

among 70SA cows than the 100SA cows ( $P < 0.05$ ). Long-term there was a tendency for cows in the 70SA treatment to have increased LPS-induced B-cell proliferation compared to 100SA cows ( $P = 0.09$ ). Postpartum disease prevalence was similar for cows on both treatments. There were interactions between treatment and cohort and week and cohort on locomotor score ( $P < 0.05$ ). Locomotor score did not change over time for cohort 1 cows or for the 100SA cows

in cohort 2, but it worsened over time for the 70SA cows in cohort 2. A moderate reduction in freestall access in dry cow facilities should not adversely affect immune function, but it may negatively impact hoof health.

**Key Words:** Transition Cows, Freestall Availability, Immune Function

## Beef Species I

**400 Post-weaning growth performance of heifers grazing Tasmanian native pastures and the estimation of inbreeding levels using random amplified polymorphic DNA markers.** A. E. O. Malau-Aduli\*<sup>1</sup> and M. Dunbabin<sup>2</sup>, <sup>1</sup>University of Tasmania, Hobart, Tasmania, Australia, <sup>2</sup>Bangor, Dunalley, Tasmania, Australia.

The aims of this study were to evaluate the growth performance of Hereford, Angus, Hereford × Angus and Hereford × Saler heifers within the same herd grazing native pastures and to estimate homozygosity and inbreeding coefficients using random amplified polymorphic DNA (RAPD) markers. Post-weaning liveweight (BW), average daily gain (ADG) and body condition score (BCS) on a scale from 0 to 5 were monitored monthly from 2005 to 2006. Genomic DNA was extracted from blood samples, amplified using RAPD primers, fragments resolved by gel electrophoresis and banding patterns elucidated under UV light. Estimation of homozygosity through band sharing patterns was utilised in determining within-breed inbreeding levels. Regardless of breed, LWT, BCS and ADG of heifers followed a typical sigmoid curve pattern characterised by a decline in average BW from 200 kg in May to 188 kg in June, a continuous monthly increase through to March 2006 when it reached a peak (380 kg) before a final decline to 375 kg in May. The BCS ranged from 1.6 to 3.6 while ADG ranged from -0.4 to 1.5 kg/d. Significant genetic variation was observed between the different breeds in that BCS and BW of purebred Angus heifers were lower than those of purebred Hereford and their crosses with Angus and Saler. Average BW of the Angus breed ranged from 164-349 kg, with BCS ranging from 1.4 to 3.3 compared to the Hereford (186-383 kg, 1.6-3.6), Hereford × Angus (192-383 kg, 1.7-3.6) and Hereford × Saler (192-385 kg, 1.6-3.7), respectively. The ADG of the Angus was not different from those of Hereford and their crosses indicating that the Angus was perhaps better in terms of feed efficiency since they probably ate less and gained the same weight as the heavier breeds that must have eaten more commensurate with their maintenance requirements. The strongest residual correlation ( $r=0.98$ ) was between BW and BCS. Average band sharing frequencies ranged from 0.60 in the crossbreds to 0.96 in the purebreds with estimated inbreeding coefficients ranging from 0.5% to 3%, respectively, which is very low.

**Key Words:** RAPD Markers, Post-weaning Growth, Beef Cattle

**401 Influence of breed on postpartum interval and estrous cycle length in beef cattle.** R. A. Cushman\*, M. F. Allan, R. M. Thallman, and L. V. Cundiff, USDA, ARS, Roman L. Hruska U.S. Meat Animal Research Center, Clay Center, NE.

Before genetic markers can be generated for fertility in beef cows, greater characterization of reproductive phenotypes is needed. The present study tested the hypotheses that 1) breeds vary in postpartum interval (PPI) and estrous cycle length, 2) a longer estrous cycle immediately prior to breeding increased pregnancy rates, and 3) a greater number of cycles prior to breeding increased pregnancy rates. Postpartum interval, estrous cycle length, and number of cycles prior to breeding were examined in F1 cows ( $n = 519$ ) obtained from mating Hereford, Angus and USMARC III cows to Hereford, Angus, Simmental, Limousin, Charolais, Gelbvieh, and Red Angus sires. Cows were classified as having 0, 1, 2, or 3 observed estrous cycles prior to breeding, and breed effects on PPI, number of cycles, and estrous cycle length were examined using the MIXED procedure of SAS. Sire breed of the cow influenced the length of the PPI and number of cycles prior to the start of breeding ( $P < 0.001$ ). Simmental-sired cows had the shortest PPI and greatest number of cycles prior to breeding; Limousin-sired cows had the longest PPI and least number of cycles prior to breeding. Cows with a greater number of cycles prior to breeding did not have greater pregnancy rates than cows that had not exhibited estrus prior to breeding ( $P = 0.87$ ). In cows that cycled prior to breeding, the length of the estrous cycle immediately prior to breeding was influenced by dam breed and body condition score (BCS,  $P < 0.01$ ). Cows out of Hereford dams had shorter estrous cycles than cows out of USMARC III or Angus dams, and estrous cycle length increased as body condition score increased. Pregnancy rate decreased as length of the estrous cycle prior to breeding increased ( $P = 0.05$ , -2.2% per day of cycle length), suggesting that there may be an influence of length of the estrous cycle immediately prior to breeding on conception rates due to prolonged follicles with lower quality oocytes. Breed differences in PPI and estrous cycle length suggest that there are genetic components to these traits.

**Key Words:** Beef Breeds, Postpartum Interval, Reproductive Efficiency

**402 Effect of an artificial sweetener and yeast product combination on immune function measurements, growth performance, and carcass characteristics of beef heifers.** R. R. Reuter\*<sup>1,2</sup>, J. A. Carroll<sup>2</sup>, M. S. Brown<sup>3</sup>, N. E. Forsberg<sup>4</sup>, Y.-Q. Wang<sup>4</sup>, R. Mock<sup>5</sup>, J. D. Chapman<sup>6</sup>, and M. L. Galyean<sup>1</sup>, <sup>1</sup>Texas Tech University, Lubbock, <sup>2</sup>USDA-ARS Livestock Issues Research Unit, Lubbock, TX, <sup>3</sup>West Texas A&M University, Canyon, <sup>4</sup>Oregon State University, Corvallis, <sup>5</sup>Texas Veterinary Medical Diagnostic Laboratories, Amarillo, TX, <sup>6</sup>Prince Agri-Products, Quincy, IL.

One hundred ninety-nine crossbred beef heifer calves ( $205 \pm 7.9$  kg initial BW) were used in a 44-d receiving trial with 2 dietary

treatments (9 pens/treatment) in a completely random design. Diets were a steam-flaked corn- and alfalfa hay-based control (CON) diet or the same diet (ADD) with added artificial sweetener (Sucram; Prince Agri-Products; 198 mg/kg of diet DM) and a source of yeast and B-complex vitamins (OmniGen-AF; Prince Agri-Products; 0.8% of diet DM). Heifers were weighed and bled on d 0, 16, 30, and 44 after arrival at the feedlot. Serum was collected from jugular venipuncture blood samples and analyzed for cortisol, cytokine, and acute-phase protein concentrations, L-selectin expression, and respiratory virus titer. At d 44, the heifers were transported to a commercial feedlot, fed for 200 d, and individual carcass data were collected at slaughter. Morbidity (9.5%) and mortality (0.5%) were less than expected and not affected by treatment ( $P > 0.63$ ). On d 16, ADD decreased ( $P < 0.001$ ) haptoglobin concentration, but diet did not affect ( $P > 0.43$ ) other measures of immune function. Diet had no effect on ADG, DMI or G:F ( $P > 0.32$ ) in either the initial 16-d after arrival or the overall 44-d receiving period. Receiving period diet had no effect on carcass characteristics, except that ADD decreased marbling score ( $P = 0.045$ ), marbling score adjusted to a constant fat thickness ( $P = 0.08$ ), and tended ( $P = 0.11$ ) to decrease percentage of heifers that graded USDA Choice. Results were inconsistent with previous research, possibly because animals were not exposed to the treatments prior to the stress period and did not experience a substantial pathogen challenge.

**Key Words:** Beef Cattle, Immune Function, Sweetener

**403 Evaluation of the effects of two commercially available modified live vaccines for bovine respiratory disease complex on naïve beef steers.** W. J. Horne<sup>\*1</sup>, K. S. Barling<sup>2</sup>, A. D. Herring<sup>1</sup>, D. K. Lunt<sup>1,3</sup>, A. Thomas<sup>2</sup>, and J. E. Sawyer<sup>1</sup>, <sup>1</sup>Texas A&M University Department of Animal Science, College Station, TX, <sup>2</sup>Novartis Animal Health US, Inc, Larchwood, IA, <sup>3</sup>McGregor Agricultural Research Center, McGregor, TX.

A study was conducted to evaluate effects of two commercially available modified live respiratory vaccines (MLV) on performance and antibody formation in beef steers. Naïve (confirmed seronegative to IBR and BVDV Types 1 & 2) beef steers ( $n = 107$ ) were stratified by BW and randomly assigned to treatment within strata. Treatments consisted of either vaccine A (Type 1 BVD, IBR, PI3, BRSV), vaccine B (Types 1 & 2 BVD, IBR, PI3, BRSV), or control (physiological saline) administered SQ. Animals were fed individually in Calan™ gates with rectal temperature (RT) (d 0, 13, 7, 14, 28), body weight, BVDV Type 1, BVDV Type 2, and IBR titer responses collected serially (d 0, 14, 28, 42) post-vaccination. Data were analyzed as repeated measures in time using mixed models procedures. At d 14, no differences existed for BVDV Type 1 or Type 2 antibody titers. At d 28 and 42, steers receiving B had the highest ( $P < 0.01$ ) BVDV Type 1 titer response: A produced higher titers ( $P < 0.01$ ) than control. At d 28, steers receiving B had a greater ( $P < 0.01$ ) BVDV Type 2 titer response than A- and control-treated steers. On d 42, B generated the highest ( $P < 0.01$ ) titer response: A was greater ( $P < 0.01$ ) than controls. Titers for IBR on d 14, 28, and 42 were greatest in steers receiving A ( $P < 0.01$ ): B produced higher IBR titers than control ( $P < 0.01$ ). Treatment had minimal effect on RT. Time affected RT ( $P < 0.01$ ), which declined through d 3, increased through d 14, and then stabilized. A treatment by day interaction occurred for ADG ( $P < 0.01$ ). Gain declined throughout the study for steers receiving control or B. For steers receiving A, ADG was higher ( $P < 0.01$ ) for the middle third of the feeding period, such that overall ADG was similar for all treatments

( $P = 0.10$ ). Inoculation with vaccine B resulted in the highest increase in BVDV Type 1 and 2 titers, without decreasing overall ADG relative to other treatments. Vaccine A produced the highest IBR titers. Vaccination with a MLV can create adequate immune responses without negatively altering feeding performance of beef steers.

**Key Words:** Modified Live, Vaccine, Bovine

**404 Management factors affecting selling prices of Arkansas beef calves: 2000 vs. 2005.** B. L. Barham and T. R. Troxel<sup>\*</sup>, University of Arkansas Cooperative Extension Service, Little Rock, AR.

Five USDA certified livestock market reporters collected data from weekly livestock auctions in Arkansas from January 1 to December 31 in both 2000 and 2005. The market reporters collected information from 17 markets in 2000 and 15 markets in 2005. The data collected included calf gender, horn status, fill, condition, health, weight and price. A total of 533,283 feeder cattle were sold through these livestock auctions in 2000, and data was randomly collected on 81,703 (15.3%) head. A total of 581,413 feeder cattle were sold through these livestock auctions in 2005, and data was randomly collected on 52,401 lots consisting of 105,542 (18.2%) head. The average selling prices for 2000 and 2005 were \$92.91 and \$118.32/45.45 kg, respectively. Data were analyzed by subtracting the actual selling price from the average selling price for the given year. All dollar value results are reported as a deviation from the respective year mean and expressed as dollars/45.45 kg. Arkansas cow-calf producers castrated more (8.9%) bull calves before selling in 2005 than in 2000 ( $P < 0.01$ ). Buyers paid a higher premium for steers (\$6.48 vs. \$6.02;  $P < 0.0001$ ) and paid less for bull calves (\$0.30 vs. \$1.68;  $P < 0.001$ ) in 2005 than in 2000. Additionally, cattle buyers discounted horned cattle greater in 2005 than 2000 (-\$2.86 vs. -\$0.51;  $P < 0.0001$ ). Thin cattle in 2000 received a discount (-\$1.91) but in 2005 received a premium (\$1.67). The percentage of calves with dead hair, stale, sick, bad eye(s) and lame was low in 2000 and even lower in 2005 ( $P < 0.01$ ). Arkansas cow-calf producers sold more calves in groups (26% vs. 19%;  $P < 0.01$ ) and fewer calves individually in 2005 than they did in 2000 (75% vs. 81%;  $P < 0.01$ ). Buyers paid a higher premium for cattle sold in groups in 2005 than in 2000 (\$4.05 vs. \$3.09;  $P < 0.001$ ). Cow-calf producers can do more to improve the quality and selling price of feeder cattle by making genetic selection and management changes.

**Key Words:** Beef Cattle, Selling Price, Price Comparisons

**405 Impact of the phenotypic expression of calf genetics on the selling price of calves sold in Arkansas livestock markets: 2000 vs. 2005.** B. L. Barham<sup>\*</sup> and T. R. Troxel, University of Arkansas Cooperative Extension Service, Little Rock, AR.

Five USDA certified livestock market reporters collected data from weekly livestock auctions in Arkansas from January 1 to December 31 in both 2000 and 2005. The market reporters collected information from 17 markets in 2000 and 15 markets in 2005. The data collected included breed or breed type, color, muscle thickness, frame score, weight and price. A total of 533,283 feeder cattle were sold through these livestock auctions in 2000, and data was randomly collected on 81,703 (15.3%) head. A total of 581,413 feeder cattle were sold through

these livestock auctions in 2005, and data was randomly collected on 52,401 lots consisting of 105,542 (18.2%) head. The average selling prices for 2000 and 2005 were \$92.91 and \$118.32/45.45 kg., respectively. Data were analyzed by subtracting the actual selling price from the average selling price for the given year. All dollar value results are reported as a deviation from the respective year mean and expressed as dollars/45.45 kg.. More number 2 muscle score cattle and fewer number 1, 3 and 4 muscle score cattle were sold in 2005 than 2000 ( $P < 0.01$ ). In 2005, buyers paid a higher premium for muscle score 1s than in 2000 (\$2.58 vs. \$0.02;  $P < 0.0001$ ). The Arkansas cow-calf producer marketed more large-framed and fewer medium- and small-framed calves in 2005 than in 2000 ( $P < 0.01$ ). The cattle breeds or breed types that increased in value from 2000 to 2005 were Angus x Hereford, Angus, Angus x Charolais and Brahman ( $P < 0.0002$ ). Buyers discounted Charolais x Limousin, Charolais, Charolais x ¼ Brahman, Hereford x Limousin, Hereford x Charolais, Limousin, Limousin x ¼ Brahman, Simmental, Saler, Longhorn and ¼ Brahman Cross more in 2005 than in 2000 ( $P < 0.01$ ). The calf colors that received an increase in selling price were yellow-white face, black-white face, grey-white faced, black and gray. White, red-white face and red calves were discounted in 2005 compared to 2000. Cow-calf producers can do more to improve the quality and selling price for the feeder cattle by making genetic selection and management changes.

**Key Words:** Feeder Cattle, Selling Price, Beef Calves

**406 Carcass trait characterization of retained and purchased Alabama feeder calves.** S. V. Free\*, W. C. Rutherford, J. B. Elmore, G. S. Hecht, and L. A. Kriese-Anderson, *Auburn University, Auburn, AL*.

Alabama Beef Connection (ABC) (n=6,222) and Alabama Pasture to Rail (P2R) (n=901) cattle carcass traits were analyzed to compare Alabama feeder cattle finished in the High Plains region of the United States. Cattle consigned to P2R were retained, co-mingled loads of cattle having known birth dates and parentage. ABC-enrolled cattle were usually load lots of feeder cattle sold as calves by cow/calf producers desiring carcass data. Some ABC-enrolled cattle were load lots of retained or co-mingled feeder calves. Traits of hot carcass weight (HCW), 12th rib fat (BF), longissimus dorsi area (REA), USDA yield grade (YG) and marbling score (MS) were analyzed in SAS using a general linear model. Fixed effects included cattle year of enrollment (2003-2006), market method (tele-auction (TA), private treaty (PT), retained (RT) or co-mingled retained (CT)), and data source (P2R or ABC). The traits BF, MS, REA, and YG were analyzed with a covariate of harvest date or HCW. Harvest date served as a covariate for HCW. With either covariate of harvest date or HCW, market method and year were significant sources of variation ( $P < 0.05$ ). The TA carcasses were the lightest. With either covariate RT and CT carcasses had significantly more BF than TA or PT cattle. These results were similar for YG. Using HCW as a covariate for YG, ABC calves had significantly higher YG than P2R calves ( $P < 0.05$ ). For REA, only HCW was a significant covariate. The TA and PT carcasses had the largest REA followed by CT and RT ( $P < 0.05$ ). P2R carcasses had larger MS than ABC carcasses ( $P < 0.05$ ). For both covariates, TA and RT carcasses had higher ( $P < 0.05$ ) MS than CT. No differences were detected between PT and RT carcasses for MS. Despite these

differences of carcass traits among various marketing methods of Alabama cattle, all values fell within the accepted industry carcass standards.

**Key Words:** Beef Cattle, Carcass Traits, Marketing

**407 Carcass trait characterization of Alabama feeder calves fed in two regions of the United States.** W. C. Rutherford\*, S. V. Free, J. B. Elmore, G. S. Hecht, and L. A. Kriese-Anderson, *Auburn University, Auburn, AL*.

To assess the carcass quality of Alabama born cattle, carcass data from cattle (n=7,144) fed in two regions (Midwest (MW) and High Plains (HP)) were analyzed. All cattle were sold as feeder calves through a tele-auction (TA) or private treaty (PT). Market option (MO), region (R) and their interaction was used in a general linear model in SAS to analyze data. Model A used harvest date (KD) as a covariate and Model B used hot carcass weight (HCW). Traits analyzed were hot carcass weight (HCW), 12th rib fat thickness (BF), marbling score (MB), USDA yield grade (YG) and longissimus dorsi area (REA). Region, R x MO and KD were significant for HCW ( $P < 0.05$ ). The MW x TA cattle had heavier HCW than HP x PT ( $P < 0.05$ ). Both had heavier HCW than MW x PT and HP x TA which were similar. Region, MO, R x MO and KD were significant for BF ( $P < 0.05$ ). The HP x TA cattle had significantly less BF than the other three interaction classes ( $P < 0.05$ ). The R x MO interaction was significant for MB. The HP x TA cattle had significantly more MB compared to the other three interaction classes ( $P < 0.05$ ), which were similar. Region and the R x MO interaction were significant for YG ( $P < 0.05$ ). The R x MO effect was significant for YG. The MW x PT cattle had significantly better YG than the other three interaction classes ( $P < 0.05$ ). Region, MO and KD were all significant for REA ( $P < 0.05$ ). The HP-fed cattle had significantly larger REA than cattle fed in the MW ( $P < 0.05$ ) and TA cattle had significantly larger REA than PT cattle ( $P < 0.05$ ). Model B showed covariate HCW was significant for BF ( $P < 0.05$ ). R, MO and HCW were all significant for MB ( $P < 0.05$ ). HP fed cattle had more MB than the MW fed cattle ( $P < 0.05$ ) and TA cattle had more MB than PT cattle ( $P < 0.05$ ). The HP-fed cattle had significantly more MB than the other three interaction classes ( $P < 0.05$ ). The MO, R x MO and HCW were significant for YG ( $P < 0.05$ ). The MW x PT cattle had a significantly better YG than the other three interaction classes. Region and R x MO significantly affected HCW ( $P < 0.05$ ). The HP-fed cattle had larger REA than the MW-fed cattle. Carcass data from these Alabama feeder calves is comparable to data of the 2000 National Beef Quality Audit.

**Key Words:** Beef Cattle, Carcass, Quality

**408 Comparison of carcass trends of Alabama cattle with national quality audit reports.** J. B. Elmore\*, L. A. Kriese-Anderson, W. C. Rutherford, S. V. Free, G. S. Hecht, and W. F. Owsley, *Auburn University, Auburn, AL*.

Since 1991, national beef quality audits have been concerned with increasing hot carcass weight and stagnant USDA quality grades. Data from two sources containing carcass data from Alabama feeder calves were analyzed to determine if Alabama carcass trends were similar to

national trends. Hot carcass weight (HCW), 12th rib fat thickness (BF), longissimus dorsi area (REA), USDA yield grade (YG) and USDA marbling score (MS) were analyzed using records from the Alabama Beef Connection (ABC) and Alabama Pasture to Rail Program (P2R). The ABC database contained 5,160 records from 2003 to 2006 on cattle sold as feeder calves and fed primarily in the Midwest and High Plains regions of the United States. The P2R database contained 4,997 records from 1994 to 2005 of co-mingled retained ownership cattle fed in the High Plains region of the United States. Data were analyzed using a general linear model in SAS. Fixed effects included year, breed of sire and region fed. A covariate of harvest date was included for all traits. The HCW of Alabama feeder cattle have not followed audit trends. Hot carcass weights have tended to increase nationally (344 to 361 kg). In P2R cattle, HCW has significantly decreased from 352 kg in 1994 to 335 kg in 2005. The ABC cattle show a similar trend

(392 kg in 2003 to 351 kg in 2006,  $P < 0.05$ ). In both data sets, REA remained stable across all years (P2R 87.04 cm<sup>2</sup>; ABC 88.11 cm<sup>2</sup>, audit 84.5 cm<sup>2</sup>). The MS trend was significantly positive across years in both datasets. The P2R data from 1994 moved from a MS of 411 to 484 in 2006 ( $P < 0.05$ ). The ABC data from 2003 to 2006 moved from a MS of 484 to 490 ( $P < 0.05$ ). Back fat and YG were the most variable carcass traits for Alabama across years with positive and negative trends ( $P < 0.05$ ). Feedlot, market conditions and weather probably affected these traits as much as genetic predisposition. Alabama cattle are generally YG 2 cattle (P2R 2.54 vs. ABC 2.56; audit 3.0). This is primarily due to 3.23 cm<sup>2</sup> more REA than required for the associated HCW. Alabama results do not agree with audit findings of increased HCW and REA over time.

**Key Words:** Beef Cattle, Carcass Characteristics, Beef Quality

## Breeding and Genetics - Livestock and Poultry: Analyses and Methods I

**409 Using epidemiological models and genetic selection to identify theoretical opportunities to reduce disease impact.** G. D. Snowden\*, USDA, ARS, U.S. Meat Animal Research Center, Clay Center, NE.

Selection for disease resistance is a contemporary topic with developing approaches for genetic improvement. Merging the sciences of genetic selection and epidemiology is essential to identify selection schemes to enhance disease resistance. Epidemiological models can identify theoretical opportunities for genetic selection to reduce the impact of a disease. Potential selection venues may be more appropriately comprehended by compartmentalization of disease components using epidemiological models. This study considers the standard Susceptible, Infected, Recovered (SIR) epidemiological model and five other common epidemiological models (MSIR, SEIR, SIS, Carrier State, and SIR Vector) with genetic selection alternatives. Theoretical modeling of genetic selection effects on epidemiological models were used to: predict the economic effect of selection, estimate the optimal number of resistant animals to prevent an epidemic, and determine genetic selection alternatives. Selection alternatives to genetic disease resistance include lowering the probability of being infected, tolerance for the pathogen, longer latency period, less severe clinical expression, faster recovery rate, and compensatory rebound. These selection alternatives can result in favorable changes to the differential equations for susceptibility, infected, and recovery rates. Potentially undesirable consequences due to selection can be predicted, such as an increase in the size of sub clinical populations harboring and shedding pathogens. When applied to actual data for bovine respiratory disease, this approach identifies the complexity of genetic resistance to this disease while detecting potential opportunities for genetic selection. When a disease such as bovine respiratory disease is caused by different pathogens (bacterial, viral, mycoplasmal, etc.) with different pathways of infection, the probability of reducing the disease prevalence with genetic selection is diminished.

**Key Words:** Animal Breeding, Cattle, Disease Resistance

**410 Assessment of different selective phenotyping design strategies for genetical genomics studies with outbred F2 populations.** F. F. Cardoso\*<sup>1,2</sup>, J. P. Steibel<sup>1</sup>, G. J. M. Rosa<sup>3</sup>, C. W. Ernst<sup>1</sup>, R. O. Bates<sup>1</sup>, and R. J. Tempelman<sup>1</sup>, <sup>1</sup>Michigan State University,

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Quantitative genetic analysis of transcriptional profiling experiments is emerging as a promising approach to discover candidate genes underlying variation of complex biological traits. However, adoption of these genetical genomics approaches is currently limited by the high cost of microarrays. We studied variants of three recently proposed design strategies to optimally select subsets of individuals for transcriptional profiling including maximizing genetic dissimilarity between selected individuals, maximizing the number of recombination events in selected individuals, and selecting phenotypic extremes within genotypes of a previously identified quantitative trait locus (QTL). We also investigated two other options, namely purely random selection and profiling animals with the highest and lowest phenotypic values within each family-gender subclass. A simulation study was conducted based on linkage map and marker genotypes provided from a dataset on Chromosome 6 for 510 F2 animals from an actual pig resource population. Comparisons between methods were based on a biallelic QTL with pleiotropic effects on a phenotypic trait and a particular expression profile. The model included an overall mean, fixed additive QTL and sex effects and random polygenic and family effects. Bivariate (gene expression with phenotypic data) mixed model analyses were conducted for subset selection intensities of 80/510, 160/510 and 240/510. All methods were deemed to be similar for the mean absolute distance of the estimated QTL to the true QTL location. Precision and bias of estimates of QTL effects was further assessed by their Mean Square Error (MSE). The genetic dissimilarity and extremes within genotype methods had the smallest MSE and maximum sensitivity, outperforming all other selection strategies, particularly at the smallest proportion of selected samples (80/510).

**Key Words:** Genetical Genomics, Selective Phenotyping, QTL

**411 Different methods of selecting animals for genotyping to maximize the amount of genetic information known in the population.** M. L. Spangler\*<sup>1</sup>, R. L. Sapp<sup>2</sup>, J. K. Bertrand<sup>1</sup>, M. D. MacNeil<sup>2</sup>, and R. Rekaya<sup>1</sup>, <sup>1</sup>University of Georgia, Athens, <sup>2</sup>USDA-ARS Fort Keogh Livestock and Range Research Laboratory, Miles City, MT.