

EXTENSION

91 Effect of night lighting on feedlot cattle performance in a hot-arid climate. L. Avendaño¹, N. Torrentera^{1*}, F. D. Alvarez¹, A. Correa¹, and D. E. Ray², ¹Universidad Autónoma de Baja California, Mexicali, México and ²University of Arizona, Tucson.

An experiment using one hundred and eighty beef heifers (mainly Charolais, Hereford, Angus and their crosses) between 1 and 1.5 years of age and weighing an average of 266 kg was carried out to evaluate the effect of a night lighting regimen on the performance of heat-stressed beef heifers. The treatments were: no night lighting regimen (treatment C), and 2 h (12.00-02.00 a.m.) regimen of night lighting (treatment L) during 84 d in summer at a commercial feedlot in the Mexicali valley, Baja California, México. Average minimum and maximum temperatures during the trial were 22.6 and 40.5 °C ; respectively. Treatment L heifers showed better (P<.01) daily gain (1.27 ±0.03 vs 1.11 ±0.03 kg) and carcass weight (244.3 ± 3.3 vs 233.9 ± 3.2 kg) than those on treatment C, but similar (P>.05) feed consumption (9.6 ± .44 vs 9.5 ± .44 kg). The respiration rate was higher (P<.05) in treatment C heifers (93.5 ± 2.4 breaths/min) than in treatment L heifers (83.9 ± 2.3 breaths/min). There were no significant differences (P>.05) in carcass yield grade, ribeye area, fat thickness and marbling. Treatment L tended to produce increased backfat. The meat chemical composition (moisture, fat and protein) was similar (P>.05) in both groups. These results suggest that the use of 2 h night lighting regimen may have a positive effect on beef heifer performance during high environmental temperatures.

Key Words: Feedlot, Night lighting, Performance, Heat stress

92 Chromium picolinate impacts blood metabolite status in pigs measured in a practical farm setting. K. D. Porter^{1*}, M. D. Newcomb², D. O. Kiesling¹, A.N.V. Stewart¹, M. A. Stewart², S. D. Crow², and J. Rodgers², ¹Lincoln University, Jefferson City, MO and ²University of Missouri, Columbia.

Fifty-six barrows and twenty-four gilts comprising of a Hampshire, Yorkshire, Landrace, and Duroc origin were used in a completely randomized design to evaluate the effects of chromium picolinate(CrP) on blood metabolic status and carcass composition. The objective of the study was to determine if metabolic and carcass responses to CrP could be detected in a practical swine operation under a production situation. The experiment was conducted in a complete confinement facility with treatment starting while pigs were four weeks of age and finishing when pigs were 22 wks of age. All diets met or exceeded NRC recommend requirements with CrP being added at 200 ppb. Blood samples were taken from 24 pigs/treatment at 0,3,6,and 18 wks after CrP treatment. During the designated week, pigs were fasted for 16 hrs before first blood sample was taken (fasted), then pigs were fed and a second sample taken two hours later (fed). These samples were analyzed for concentrations of glucose and insulin. Carcass evaluation was done by real-time ultrasound. Treatment did not affect glucose of the fasted pigs, while treatment altered fed glucose concentration and this effect was maintained over time. Fasted pigs showed no treatment effect in insulin concentration. Post-feeding insulin concentration approached a significant effect(P=.06) due to treatment just two hours after first exposure to CrP on d 0. Treatment did not affect the magnitude of glucose or insulin change between fasted and fed samples. Over time, fasted insulin, fed glucose, and fed insulin concentrations changed in a quadratic manner; however, CrP treatment did not impact this temporal change. CrP pigs had a larger (P<.05) loin eye area (41.72 ± .77 cm²) compared with controls (39.42 ± .77cm²). There was no difference (P>.05) between treatments in backfat (1.85 and 1.72 ± .07 cm) for controls and CrP pigs, respectively. CrP did affect blood metabolic status as early as two hours after the first exposure to CrP and increased loin eye area in pigs.

Key Words: Chromium picolinate, Pigs, Blood

93 Identification and management of critical control points in the cow-calf enterprise for achieving and maintaining consistency and low cost of production: IRM-SPA™ results. W. L. Lankister*, R. D. Green, P. E. Gutierrez, and R. E. Taylor, Colorado State University, Fort Collins.

Cow-calf producers currently are being challenged to increase quality and consistency of beef while simultaneously lowering costs of production. This is difficult to accomplish; however, because most producers lack information on both costs of production and feedlot and carcass performance of their calves. With this dilemma in mind, a study was designed to collect and interpret this information from ranches representing a specific geographic region. Ten cooperating ranches were selected from the southwest quadrant of Colorado. Ranches ranged in size from 50 to 2,000 breeding females, agreed to complete an IRM-SPA™ analysis for fiscal years 1994 and 1995, and to retain ownership on a random set of twenty of their steer calves from the 1995 calf crop. Site visits were made to each ranch in 1995 and 1996 to complete the IRM-SPA™ analysis. Results of the analysis for the 1995 production year are presented here. Average pounds of calf weaned per cow exposed was 241.7 kg (range of 208.6 to 278.9 kg), weaning at seven months of age. Adjusted financial annual cow costs were highly variable between ranches (Avg. = \$470, range \$142-\$1446). Size of ranch had no effect (P>.10) on any of the performance or financial measures from the analysis. Break-even prices (\$/cwt) of calves ranged from \$27/cwt to \$396/cwt. Using average calf prices for fall 1995 of \$66/cwt (Cattle-FAX, Englewood, CO), only three of the ten operations were break-even or above. The results were even less favorable on an economic cost basis (including opportunity cost for land and raised feed). There results clearly show the high degree of variation in cost of production at the cow-calf level, even within a somewhat homogeneous environment.

Key Words: Beef cattle, Cost, IRM-SPA™

94 Identification and management of critical control points in the cow-calf enterprise for achieving and maintaining consistency and low cost of production: Feedlot, carcass, and profitability results. W. L. Lankister, R. D. Green*, N. E. Dalsted, R. E. Taylor, and G. G. Hilton, Colorado State University, Fort Collins.

Cow-calf producers currently are being challenged to increase quality and consistency of beef while simultaneously lowering costs of production. This is difficult to accomplish; however, because most producers lack information on both costs of production and feedlot and carcass performance of their calves. This study utilized ten cooperating ranches from southwestern Colorado to collect and interpret this type of information. IRM-SPA™ analyses were conducted for each ranch for the 1994 and 1995 production years. In addition, twenty steer calves were randomly selected from each herd and then fed to a targeted 1.1 cm fat thickness endpoint as a part of the 1996 Rocky-Mountain Ranch to Rail program. Standard carcass data for USDA yield grade and quality grade were collected by trained personnel and rib steaks were obtained from 50% of the carcasses from each ranch for Warner-Bratzler shear force (kg) determination after a 14 d aging period. There was no relationship (P>.10) between non-conformance and annual cow cost. The results of this study indicate that it is possible to produce cattle with acceptable carcass and feedlot performance at low-cost of production. Furthermore, the variation between ranches observed in this study points out the importance of documenting this information on an individual ranch basis to allow improvements to occur in the beef industry.

Measure	Ranch										Avg.
	1	2	3	4	5	6	7	8	9	10	
Cost of gain (\$/cwt)	67.47	64.60	58.44	73.02	60.49	63.27	67.03	68.23	60.00	65.90	64.85
Annual cow cost (\$)	229	226	319	336	428	549	521	541	432	1463	504
Carcass Wt. (kg)	328	340	350	333	346	342	330	337	360	334	340
USDA YG	3.2	2.9	2.4	2.0	3.5	2.1	2.7	3.1	2.6	3.0	2.8
Marbling Score	418	379	362	377	406	352	391	354	382	442	386
WBS (kg)	3.4	3.1	3.0	2.9	3.4	2.8	3.3	3.2	3.5	3.2	3.2
% non-conformance	58	57	43	53	96	35	63	50	60	77	59

Key Words: Beef cattle, Cost, Non-conformance, Carcass

95 Performance and economic comparisons between small, moderate and large size cows enrolled in the Arkansas Beef Improvement Program. S. R. McPeake*, T. R. Troxel, W. T. Wallace, and G. V. Davis, *University of Arkansas Cooperative Extension Service, Little Rock.*

Data from (N=643) cows and their calves were analyzed to compare differences in performance levels and economic efficiency between small cows (<454 kg), moderate cows (454-544 kg) and large size cows (>544 kg). Cows were represented in both spring and fall calving systems. Cow size was significant ($P < .05$) for cow efficiency (CE), average adjusted weaning weight per animal unit (WWT AU), ratio of adjusted weaning wt to cow weight⁷⁵ (WWT MWT) and breakeven (BE). No significant differences were found between different size cows for adjusted weaning weight AWWT. Cows that calved in the spring had significantly higher ($P < .05$) adjusted weaning weights, higher ($P < .05$) cow efficiency, higher ($P < .05$) WWT MWT, and lower ($P < .05$) BE as compared to fall calving cows. The interaction of cow size by calving season was significant ($P < .05$) for AWWT. These results indicate that spring-calving is advantageous to fall-calving. These results also imply as cow size increases breakeven increases. Cow size by calving season interactions indicate a need for considering environment and production management systems when selecting cow size.

Key Words: Beef cattle, Cow size, Economic analysis

96 Heifer source influences culling percent, market value and conception rates in a heifer development program. G. C. Lamb, J. M. Lynch*, B. L. Miller, and L. R. Corah, *Kansas State University, Manhattan.*

The objective was to determine the effect of heifer source on conception rates, culling percent, and market value for a heifer development program. In October 1995, a heifer development program located in north-central Kansas purchased 468 commercial heifers from 12 different sources. Number of heifers per source ranged from 8 to 124 head. Before the breeding season, 17% of all heifers were culled based on visual appraisal, average daily gain, pelvic area, and disposition, at which time they were sent to a feedlot through a retained ownership program. The percentage of heifers culled from each source ranged from 0% to 60%. In April 1996, heifers were synchronized using a MGA-prostaglandin $F_{2\alpha}$ system followed by AI 12 to 16 h after a detected estrus. Artificial insemination continued for 30 d followed by 15 d of natural mating by a bull. Ultrasonography determined first and second service conception rates, whereas rectal palpation confirmed pregnancy 90 d after the completion of the breeding season. Pregnant heifers were sold either by private treaty or through a special replacement heifer sale in January 1997. First service conception rates for each source ranged from 38 to 100% (mean = 70%), whereas the overall pregnancy rate, expressed as a percentage of the original heifers purchased, ranged from 40 to 100% (mean = 79%). Heifers culled prior to the breeding season realized a net profit of \$16 per head, whereas heifers that were diagnosed non-pregnant after the breeding season realized a net loss of \$144. Heifers that were sold as first service AI, second service AI, or bull bred were sold for an average net profit of \$164, \$88, and \$72, respectively. We conclude that source influences culling rates, conception rates, and profit potential in replacement heifers.

Key Words: Heifer, Artificial Insemination, Estrous Synchronization

97 Trends in live and carcass characteristics of steers at the Houston Livestock Show, 1974-1996. S. P. Hammack* and D. B. Griffin, *Texas A&M University - Texas Agricultural Extension Service, College Station.*

Live and carcass information was collected in most years from 1974-1996 at the Houston Livestock Show Junior Steer Division. Numbers shown ranged from 998 to, in 1996, 1648 head. Information was available from the first two places in three weight classes of 14 or 15 breed or breed-cross divisions, comprising 84 or 90 head per year. Minimum live weight was 409 kg until increased to 455 kg in 1987, with no maximum weight. Live weight increased almost 80 kg from 1974, most of which occurred by 1987, to 550 kg in 1996. Hip heights, first measured in 1981, peaked in 1987-89 at almost 140 cm but declined to 133 cm by 1996. Carcass weight followed the same trend as live weight, increasing approximately 50 kg. Dressing percentage began at slightly below 65%, increased to 67% by 1985, and declined to 65% in 1996. Fat cover trended slightly but erratically upward, ranging from slightly below 1.0 to 1.2 cm. Ribeye area increased with body size through 1989 then slightly declined. Yield grade started at the mid-2 level, decreased to low-2 in 1985-87, moving back to mid-2 by 1996. Quality grade paralleled Yield grade, starting at high-Select, declining to mid-Select, and returning to high-Select by 1996. In general; steers are now heavier, but weight has apparently plateaued; hip heights have peaked and declined, and both Yield and Quality grades slightly declined numerically and then returned to beginning values. Finally, a requirement was implemented in 1993 that hair be clipped to a maximum of 0.635 cm in length from the hooves up. This procedure has not notably affected any factors of size or composition.

Key Words: Beef, Carcass, Youth

98 A national pilot initiative for beef quality education of cattle producers and order buyers. J. G. Floyd, Jr.^{1*}, L. A. Kriese¹, N. J. VanDyke¹, R. E. Blaylock¹, W. R. Jones¹, D. M. Gimenez, Jr.¹, R. A. Ebert¹, and G. L. Cowman², ¹*Auburn University* and ²*National Cattlemen's Beef Association, Englewood, CO.*

Although progress has been made toward improving the quality and consistency of beef, a substantial segment of cattle producers is unfamiliar with the factors influencing improvement identified in the National Non-Fed Quality Audit (1994) and National Beef Quality Audit (1995). Based on the premise that these producers are unlikely to attend extension and producer organization meetings but would attend programs at local livestock auction markets, a national pilot project, to serve as a model for other states, was conducted in Alabama from January through April, 1997. A series of 15 presentations were made in auction markets utilizing three displays: "Responsible Management Enhances Beef Quality and Product Value," "Targeted Breeding Equals Customer Satisfaction," and "Responsible Culling Improves Herd Productivity and Efficiency." Each audience was divided into three groups and rotated among 20-minute formal presentations in three separate locations in the facility conducted by extension faculty at each display. Three-dimensional models were used to demonstrate target carcass parameters, including USDA yield and quality grade, and anatomical origin of defects, such as injection and bruise lesions in steaks lifted from a standing calf, ectoparasite and brand damaged leather, ocular neoplasia lesions, feet and leg defects, teeth condition, and udder conformational defects and mastitis. A calf's head and neck demonstrated proper injection sites and a s.c. injection "knot". A tri-folded handout reproduced the content of each display. Presentations were also made to five major order buyers and employees, the Alabama Cattlemen's Association convention, the Alabama Conference for Food Animal Veterinarians, and the State Steer Show.

Key Words: Beef Cattle, Beef Quality, Producer Education

99 Development of a World Wide Web resource to select Hereford bulls based upon expected progeny differences. W. O. Herring^{1*} and J. D. Hough², ¹University of Missouri, Columbia and ²American Hereford Association, Kansas City, MO.

A database management tool has been developed for the World Wide Web to select Hereford bulls based upon EPD, accuracy and phenotypic criteria (<http://www.missouri.edu/~anscbeef/hereford/>). A total of 4,663 bulls were included in the initial Spring 1996 database and are the same bulls included in the printed copy of the American Hereford Association Sire Summary. The spring database is updated immediately after the North American genetic evaluation, weeks prior to releasing the printed copy. The database is updated again in the fall, with no associated printed copy. Other instructional information supplied includes proper use of EPDs, percentile rankings by sex, and associated possible changes with accuracies. Users can select bulls based upon any combination of birth weight, weaning weight, yearling weight, milk, or scrotal circumference EPDs or accuracies. Bulls can also be selected based upon name, registration number, horned/poled status, and birth date ranges. After the database has been queried for bulls meeting user-defined criteria, bulls can then be sorted by any of the selection criteria. Since development, the database has been accessed 2,910 times from at least 11 different countries. Highest usage occurs immediately after the database has been updated with a recent genetic evaluation. Development of such sire selection tools allows cattlemen to identify bulls meeting pre-defined EPD and accuracy criteria much quicker than previously possible.

Key Words: Beef cattle, EPD, Internet

100 Long Run economic impacts of maternal herd replacement alternatives. D. J. Patterson and V. L. Pierce, University of Missouri, Columbia.

The low cost producer of maternal herd reproductive capacity must evaluate long and short term effects of replacement choices and the combined sensitivity of those choices to market price and long-term reproductive integrity of the herd. Current research and extension budgeting tools need to be improved to provide the producer the ability to reveal the dynamic impact of nonserial conception, fluctuating replacement heifer costs, feed price ranges, sire expenses and cattle cycles over time on static decisions. This research evaluates the sensitivity of these factors on the economic returns to a cow/calf enterprise in Missouri. Production and economic data from the University of Missouri branch experiment station farms were evaluated to determine the optimum cow replacement strategy under various price and efficiency scenarios. Long-run price projections were included based on forecasts from the Food and Agricultural Policy Institute at the University of Missouri. Production efficiency, pregnancy, price sensitivities and spreadsheet decision aides are derived from estimates of the impacts of female herd replacement choices. The efficient producer seeking to optimize long run net farm income and reduce risk exposure will incorporate the possible ranges of these variables in analyzing the heifer development options.

Key Words: Beef Cattle, Replacement Heifers, Economics

101 Decision evaluator for the cattle industry. C. B. Williams* and T. G. Jenkins, USDA-ARS, RLHUSMARC, Clay Center, NE.

Component biological models were developed to simulate growth and body composition, and partition metabolizable energy intake, in growing and mature cattle. These component models were integrated into a life cycle model developed at Colorado State University. The integrated model was parameterized for 17 breeds of beef cattle using data from the Germ Plasm Utilization and the Germ Plasm Evaluation projects at the U.S. Meat Animal Research Center. Evaluations with independent experimental data obtained at MARC, showed that the model could accurately predict life cycle response under different levels of nutritional management. This model predicts production starting with the cow/calf operation right through to slaughter and carcass grading, and it can evaluate the impact of strategic decisions on future productivity. The model is being packaged with a graphical user interface for preparing input data sets and analyzing output data, which makes it easy to use as a management tool on individual ranches.

Key Words: Beef Cattle, Computer Simulation

102 Economic evaluation of neonatal health protection programs. R. L. Larson and V. L. Pierce, University of Missouri, Columbia.

Cattle do not pass any antibodies from the mother to the fetus prior to birth, the calf relies on antibodies present in colostrum to provide protection from disease until he is able to develop a protective active immune response. The purpose of this study is to determine the potential economic value of a management program that increases the likelihood that a greater percentage of calves receive adequate passive transfer and subsequently improve production efficiency from birth to weaning. This research reports the impact of variable sensitivities for the following factors on the economic incentives for improved neonatal care; percentage of cows bred that wean a calf, average weaning weight of calves weaned, average annual herd treatment costs, and price received for calves sold. Data from Wurdack Experiment Station in Cook Station, Missouri was evaluated for each year from 1990 to 1995 to reveal the economic benefits to the cow/calf enterprise by decreasing preweaning morbidity and mortality by 20%, 40%, and 60%. A spreadsheet decision tool developed allows producers to determine the amount of investment needed to implement a neonatal health protection management program they can afford within individual ranch sensitivities.

Key Words: Beef Cattle, Economics, Neonatal Health

103 Economic evaluation of weaning practices on herd immunity. R. F. Randle and V. L. Pierce, *University of Missouri, Columbia.*

The development and use of an effective vaccination program requires the consideration of many factors. The effects of nutrition, stress, and disease are challenging to the effectiveness of a well planned vaccination program. In any population of animals there is a portion of animals that remain susceptible to infection. It becomes important to evaluate not only the economic impact of the infected animal but herd immunity as a whole. The youngstock immunization program commonly is administered on a given date. However, this practice could lead to a situation in which a number of calves are not successfully immunized. A key success factor on immune response is the effect of maternal antibody in colostrum and age of the calf. Shultz reported a range of 5-90% effectiveness of killed and modified live vaccines on Bovine Virus Diarrhea (BVD) based on the age of the calf at time of vaccination. Production data from a sample herd of 202 animals were analyzed to determine the potential effects of age at vaccination on immune levels and resulting economic performance of the herd. Calves born in a 73 day calving period from February 11 to April 25 were analyzed. The herd consisted of the following age distributions on October 1, the projected immunization date; 14% of the calves were 4 to 5 months old, 55% were 5 to 6 months old 31% were 6 months old. However, on November 1, the following distribution held; 15% of the calves were 5 to 6 months old, 85% were over 6 months. Using the estimates of immunity on calf age at vaccination presented by Schultz, 7 to 16 percent of the sample herd may not immunize if vaccinated on October 1. Delaying vaccination by 30 days reduces the range of non-immunized animals in the herd to 6 to 10 percent. The study evaluates the economic effect of vaccination timing and demonstrates the sensitivity of the results to levels of acceptable herd susceptibility to BVD. The research results include a spreadsheet decision tool that allows producers to determine the value of an immunization timing program on their operations profitability.

Key Words: Beef Cattle, Economics, Immune Systems

104 4-H youth horsemanship participation and recognition survey. A. M. Swinker* and K. Milne, *Colorado State University, Fort Collins.*

A written survey was conducted on all 4-H horse members in Jefferson County, Colorado. The demographic of Jefferson county is made up of a suburban, rural and urban areas. The objectives of this survey was to collect data on the 4-H youth members such as number of project horses, number and types of shows attended, event involvement and approximate dollars spent on showing activities. Another objective of the survey was to collect cognitive data such as why did you choose to join 4-H? What do you hope to gain from your 4-H experience? What makes you feel good about your 4-H project? How would you like to be recognized for your 4-H horse project and accomplishments? The following results will be shared: youth want to be recognized for horse project accomplishments through verbal recognition from leaders and other youth, and county agents. What makes you feel good about your 4-H project? Answers: being in a safe environment, a sense of accomplishment, learning about horses, respect and recognition from members and leaders.

Key Words: Youth recognition, Participation, 4-H, Horse