Results from GEE showed that both factors were associated with pregnancy rate ($P<0.05$). In comparison to rainy season, beef cattle inseminated during winter and summer seasons had higher conception risks (OR = 1.63 and 1.71, respectively). Beef cattle inseminated with semen from American Brahman bull had lower pregnancy risk than the semen from Charolais bull (OR=0.74). In Thailand, the high temperature with high humidity might cause more heat stress in cattle. In conclusion, pregnancy risks in beef cattle are associated with season and bull breed of semen.

Key Words: Season, Beef, Conception

T36 TG-repeat microsatellites of growth hormone receptor and their associations with growth performances in Angus Plus calves raised on subtropical pasture. J. Yang*[1], J. Lee[1], R. Ferreira[2], M. DuPonte[1], and G. Fukumoto[1], [1]*University of Hawaii*, *Honolulu*, [2]*Olumau Angus Plus LLC*, *Lihue, HI*.

Growth hormone receptor (GHR) plays a significant role in animal growth through mediating the actions of growth hormone on the target cells. A polymorphic microsatellite (TG)n, located 90 base pairs upstream of the GHR gene, has been associated with growth performances in beef cattle. The 16-20 TG-repeat, named long allele (L), are mostly presented in Bos taurus breeds while the 11 TG short allele (S) is common in Bos indicus cattle. Angus Plus cattle are bred by maintaining a minimum o 4% Brahman in the Angus or Brangus breed. To investigate allele distributions of the microsatellite and their applications to growth trait selection, we genotyped the GHR microsatellites by PCR amplification and DNA fragment analysis, and compared growth performances between different genotypes of the GHR microsatellite. Calves were raised on 100% improved pastures of Pangola Rhodes and Guinea throughout the year in Kauai Island. Data for birth weight (BWT), 205-adjusted pre-weaning weight (PWT) and average daily gain (PWADG), hip height at birth and weaning (HHB and HHW) were obtained. Data were analyzed by MIXED procedure of SAS and all means were generated from LSMEAN. The frequency of long and short allele was 80.2% and 19.8% in the herd (N=96), respectively. Calves with LL, SS and SL genotype had BWT of 35.52±0.97, 34.21±0.91, 31.02±2.00 kg, respectively; the mean of analyzed growth traits of SL genotype is between SS and LL genotypes. No significant associations (P>0.1) of the GHR genotypes with growth traits (BWT, PWT, PWAGT, 68-d post-weaning ADG, HHB, HHW) were observed in the calves (n=42) born in 2004. Based on a limited number of the animals, the results demonstrate a moderate frequency of short GHR allele in the current Angus Plus herd. The application of this GHR microsatellite genotyping to selection of growth traits needs to be further validated with a large number of animals.

Key Words: Angus Plus Cattle, Growth Hormone Receptor, DNA Polymorphism

T37 Influence of dietary roughage source on growth performance and carcass characteristics of Korean native cattle (Hanwoo). S. O. Lee[1], K. K. Jung[1], C. B. Choi[1], and I. S. Jang*[2], [1]*Yeungnam University*, *Daegu, Korea*, [2]*Jinju National University*, *Jinju, Korea*.

Korean native beef cattle (Hanwoo) destined for production of high-quality grade beef must be castrated, and fed for a long time to achieve highly-marbled beef deserving of premium prices. The objective of this study was to determine whether dietary roughage source during the growing and fattening periods would affect growth performance and characteristics of carcass in Hanwoo cattle. Traditionally, the entire feeding period (2 yr) is divided into the growing (6 to 13 month), fattening (14 to 22 month) and finishing phases (23 to 30 month). A total of 35 Hanwoo, half-sib calves (initial BW 163±11.0 kg, housed in 7 pens of 5 calves/pen) were allotted to one of two dietary roughage sources (Control vs.Treatment). Steers in the treatment group were fed timothy hay as the only source of roughage, while control steers received a combination of timothy and alfalfa hay, and rice straw during the growing (up to 4.0kg/head/day) and fattening (down to 1.5kg/head/day) periods. Dietary source of roughage did not affect ($P > 0.05$) growing performance (ADG and BW) or feed efficiency in during the growing, fattening or the entire feeding period. Feeding timothy hay as the only roughage source resulted in 15% increased profit ($P < 0.05$) compared with the control. Back fat thickness($P = 0.28$), longissimus area (P=0.13), and yield grade (P=0.36) in carcasses from steers in the treatment group tended to be improved by 10%, 6.6% and 6.9%, respectively. However, marbling score and quality grade were similar in the two groups. The physico-chemical characteristics of carcasses including moisture, CP and drip loss were unaffected ($P > 0.05$) by dietary roughage source. In conclusion, feeding timothy hay was beneficial for the production of Hanwoo steers due to greater yield grade and improved profit, although growth performance and carcass quality were unaffected by roughage source.

Key Words: Hanwoo Beef Cattle, Dietary Roughage Source, Carcass Quality

T38 Predicting beef carcass retail products of Mediterranean buffaloes by real-time ultrasound measures. A. M. Jorge*, C. Andrighetto, C. L. Francisco, A. P. Neto, and R. C. Mourão, *Sao Paulo State University*, *Botucatu, SP, Brazil*.

Twenty eight Mediterranean buffaloes bulls were scanned with real-time ultrasound (RTU), slaughtered, and fabricated into retail cuts to determine the potential for ultrasound measures to predict carcass retail yield. Ultrasound measures of fat thickness, ribeye area and rump fat thickness were recorded three to five days prior to slaughter. Carcass measurements were taken, and one side of each carcass was fabricated into retail cuts. Stepwise regression analysis was used to compare possible models for prediction of either kilograms or percent retail product from carcass mesaurements and ultrasound measures. Results indicate that possible prediction models for percent or kilograms of retail products using RTU measures were similar in their predictive power and accuracy when compared to models derived from carcass measurements. Both fat thickness and ribeye area were over-predicted when measured ultrasonically compared to measurements taken on the carcass in the cooler. The mean absolute differences for both traits are larger than the mean differences, indicating that some images were interpreted to be larger and some smaller than actual carcass measurements. Ultrasound measurements of REA and FT had positive correlations with carcass measures of the same traits (r=.96 for REA and r=.99 for FT). Standard errors of prediction currently are being used as the standard to certify ultrasound technicians for accuracy. Regression equations using live weight (LW), rib eye area (REAU) and subcutaneous fat thickness (FTU) between 12th and 13 th ribs and also over the biceps femoris muscle (FTP8U) by ultrasound explained 95% of the variation in the hot carcass weight when measure immediately before slaughter.

Key Words: Ribeye Area, Rump Dat, Backfat Thickness

T39 Correlations among carcass traits taken by ultrasound and after slaughter in Mediterranean (Bubalus bubalis) buffaloes. A. M. Jorge*, C. Andrighetto, R. S. B. Pinheiro, C. L. Francisco, and A. P. Neto, *Sao Paulo State University*, *Botucatu, SP, Brazil*.

The objective of this work was to estimate the correlations among measurements taken in vivo with ultrasound equipment with some

carcass traits measured after slaughter. Twenty eight Mediterranean bulls, with average shrunk body weight of 330 kg and 14 months of age, were fed high concentrate diets for 120 d. Shrunk body weight, ribeye area (REAU), fat thickness (FTU) over the Longissimus dorsi muscle between 12th and 13th ribs, and rump fat (EGP8U) were measured at 28-d intervals. A Piemedical Scanner 200 VET real time ultrasound scanner, with 18 cm linear array transducer, was utilized. After slaughter, hot carcass weight (PCQ) and kidney, pelvic and inguinal fat (GRPI) were weighed and dressing percentage (DP) calculated. After 24 hours of cooling, ribeye area (REAC), fat thickness (FTC) and rump fat (EGP8C) were measured. The REAC, FTC and EGP8C were underestimated by ultrasound measurements. The Pearson correlation coefficients for ribeye area, backfat thickness and rump fat measured in the carcass with ultrasound measurements were 0.96, 0.99 and 0.91, respectively. The correlation between DP and REAU was 0.47; 0.45 between DP and REAC, 0.56 between DP and FTU and 0.58 between DP and FTC. Dressing percentage had a correlation of 0.59 with EGP8U. Spearman correlations estimated between REAU and REAC, FTU and FTC, EGP8U and EGP8C, were 0.96, 0.99 and 0.91, respectively. Ultrasound measures could be used to estimate carcass traits in buffaloes with acceptable accuracy.

Key Words: Ribeye Area, Rump Fat, Backfat Thickness

T40 Influence of shade in pen on performance of feedlot calves received during the autumn in the Northwest of Mexico. R. Barajas*[1], B. J. Cervantes[2,1], E. A. Velazquez[1], F. Juarez[1], and J. A. Romo[1], [1]*FMVZ-Universidad Autonoma de Sinaloa*, *Culiacan, Sinaloa, Mexico*, [2]*Ganadera Los Migueles SA de CV*, *Culiacan, Sinaloa, Mexico*.

Sixty Brahman cross bull calves (BW = 244 kg) were used in a 28-d feedlot experiment to determine the influence of shade on performance during the autumn in Northwest Mexico (24° 50′ N-latitude and 107° 26′ W-longitude). Calves were blocked by weight and placed in each of six dirt-surfaced shaded pens (5 hd/pen) providing 3.4 m^2 of shade/head or in six unshaded pens. Calves were fed ad libitum a 20% CP receiving diet containing (DM basis) 44% corn silage, 17% corn straw, 10% ground corn, 22% soybean meal, 3% meat and bone meal, 3% mineral premix, and 1% buffer premix twice daily. Calves were weighed on days 1, 14 and 28. Air temperature, soil temperature and relative humidity were recorded daily at 1400 h. Shade decreased (P = 0.08) air (32.3 vs. 31.4°C) and soil (P < 0.01) temperature (33.9 vs. 31.6°C). Relative humidity was not affected (P = 0.18) by shade (38.13 vs. 41.85%), and THI was similar (P = 0.60) between treatments (79.03 vs. 78.66). Over the 28-d experiment, use of shade increased (P = 0.05) ending weight (280.8 vs. 285.8 kg) 1.9% and (P = 0.06) average daily gain (1.30 vs. 1.47 kg/d) 12%. Dry matter intake measured both as daily intake or percentage of body weight was not altered (P > 0.13) by shade. Feed/gain ratio was similar (P = 0.14) in both treatments. A 30% of compensatory growth estimated as observed/expected NEm ratio was shown by calves during the complete 28 d trial, mostly due to 65% impetus displayed during the first 14 d, the remainder time (d 15 - 28) observed/expected NEm ratio was 0.98. These results suggest that shade in feedlot pen contributes to enhance performance of calves during their first two weeks in the feedlot.

Key Words: Feedlot, Bulls, Shade

T41 Effect of weaning and post-weaning management of beef steers on carcass characteristics and tenderness. A. E. Radunz*, H. N. Zerby, J. F. Grimes, G. D. Lowe, and F. L. Fluharty, *The Ohio State Univeristy*, *Columbus*.

To evaluate effect of weaning and post-weaning management on carcass characteristics and tenderness, 104 steers from a closed Angus herd, born over a four year period, were assigned to one of three weaning management systems based upon chronological birth order. The management systems were 1) early weaned (EW) at 100 days of age (DOA); 2) normal weaned (NW) at 200 DOA; 3) yearlings (YR) weaned at 200 days of age and fed a forage-based diet until 400 DOA. Steers were fed a finishing diet starting a 100, 200, and 400 DOA for EW, NW, and YR, respectively. The finishing diet contained 65% whole corn, 15% timothy hay, 12 % soybean meal, and 8% vitamin/mineral supplement and was formulated to contain 14.6% CP, 2.019 NE_m, and 1.371 NE_g. Cattle were harvested at 395, 415, and 540 ± 5.0 DOA for EW, NW and YR, respectively. Two steaks were removed from 12th rib location, aged for 72 h and 14 d, and used to determine Warner-Bratzler shear force (WBS). Data were analyzed using the MIXED model of SAS with year as a random variable and mean separation by LSD ($P = 0.05$). Yearling steers had greater ($P < 0.05$) hot carcass weights compared to EW and NW steers (344.0, 329.5 and 328.8 ± 3.6 kg, respectively). Weaning and post-weaning management had no affect on ribeye area; however, carcasses from YR had less ($P < 0.05$) 12th rib fat than from EW and NW steers (1.18, 1.63 and 1.52 ± 0.07 cm, respectively), which resulted in lower ($P < 0.05$) USDA yield grade (3.25, 3.61 and 3.60 ± 0.11, respectively). Conversely, carcasses from EW and NW steers had greater ($P < 0.05$) marbling scores than from YR (582.0, 558.7, and 494.1 ± 26.66, respectively). Steaks from YR steers' carcasses had greater ($P < 0.05$) WBS than from EW and NW at both 72 h (5.56, 3.94, and 2.73 ± 0.22 kg, respectively) and 14 d (4.12, 3.88 and 2.85 ± 0.29 kg, respectively). Weaning age and post-weaning management systems in which steers are harvested at an older age can result in heavier carcass weights, less backfat, lower quality grades and tougher steaks.

Key Words: Beef, Weaning Manangement, Meat Quality

T42 Effect of Wagyu- versus Angus-sired calves on feedlot performance, carcass characteristics, and tenderness. A. E. Radunz*, H. N. Zerby, S. C. Loerch, G. D. Lowe, and F. L. Fluharty, *The Ohio State Univeristy*, *Columbus*.

Thirty-nine Wagyu-sired (n = 21; WAG) and Angus-sired (n = 19; ANG) steers and heifers were used to compare the effects of sire breed on feedlot performance, carcass characteristics and meat tenderness. Calves were weaned at 138 ± 15.7 d of age and individually fed a finishing diet consisting of 65% whole corn, 20% protein/vitamin/mineral supplement, and 15% corn silage on a dry matter basis. Heifers and steers were harvested at 535 and 560 kg, respectively. Carcasses were ribbed between the 12th and 13th (USDA grading system) and the 5th and 6th ribs (Japanese grading system) to measure fat thickness, longissimus muscle area (LMA), and intramuscular fat (IMF). Two steaks were removed from the 12th rib location and aged for 72 h and 14 d to determine Warner-Bratzler shear force (WBS) and cooking loss. Data were analyzed using the MIXED procedure of SAS. Breed of sire by gender interactions were not significant ($P > 0.05$). Angus-sired calves had greater ($P < 0.05$) ADG and DMI and improved ($P < 0.05$) G:F than WAG. Breed of sire

did not affect hot carcass weight, 12th rib fat, USDA yield grade, or percentage boneless closely trimmed retail cuts ($P < 0.05$). Carcasses of WAG had greater ($P < 0.001$) marbling scores at the 12th rib than those of ANG (770.9 vs 597.3 ± 41.01, respectively). Carcasses of WAG also had greater ($P < 0.05$) 12th rib IMF (12.91 vs 10.54 ± 1.00 %), and 5th rib IMF (15.15 vs 11.90 ± 0.956%) than ANG. Carcasses from WAG tended ($P < 0.07$) to have greater LMA at 12th rib, while ANG carcasses had greater ($P < 0.05$) LMA at 5th rib. Sire breed did not affect ($P < 0.05$) tenderness following aging for either 72 h or 14 d. Cooking loss was greater ($P < 0.05$) for ANG than WAG steaks at 72 h and 14 d. Angus-sired calves had greater feedlot performance; however, the resulting carcasses of Wagyu-sired calves had greater marbling with no difference in percentage of retail product and tenderness at a similar harvest weight.

Key Words: Angus, Wagyu, Meat Quality

T43 Impact of using proven genetics in an AI program. D. J. Schafer*[1], J. K. Haden[1], S. R. Bartholomew[1], M. T. Griffin[1], M. E. John[1], J. L. Parcell[2], and D. J. Patterson[2], [1]*MFA Inc.*, *Columbia, MO*, [2]*University of Missouri*, *Columbia*.

This experiment evaluated the economic impact of using proven genetics in an AI program. Steers (n = 328) representing 4 sire groups from 4 locations were vaccinated, fed standardized nutrition and weaned for a minimum of 45 d before placement in the same feedlot. Steers were the result of AI and natural service (NS) matings. Sires of these steers were categorized on the basis of EPD accuracies: High Accuracy AI (HA); Low Accuracy AI (LA); Calving Ease AI (CE); or NS. HA sires were bulls with EPD accuracies ≥ 0.85 for BW, WW, and YW. Steers were assigned to pens within sire groups by weight, and received the same ration throughout the duration of the trial. Individual carcass measurements were collected for all steers at harvest, which was performed at the same commercial packing facility. Steers were determined to be finished based on ultrasound measurements and fat deposition patterns. Feeder calf value was determined using the Kansas State University price slide equation based on the 3 yr average of fed cattle and corn futures. Carcass value was determined using a 3 yr average of USDA reported values to establish fixed values for base price, premiums, and discounts to eliminate any market seasonality. Although all sire groups were harvested at the same yield grade (P = 0.18), steers sired by HA sires finished relative to all other sire groups at a younger age (P < 0.0001; HA, 408 d; LA, 430 d; CE, 443 d; NS, 416 d) with better average quality grades (P < 0.0001; HA, Choice +; LA, Choice -; CE, Choice; NS, Choice -). Steers sired by HA sires also finished with more (P < 0.0001) net return than the other sire groups (LA, $50.69; CE, $53.83, NS, $89.66). The estimated lifetime value of the HA sired replacement females compared to the NS sired replacement females ranged from $248.43 (4 yr expected productive life) to $416.40 (7 yr expected productive life). Artificial insemination to sires with high accuracy EPDs provides the opportunity to increase profitability and marketability of both terminal and replacement female calf crops. Furthermore, AI to HA sires offers the greatest probability of making improvements in the traits to which selection pressure is applied.

Key Words: AI, EPD, Economics

T44 Performance and carcass characteristics of straightbred and crossbred Bonsmara and Tabapua steers at the same carcass weight. E. L. A. Ribeiro*, I. Y. Mizubuti, L. D. F. Silva, M. A. Rocha, and S. M. Climaco, *Universidade Estadual de Londrina*, *Londrina, Brazil*.

This experiment was carried out to evaluate the performance of steers of four genetic groups: 1) Bonsmara (B), 2) ½ Bonsmara - ½ Nelore (B1), 3) ½ Bonsmara - ¼ Red Angus - ¼ Nelore (B2), and 4) Tabapua (T). Twenty animals, 22 mo of age at the initiation of the study, were maintained under the same conditions in a feedlot, in the state of Parana, Brazil. The five steers of each genetic group were collectively fed. They were slaughtered, on average, after 112 d in feedlot. Traits were evaluated on a final carcass weight (260 kg) basis. Initial weight was also used as covariate in the statistical analyses. Tabapua steers were lightest (P<0.05) at slaughter, had the lowest (P<0.05) average daily gain (ADG), but the greatest (P<0.05) dressing percentage (55.2%). Averages for live weight at slaughter and ADG were: 493, 490, 506 and 471 kg, and 1.035, 0.952, 1.122 and 0.630 kg, respectively, for B, B1, B2 and T. Tabapua steers needed 43 more days (P<0.05) to achieve the same carcass weight than Bonsmara steers. Bonsmara steers had the largest (P<0.05) ribeye area (82.9 cm^2) and percentage of muscle (68.2%) in the carcass, and the lowest percentage of fat (17.1%). Averages for subcutaneous fat thickness were 3.7, 8.8, 7.0 and 4.5 mm (P<0.05), respectively, for B, B1, B2 and T. Percentages of carcass cuts (sawcut, forequarter and sidecut) were similar (P>0.05) among the genetic groups. Meat tenderness measured by a texturometer fitted with a Warner-Bratzler shear attachment were 4.9, 5.6, 4.9 and 7.3 kgf (P<0.05), respectively, for B, B1, B2 and T. Straightbred and crossbred Bonsmara steers had similar performance, on the other hand the zebu (Tabapua) steers produced less tender meat.

Key Words: Crossbreeding, Meat, Zebu

T45 Efficacy of rumen temperature boluses for health monitoring. T. K. Dye*, C. J. Richards, L. O. Burciaga-Robles, C. R. Krehbiel, and D. L. Step, *Oklahoma State University*, *Stillwater*.

Remote rumen temperature monitoring is a potential method for early disease detection in beef cattle. The objective of this experiment was to determine the efficacy of disease detection using remote monitoring rumen temperature boluses (SmartStock, LLC) in steers challenged with Bovine Respiratory Disease pathogen (*Mannheimia haemolytica*) following exposure to Bovine Viral Diarrhea (BVD). Twenty-four Angus crossbred steers (initial BW=305 ± 20 kg) were allotted to 4 treatments: 1) no challenge (Control); 2) challenge with *M. haemolytica* (MH); 3) 72 h exposure to persistently infected BVD steers (BVD); and 4) 72 h BVD exposure and challenged with *M. haemolytica* (BVD+MH). Remote monitoring rumen temperature boluses programmed to transmit temperature every minute were placed in the rumen prior to the time of exposure to persistently infected BVD steers. Rectal temperatures were taken prior to MH challenge (0) and 2, 4, 6, 12, 18, 24, 36, 48, 72 and 96 h post challenge. Rumen temperatures were recorded for 14 d post MH challenge. Rumen temperatures were analyzed using repeated measures analysis using a first-order autoregressive covariance structure. Average daily rumen temperature resulted in a treatment x day interaction (P < 0.01). Steers challenged with MH had increased rumen temperatures on d 1 and 2 post MH challenge, whereas steers exposed to BVD had increased rumen temperatures on d 6 and 7. Post MH challenge, hourly rumen temperature peaked

at approximately 8 h for MH and 112 and 136 h for BVD. Maximum rumen temperature was increased ($P < 0.02$) for the MH (1.32°C), BVD (0.54°C) and BVD+MH (1.44°C) steers. On average, rumen temperature measured by the boluses at the same time points as the rectal temperatures were 0.19°C lower than rectal temperatures with a R^2 of 0.78. Rumen temperature boluses appear to have potential as a tool for detecting responses to adverse health events such as exposure to BRD and BVD.

Key Words: Rumen Bolus, Temperature Monitoring, Health Monitoring

T46 Relationships between MUFA ratio of marbling flecks and image analysis traits in *M.longissimus* muscle for Japanese Black cattle. Y. Nakahashi*[1], M. Oishi[1], Y. Hamasaki[1], S. Hidaka[1], S. Maruyama[2], and K. Kuchida[1], [1]*Obihiro University of Agricalture and Veterinary Medicine*, *Obihiro, Japan*, [2]*Gifu Prefectual Livestock Reseach Institute*, *Gifu, Japan*.

It is known that monounsaturated fatty acid (MUFA) ratios to total fatty acid are different among inter- and intra-muscular and subcutaneous fat even for the same animal. But there are few reports for the variation of the MUFA ratio by geometric change of marbling. Our objective was to investigate the variation of the MUFA ratio by the geometric and sectional change of marbling in rib eye. *M.longissimus* muscle of 8 Japanese Black steers from a common sire and a common maternal grand sire were used. Three slices (one was from rib roast and the others were from sirloin) were used for each animal. For each slice, 5 marbling flecks were randomly sampled to obtain the MUFA ratio by gas chromatography. High quality digital images of all slices were taken by a mirror type camera for carcass cross section. The area and coordinates of each marbling fleck were calculated by image analysis. The marbling flecks were categorized by area (S:<0.4 cm^2, M:0.4~2cm^2, L:>2cm^2), coordinate (dorsal, ventral), and slice section (rib roast, cranial and caudal sirloin). ANOVA was performed using SAS software. The MUFA ratio was treated as a dependent variable, and the classification of the area, coordinate and slice section were treated as fixed effects. The fixed effects were significant for the MUFA ratio ($P<0.05$). Least square means of S, M and L for the area of marbling flecks were 56.8%, 58.4% and 60.2%, respectively. Those of dorsal, ventral, rib roast, cranial and caudal sirloin were 59.1%, 57.8%, 55.4%, 59.9%, and 60.1%, respectively. Large marbling flecks revealed higher MUFA ratios ($P<0.05$). The MUFA ratio of the marbling flecks located in the rib eye of the dorsal part was higher than in the ventral part ($P<0.05$). Those from sirloin were higher than from rib roast ($P<0.01$). Interaction between slice section and coordinate was significant ($P<0.05$). MUFA ratios of marbling flecks located in the ventral part were higher than those in the rib roast of the dorsal part, but lower in sirloin.

Key Words: Japanese Black, MUFA Ratio, Image Analysis

T47 Effect of Zilpaterol or Ractopamine on productive performance of finishing bullocks. G. Aranda-Osorio*, R. Aguayo-Garcia, A. Carreño-Aviles, and J. C. Garcia-Ortiz, *Universidad Autonoma Chapingo*, *Chapingo, Mexico*.

The objective of this study was to evaluate the effect of adding β-agonists, Zilpaterol or Ractopamine, to the finishing diets of bullocks on: feed intake (DMI), average daily gain (ADG), and feed conversion (FC), under feedlot conditions. This investigation was carried out at the Experimental Farm of the Animal Husbandry Department of the University of Chapingo, Chapingo, Mexico. Thirty-six bullocks of commercial cross (Zebu x Brown Suiss) were used with initial liveweight of 427 ± 60 kg, which were housed in individual pens (2 × 2 m) and randomly allotted to the following treatments: T1, diet A without β-agonists; T2, diet A + zilpaterol; T3, diet A + ractopamine; T4, diet B without β-agonists; T5, diet B + zilpaterol; and T6, diet B + ractopamine; with 5 replicates per treatment. Diet A was elaborated using a true protein source (soybean meal) and the addition of a probiotic (Saccharomyces cerevisiae). In contrast, diet B was elaborated using poultry litter as a main source of protein and without probiotic. Both diets were formulated to meet the requirements of this type of cattle according to the NRC (1996). The experimental period lasted 92 d, and from d-60 to the end, β-agonists were added to the feed into the feedbunks and thoroughly mixed by hand for treatments 2, 3, 5 and 6. Feed was offered twice a day (0800 and 1600 h). Sixty mg of Zilpaterol hd^{-1} d^{-1} were supplemented to treatments 2 and 3; and 400 mg of Ractopamine hd^{-1} d^{-1} were supplemented to treatments 5 and 6, during the morning feeding only. Data were analyzed as completely randomized design using the GLM procedure of SAS. The comparison of Zilpaterol (T2 + T5) vs Ractopamine (T3 + T6) revealed no differences ($P>0.05$) in DMI (9.93 vs 9.59 kg hd^{-1} d^{-1}) or ADG (1.02 vs 1.08 kg hd^{-1} d^{-1}), although a difference ($P<0.05$) was found for FC (10.64 vs 9.29 kg d^{-1}). When β-agonists were added to diets A or B, animal performance tended ($P>0.05$) to improve, with no differences ($P>0.05$) between β-agonists. It is concluded that the β-agonists (Zilpaterol or Ractopamine) hardly represent an alternative to improve animal performance for beef producers using this type of diets and cattle.

Key Words: B-Agonists, Beef Cattle, Animal Performance

T48 Comparison of color value measured by colorimeter and image analysis method for beef muscle. Y. Hamasaki*[1], T. Saito[2], Y. Sato[2], S. Hidaka[1], and K. Kuchida[1], [1]*Obihiro University of A&VM*, *Obihiro, Hokkaido, Japan*, [2]*Hokkaido Animal Research Center*, *Sintoku, Hokkaido, Japan*.

Beef lean color is usually measured with a colorimeter. The marbling area percentage of Japanese Holstein steers is over 20%, so the diameter of the colorimeter (8mm) may be too large to measure the lean color accurately. The objective of this study were to compare the values from the colorimeter and from the high resolution digital image analysis as an accurate measurement of lean color of *M. longissimus thoracis* (ribeye) and to investigate whether the image analysis method is applicable to measure meat color. Digital images of the 6-7th rib cross section from 80 Holsteins were photographed for the beef carcass cross section. The ratio of marbling area to ribeye area (FATPER) was obtained by image analysis. Also, RGB components and luminance for lean, marbling and whole ribeye were calculated by the image analysis method. The L* value of lean was measured using the colorimeter (Minolta CR-13:Φ8mm) during the same time of photographing of the digital images. The L* values were measured 3 times per carcass then averaged. A multiple regression analysis was performed by REG procedure in SAS to predict the L* value by colorimeter. The L* value was used as a dependent variable, and traits obtained by the image

analysis were used as candidates of independent variables. Correlation coefficients between BCS (Beef Color Standard) numbers evaluated by graders and L*, and between BCS and luminance by the image analysis were -0.39 and -0.62, respectively. FATPER of ribeye was classified into 3 levels (S:<19%, M:19%~23% and L:>23%). Correlation coefficients of L* value and luminance of lean were 0.80 for S, 0.50 for M and 0.20 for L. The L* value of lean with a low FATPER level might reflect the accurate lean color. However, the L* value with more marbling meat might not be as accurate as the lean color value. In the multiple regression analysis predicting the L* value by colorimeter, the most affected image analysis traits for S, M and L were the luminance of lean, R component of whole ribeye, and G component of marbling, respectively. The diameter of the colorimeter probe might be oversized for measuring the lean color of beef, marbling included.

Key Words: Beef Color, Image Analysis, Colorimeter

T49 Alternative supplementation strategies for replacement beef heifers grazing dry California foothills annual range during summer. R. B. Monteiro*[1,2], G. D. Cruz[1], D. M. Myers[1], J. W. Oltjen[1], and R. D. Sainz[1], [1]*University of California*, *Davis*, [2]*University of Sao Paulo*, *Piracicaba, SP, Brazil*.

California's annual foothill rangelands are the main forage source for the state's range livestock industry and are characterized by marked seasonal variations in forage availability and quality. Due to the inadequate quality of dry forage during summer and fall, cattle require supplemental feed to balance deficiencies in protein, energy and minerals. The objectives of this study were to evaluate the effects of different types of supplementation for weaned heifer grazed in dry range and analyze the cost-benefit within the treatments. The supplements were: a commercial molasses-based tub supplement (COM; 30% CP) and a low-cost protein/energy/mineral formulation (UCD; 58% CP, 60% TDN, 3% P, 500 mg/kg Cu, 3 mg/kg Se). In 2005 and 2006, 60 weaned replacement Angus-Hereford heifers (248 ± 11.8 kg BW) were stratified by BW and allocated randomly to 6 groups of two supplement types with three replicate groups of 10 heifers for each treatment in each year. Heifers were given supplements every 3 d (UCD) or every 20 d (COM) for 70 d, and weighed every 28 d. Average daily gains were determined by regression. The data were analyzed by ANOVA with year and supplement as main effects and pasture group as the experimental unit. Supplement intakes were different ($P < 0.05$) between years, but ADG only tended to differ ($P < 0.10$). Across years, supplement intakes and costs per heifer averaged 547 and 398 g/d and \$0.331 and \$0.184 ($P < 0.05$) for the COM and UCD groups, respectively. Heifers' ADG were 78 and 246 g/d for the COM and UCD groups, respectively ($P < 0.01$). The UCD supplement produced greater gains (>3X) compared with a commercial tub supplement, at much lower cost. With appropriate feeders the UCD supplement can be fed free choice to improve calf performance and reduce costs of production.

Key Words: Beef Heifers, Annual Range, Supplementation

T50 Effects of deworming nursing calves 90 days prior to weaning on calf weaning weight. J. E. Rossi*[1], D. T. Ensley[2], and B. G. Mullinix, Jr.[1], [1]*University of Georgia*, *Tifton*, [2]*University of Georgia*, *Athens*.

Two trials were conducted to determine the effects of deworming winter born (Jan/Feb) calves 90 days (June) prior to weaning on calf weaning weight. In trial 1, nursing Angus calves (n=117, 174 ± 5.3 kg) were allotted by weight and sex in each of six fescue pastures. Treatments consisted of no deworming (CON) or deworming (DW) with Doramectin injectable (1 mL/50 kg BW). Equal numbers of steers and heifers were in each treatment within each pasture. All cows were dewormed with Doramectin pour-on (1 mL/10 kg BW) on d 0. Calves were weighed on d 0, 30, 60, and 90 of the trial. Data were analyzed using the MIXED procedure of SAS. Overall ADG was greater ($P < 0.10$) for DW (0.87 kg/d) compared with CON (0.84 kg/d) calves. Daily gain was not different ($P > 0.18$) from d 0 to 30 (1.03 and 1.00 kg/d for DW and CON; respectively), d 31 to 60 (0.95 and 0.91 kg/d for DW and CON; respectively) or d 61 to 90 (0.68 and 0.66 kg/d for DW and CON; respectively). In trial 2, nursing Angus, Angus × Charolais, and Hereford × Charolais calves (n=209, 175 ± 9.7 kg) were dewormed 90 days prior to weaning. Calves were allotted by weight, sex, and breed to each of three bermudagrass pastures. Treatments consisted of no deworming (CON) or deworming (DW). Equal numbers of steers and heifers were in each treatment within each pasture. Deworming and weighing procedures were the same as in Trial 1. Overall ADG was not different ($P = 0.59$) between treatments (0.95 and 0.93 kg/d for DW and CON; respectively). Daily gain was not different ($P > 0.32$) from d 0 to 30 (0.99 and 0.97 kg/d for DW and CON; respectively), d 31 to 60 (0.85 and 0.80 kg/d for DW and CON; respectively) or d 61 to 90 (0.99 and 1.00 kg/d for DW and CON; respectively). Calves that were dewormed returned \$5.15 per hd in Trial 1 and \$2.77 per hd in Trial 2 more than the CON calves when valued at \$1.00 per 0.45 kg of BW at weaning. Cost of the dewormer would be approximately \$1.60 per calf, excluding the cost of labor. Deworming nursing calves in early June (90 days prior to weaning) increased calf weaning weight in Trial 1 and increased the value of the calf at weaning in both trials.

Key Words: Calves, Deworming

Breeding and Genetics - Livestock and Poultry

T51 Joint analysis of egg and production traits in broilers. R. L. Sapp[1], T. Wing[2], and R. Rekaya*[3], [1]*USDA-ARS*, *Miles City, MT*, [2]*Cobb-Vantress, Inc.*, *Siloam Springs, AR*, [3]*University of Georgia*, *Athens*.

The objective of the study was to investigate the relationship between egg and production traits in chickens. The data were obtained from a closed, fully pedigreed, commercial broiler line. Records included measurements of body weight (BW), residual feed intake (RFI), percent breast meat (PBM), egg production (EP) and egg weight (EW) from 13,836 birds. A total of five analyses were conducted: 1) joint analysis of BW, RFI, PBM, EP, and EW in parent data (PA); 2) joint analysis of BW, RFI, and PBM in progeny data (PR1); 3) PR1 with EP and EW covariates (PR2); 4) PR1 with covariates of EP and EW grouped into 6 classes; and 5) joint analysis of BW, RFI, PBM, EP, and EW in both progeny and parent data (PR4). The mixed model included