

heavier than females and the highest birth weight was recorded in the late wet season. This seasonal variation in birth weight was due to the amount of precipitation recorded in those seasons as reflected in the availability of forage for the pregnant dams, which are rarely given supplemental feeds. and the h^2 for Holstein and Jersey was 0.49 ± 0.26 and 0.54 ± 0.35 respectively. The moderate to high heritability estimate obtained in these analyses implies that these breeds of animal could be maintained as purebred, despite the prevailing inimical environmental conditions.

Source	DF (Holstein)	MS (Holstein)	DF (Jersey)	MS (Jersey)
Year of birth	15	90.87**	6	8.27ns
Season of birth	3	163.02**	3	10.82ns
Sex of Calf	1	213.87**	1	1.42ns
Parity of dam	7	24.66ns	5	11.42ns
Sire of calf	12	67.99**	3	22.55*
Error	436	23.36	19	7.10

** = $P < 0.01$; * = $P < 0.05$; ns = $P > 0.05$

Key Words: Heritability, Birthweight, Trypanosomiasis

ASAS/ADSA Extension Education: Beef

899 Performance comparisons between mature cows categorized by weight and frame score combinations that are enrolled in a cow herd performance testing program. S.R. McPeake*, W.T. Wallace, and L. Keaton, *University of Arkansas Cooperative Extension Service.*

Data from (n = 164) cows and their calves were analyzed to compare differences in performance levels between cows categorized by weight and frame score combinations. General linear model procedures were used to generate least squares means for dependent variables. Weight categories (WT) for the cows were small (< 500 kg), moderate (500 to 544 kg), large (545 to 590 kg) and extra large (> 590 kg). Frame scores (FS) represented included 4, 5, 6, and 7. Cow size (CS) included all possible combinations of WT and FS that were available in the data set. WT was significant ($P < 0.05$) for adjusted 205 day weight (WWT), cow efficiency (CE) and FS. CS was significant ($P < 0.05$) for WWT, CE, and body condition score of cows (BC). No significant differences were found between CS for muscle score (MS) of calves. As WT increased, WWT increased but CE decreased. Within WT, cows with larger frame scores generally had higher WWT with the exception of extra large cows. Within each WT, CE increased with FS with the exception of the extra large cows. Cow frame size and weight may need to be considered when matching cows to production environments.

Key Words: Beef cattle, Cow size, Efficiency

900 Designing and implementing a quality assured, source-verified feeder calf sale program. T. Nennich^a, C. R. Dahlen^b, C. M. Zehnder^b, L. R. Miller^b, G. C. Lamb^c, D. Kampmeier^d, and A. DiCostanzo^{*b}, ^a*Clearwater County Extension, Bagley, MN*, ^b*University of Minnesota, St. Paul*, ^c*North Central Research and Outreach Center, Grand Rapids*, ^d*Central Livestock Association, South St. Paul.*

A producer-driven quality assured, source verified feeder calf sale program was initiated to enhance marketing options for producers, to create a repeat-buyer feeder calf outlet, and to increase profitability and growth of the Minnesota beef industry. Several marketing agencies were interviewed according to marketing criteria producers wished to follow. A marketing agency was chosen and charged to set and promote sale dates, provide transportation, facilities and personnel to form outcome groups of cattle of similar color, frame and muscling, and to sell outcome lots within a regular sale date. Producers agreed to follow specific beef quality assurance (MBQA) procedures, and to background and process calves for disease prevention. Cattle were immunized against viral and bacterial diseases at weaning time and boosted against viral diseases 15 d before the sale. On the sale date, an experienced sale observer gathered cattle description, weight and price data on all lots sold. A regression equation was fitted to determine factors that had a significant ($P < .05$) effect on sale price. Color, muscling, sex, and health status were factors that influenced sale price in addition to weight and lot size. Steer MBQA lots sold better than other vaccinated steers or steers under no vaccination protocol 56% or 75% of the time for a total advantage of \$3 or \$13/head, respectively. Heifer MBQA lots sold better than other vaccinated heifers or heifers under no vaccination protocol 41% or 76% of the time for a total advantage of \$1.86 or \$12.21/head, respectively. Compared to single source lots, when a producer contributed up to 12 steers or heifers to a larger lot, the advantage of selling in larger lots

was \$.068/kg. Producers and the marketing agency were satisfied with the experience and have made a commitment to continue this endeavor.

Key Words: Quality Assurance, Cattle, Sales

901 Mississippi farm to feedlot program: carcass performance. W.B. McKinley, A.R. Williams*, J.N. Myers, A.G. Gardner, and E. Ward, *Mississippi State University, Starkville, MS.*

The objectives of the Mississippi Farm to Feedlot program are to evaluate production and carcass information of steers produced in Mississippi, and to provide educational information regarding retained ownership as a marketing alternative. Seven years (1993-1998) of data were collected and the effects of year of feeding (YR) and sire breed (SB) on carcass performance were evaluated. Sire breeds were classified into three breed groups, British Breeds (BB), European breeds (EB), and American breeds (AB). Carcass performance response variables included steer hot carcass weight (HCWT), back fat thickness (BF), ribeye area (REA), marbling score (MS), quality grade (QG), and yield grade (YG). Both YR and SB significantly influenced carcass performance. HCWT was greatest ($p < .05$) for steers in YR 5 and 6 (352 and 344 kg, respectively) compared to all other years. Steers in YR 1 had greater ($p < .01$) BF (1.52 cm) than steers in all other years. REA was larger for steers in YR 3 and 7 (87.09 and 87.07 cm²) and least for steers in YR 1 (79.04 cm², $p < .01$). MS was the highest in YR 5 at 396 and the lowest in YR 1 at 362 ($p < .01$). QG mirrored MS with steers in YR 5 having the highest QG and those in YR 1 the lowest QG (17.89 and 17.24, respectively, $p < .01$). YG was greatest in YR 7 at 2.86 and the lowest in YR 4 at 2.57 ($p < .01$). SB did not influence ($p > .05$) HCWT. However, SB did significantly influence all other carcass traits. BB and AB sired steers had greater ($p < .01$) BF (1.34 and 1.31 cm, respectively) than EB sired steers (0.97 cm). EB sired steers had larger REA (88.14 cm², $p < .05$) than BB and AB sired steers (83.39 and 82.16 cm², respectively). MS and QG were greater ($p < .01$) for BB sired steers (403 and 18.07, respectively). YG was lowest ($p < .01$) for EB sired steers at 2.4 compared to 2.76 and 2.89 for AB and BB sired steers, respectively. Overall, QG improved as the program progressed. BB sired steers exhibited the highest QG, while EB sired steers had the lowest YG.

Key Words: Cattle, Feedlot, Carcass

902 On farm/ranch HACCP - Is it time? W.J. Means*, *University of Wyoming, Laramie, WY/USA.*

Based on review of available literature, the objective was to determine if HACCP (Hazard Analysis Critical Control Points) could be efficaciously applied to livestock production systems to reduce the prevalence of *Escherichia coli* O157:H7 in beef products. HACCP involves prevention of hazards affecting food safety from production to consumption. Currently, HACCP application in relation to control of pathogenic food-borne bacteria extends to processing plants, retail outlets, and restaurants - not to the farm or ranch. Steps necessary for food borne illness (FBI) to occur include pathogen contamination of the food, abuse of the food, improper cooking, and consumption of the food in question by a susceptible individual. Measures that break the sequence of events, thus deterring FBI, may be considered critical control points (CCP's). Reducing the number of pathogens entering a food/meat processing facility in/on livestock could further decrease the pathogen load of finished raw or cooked product. However, prevalence of *E. coli* O157:H7 in individual animals/herds as well as factors affecting shedding of the organism

has received limited study. Seven reports indicate *E. coli* O157:H7 is present in 0.28 to 11.6% of dairy cattle with a herd incidence of 8.3 to 75%. Two studies indicate *E. coli* O157:H7 is present in 0.33 to 13.4% of feedlot cattle and can be found in 10% of feedlots tested. Factors that may be associated with prevalence of *E. coli* O157:H7 include age of animal, herd biosecurity, feeding regimen, manure handling practices, weaning, and fasting. It is clear that single-time-point sampling of beef and dairy herds is an inadequate method to determine *E. coli* O157:H7 prevalence and that more research is needed to describe the true animal/herd prevalence. Since management practices that can actively reduce carriage and shedding of *E. coli* O157:H7 are not clearly defined, it is unrealistic to apply HACCP principles to cattle production systems at this time. Continued research to identify on-farm/ranch CCP's is needed to decrease the pathogen load of cattle entering processing plants.

Key Words: HACCP, *E. coli* O157:H7, cattle

903 A bioeconomic model of the broiler chicken supply chain - simulation for extension. M. J. Zuidhof^{*1}, R. J. Hudson², T. Joro², and J. J. R. Feddes², ¹*Alberta Agriculture, Food and Rural Development*, ²*University of Alberta*.

A dynamic, deterministic bioeconomic model of the broiler supply chain has been developed with the objective of assisting the poultry industry with complex decisions. Because of biological variability and complex industry structure it is often difficult to optimize decisions, which may be defined as decisions that yield maximum economic benefit to the supply chain. The model spans five sectors of the broiler supply chain: feed, hatching egg production, hatchery, broiler production, and processing. Biological productivity is based on the genetic potential of each strain of bird used in the model. The model operates on a daily time step, and accrues production and associated costs daily. The model simulates daily hatchery, feed, and processing cycles. The length of the broiler cycle is determined by the length of time required to produce chickens for specific processing objectives, which can be set in the user interface of the model. In the broiler sector, production costs are accrued until the time of processing, after which costs are held constant. Prior to the onset of lay in the breeders, actual costs of chick production are undefined, so the model draws on a user supplied chick price. After 250 d of simulation, the model uses simulated chick cost, which drops with increasing breeder age as costs are spread over larger chick numbers. The cost reported on the last day of simulation represents the predicted costs if breeders are kept for the entire production cycle. The model is set to simulate 66 wk of production, the standard broiler breeder cycle length in Canada. Costs are reported in formats that are meaningful to each sector of the supply chain, and as the total cost per kg of meat produced by the supply chain. This is useful for analyses of the effects of specific supply chain management decisions, such as the choice of genetic strain, on costs at the level of each sector. This is important because although a decision may be optimal for the supply chain as a whole, it may not be optimal for all participants in the supply chain.

Key Words: bioeconomic model, supply chain, chicken

904 Profitability analysis model for assessing the relationship between feeder frame scores, feed efficiency and carcass merit. K.C. Olson^{*}, V.L. Pierce, R.L. Larson, E.P. Berg, and C.L. Loenzen, *University of Missouri*.

Problem Cow calf producers are facing a changing beef marketing system. To that end, their interest in animal performance beyond the point of weaning is gaining with tremendous speed. However, the ability of cow calf producers to identify characteristics of early life animal performance which later impact feed efficiency, health, and carcass quality and yield are limited.

Objective To determine the economic relationship between USDA frame scores, weaning weight and early post weaning health on feedlot performance and carcass grade and yield.

Data and Methods

Data from the Missouri Premier Beef Marketing program is used in the study. Complete data collected from 699 calves in the Premier beef program include USDA feeder frame score, weaning weight, feeding efficiency, and carcass yield and quality. A general backpropagation-estimated feedforward artificial neural network is developed to explain the relationships between the stages of the animals life in these systems. This model is contrasted to an OLS regression attempting to explain

the same relationship. Model parameters are then used to identify economic relationships between early life performance, frame scores, feed efficiency and USDA carcass merit values. Multi-variate distributions are assigned to model stochastic variables to assess the risk and reward trade-offs in the final analysis.

Conclusion Economic trade-offs are presented which demonstrate the ability and likelihood that a cow calf producer can project feed efficiency and carcass merit from feeder frame scores and weaning weight and early post weaning health and feeding efficiency. The list below shows how a group of 156 head of steers animals is tracked economically; 65 percent choice or better, average carcass value of 847 dollars, average animal cost to feeder of 529 dollars, average available to feeder 322 dollars, maximum available to feeder per head 544 dollars, minimum available to feeder 113 dollars, 92 of the 156 were profitable to the feeder leaving 19.35 dollars per head at the feedyard. This data is used with feeder grades to identify those animals that were profitable in the feedlot and determine associated relationships for use in the predictive model.

Key Words: Feeder Calves, Economics, Carcass

905 The use of early post weaning performance and quality data of feeder calves in determining the best marketing method for cow calf producers. R.L. Larson, V.L. Pierce^{*}, and K.C. Olson, *University of Missouri*.

Problem Cow calf producers are facing a changing beef marketing system. Producers have increased access to early post weaning performance and quality information on their calves. However, a system that allows producers to measure the economic trade-offs between these data and available marketing systems is largely unavailable in a user-friendly computerized decision tool.

Objective To evaluate the economic trade-offs between early post weaning performance and quality characteristics of feeder calves and develop a farm specific decision tool which allows producers to evaluate various marketing methods given likely feeding and carcass merit performance of their calves.

Data and Methods

Data from the Missouri Premier Beef Marketing program is used. This program coordinates a group of cow-calf operations with the objective of gaining market power by producing uniform, quality animals that can be traced from birth through slaughter. With this program, for example, 20 producers with 50 calves each can market 1000 calves in sorted potload size lots with similar health, genetics and management programs. Feedlot performance and carcass data can be fed back through the production chain to each cow-calf member producer to assist in making production and management decisions. Animals are commingled and developed during a short 45-90 day backgrounding period. Complete data collected from 699 calves in the Premier beef program include serial USDA feeder muscling scores, USDA frame score, weaning weight, feeding efficiency, and carcass yield and quality. An ordinary least squares multi-variate model is developed to explain the relationships between the stages of the animals life in these systems. Spreadsheet add-on tool At Risk is used with enterprise budgets to assess the impact of variable distributions on decisions regarding various marketing methods including commodity market sale, full and partial retained ownership.

Conclusion Producers can use this spreadsheet tool, based on actual calf performance data, to evaluate the likely performance of their feeder calves and thus determine the risks and reward trade-offs under various marketing scenarios.

Key Words: Feeder Calves, Economics, Decision Tool

906 The A.I.M. Program (Allied Inputs and Marketing): A Producer Cooperative that Reduces Production Costs and Increases Market Value of Calves. L. H. Anderson^{*}, J. T. Johns, K. D. Bullock, and W. R. Burris, *University of Kentucky*.

Small and medium-sized producers face tremendous production and marketing disadvantages due to the lack of economics of size. Approximately 85% of beef cattle operations in Kentucky consist of 50 cows or less. The University of Kentucky Beef Extension Team has developed a new program that encourages producers to form a production and marketing alliance. The focus of the A.I.M. (Allied Inputs and Marketing) program is to improve profitability of beef cattle production by allowing small and medium size beef producers to utilize economies of scale.

Two production alliances have been developed in Kentucky. One alliance has both a purchasing and marketing function and consists of 22 producers who own approximately 1500 cows (average size = 68 cows; range = 10-200). The second alliance is a purchasing alliance only and consists of 107 producers who own 6237 cows (average size = 58 cows, range 7-400 cows). Each member agrees to purchase only through the alliance. The alliance then requests bids from local vendors on products such as vaccines, dewormer, growth implants, mineral, preconditioning feed, semen, and estrus synchronization products like melengestrol acetate. Savings on these products have been tremendous. Purchase price of vaccines (respiratory disease complex, clostridial diseases, and reproductive diseases) have been reduced an average of 23.25% (range = 22-26%). Costs of deworming products decreased 24.0% while savings on growth promotants average 18%. Similarly, savings on mineral averaged 24.7%. Over the past two years, production costs decreased \$12-20 per cow due to the purchasing programs in these alliances. The cooperative marketing of the alliance cattle has increased net return \$28-37 per cow over the last two years in one alliance. Thus, return per cow has increased for \$40-57 per cow due to the production and marketing cooperative. Based on these results, participation in these alliances has increased profitability and sustainability of small and medium-sized beef producers.

Key Words: Beef, Extension, Marketing

907 Cow College: Implementation of an Intense, 9-day Educational Opportunity for Beef Producers in Kentucky. L. H. Anderson*, W. R. Buriss, K. D. Bullock, J. C. Henning, P. B. Scharko, D. W. Shepherd, J. D. Anderson, and C. W. Absher, *University of Kentucky*.

A renewed interest in profitability and an increase in nontraditional clientele have increased the need for more educational opportunities for producers. An instructional program was developed by the Kentucky Beef Integrated Beef Management Team to educate producers in all aspects of beef production. Cow College consists of 5 separate training sessions conducted from July to November. The first session discusses economics of the beef industry. Lecture material includes farm goal setting, record keeping, marketing, and the future market. Laboratory exercises discuss case studies in which producers are asked to make financial decisions using economic tools such as backgrounding spreadsheets. Producers also gain experience in the feedlot/packer industry by participating in the Packer-Feeder game. The second session focuses on beef cattle nutrition. Lectures regarding beef cattle nutrients, characterization of feedstuffs, planning both forage and nutritional programs and mineral supplementation. Laboratory sessions include body condition scoring, ration balancing and reading mineral and feed tags. The third session discusses herd health and cattle handling. Herd health programs, implanting, dehorning and castration are discussed and demonstrated. The basics of cattle handling are also taught. The fourth session focuses on breeding management. The basics of genetics, crossbreeding programs, bull selection, heifer selection, female reproduction, male reproduction and reproductive management are taught. Laboratory sessions provide opportunities to learn AI, pregnancy diagnosis, pelvic area measurements, BSE, and bull selection. The final session discusses end product. Students learn to calculate yield and quality grade of both live cattle and carcasses. Carcasses are fabricated and students also participate in a taste panel focusing on palatability of select versus choice beef. Since July of 1999, 32 producers have been trained. Herd sizes of these producers ranged from 10 to 900 cows and backgrounding operations ranged from 50 to 5000 calves. Most producers have indicated that Cow College was an outstanding program and session evaluations have averaged 8.6 (1-10, 1 being lowest).

Key Words: Beef, Extension, Education

908 Mississippi farm to feedlot: feedlot performance. W.B. McKinley, A.R. Williams*, J.N. Myers, A.G. Gardner, and E. Ward, *Mississippi State University, Starkville, MS*.

The objectives of the Mississippi Farm to Feedlot program are to evaluate production and carcass information of steers produced in Mississippi, and to provide educational information regarding retained ownership as a marketing alternative. Seven years (1993-1998) of data were collected and the effects of year of feeding (YR) and sire breed (SB) on feedlot performance were evaluated. Sire breeds were classified into three breed groups, British Breeds (BB), European breeds (EB), and American breeds (AB). Feedlot performance response variables included steer

final weight (FWT), final gain (FGN), final average daily gain (FADG), and final age at harvest (FAGE). Both YR and SB significantly influenced feedlot performance. FWT was greatest for steers in YR 5 at 548 kg ($p < .01$), intermediate for steers in YR 4 and 6, and the least in YR 1, 2, 3, and 7. FAGE was also greatest ($p < .01$) in YR 5, with steers averaging 532 d at harvest, whereas steers in YR 1 were significantly younger at harvest (460 d). FGN was highest ($p < .05$) in YR 4 and 6 (261 and 269 kg, respectively), and lowest in YR 3 and 7 (233 and 232 kg, respectively). FADG was highest ($p < .01$) for YR 4 and 6 (1.44 and 1.45 kg/d, respectively) and lowest for YR 2 and 5 (1.29 and 1.28 kg/d, respectively). FWT and FGN were not influenced ($p > .05$) by SB. However, SB did influence FADG with BB and EB sired steers exhibiting daily gains of 1.40 and 1.37 kg/d compared to 1.34 kg/d for AB sired steers ($p < .05$). SB also influenced FAGE with BB sired steers the oldest at harvest at 499 d, AB sired steers at 494 d, and EB sired steers were the youngest at 467 d ($p < .01$). Year of feeding significantly affected feedlot performance in all variables measured. There was a tendency for steers to be younger and lighter at harvest in the first three years of the program. SB significantly influenced FADG and FAGE. BB and EB sired steers had significantly higher FADG compared with AB sired steers.

Key Words: Cattle, Feedlot, Performance

909 Establishing a catfish off-flavor control program in Georgia. G. J. Burtle*¹, G. W. Lewis², M. Fowler³, and T. Cummings³, ¹*Animal & Dairy Science, University of Georgia, Tifton, GA 31793*, ²*Warnell School of Forest Resources, University of Georgia, Athens, GA 30602*, ³*Cooperative Extension Service, University of Georgia, Louisville, GA 30434*.

In 2000, more than 545,500 kg of channel catfish under production in Jefferson county, Georgia were off-flavor. Individual catfish ponds were sampled to determine the extent of the off-flavor problem. Ponds that had off-flavor catfish were not harvestable due to refusal of processing plants to purchase the off-flavor catfish. Twentytwo ponds ranging in size from 1.25 to 5.0 ha were found to have a few hundred to over 5,000 colonies per mL as blue-green algal species known to cause off-flavor in catfish. A leading cause of off-flavor in catfish, *Oscillatoria perornata*, was present in 40.9% of the ponds from 184 to 8,820 colonies per mL. That species produces methylisoborneol, the leading cause of catfish off-flavor. Control options included chemical treatments with copper containing herbicides, algae-eating fish, and special label extension for diuron herbicides. An emergency label extension under Section 18 of the Federal Insecticide, Fungicide and Rodenticide Act was applied for and was granted by USEPA. The label extension directly affected catfish valued at \$472,000 and indirectly affected 13 ponds containing catfish valued at \$682,000. A system of alternating copper containing chemicals with diuron herbicide was recommended for the catfish producers using county meetings, newsletter articles, and news releases.

Key Words: Catfish, Off-flavor, Herbicides

910 Effectiveness of a volunteer association in conducting 4-H/youth extension activities. M.J. Wylie*, M.J. Miller, R.B. Housel, L.H. Pribek, and R.J. Antoniewicz, *University of Wisconsin, Madison, WI*.

A volunteer association can be highly effective in the planning and conduction of 4-H/youth extension activities. Yearly district and state events are critical to most extension youth programs yet the organizational details required can often overwhelm state specialists and county staff in this era of dwindling staff and increasing program needs. One way to effectively manage yearly events such as conferences and competitions is to empower volunteers. The Wisconsin 4-H Horse Association is the current organization that has evolved and expanded since its beginnings in 1965. Its purpose is "to plan, promote and execute educational programs in the area of horse science for Wisconsin youth and their leaders". It works in conjunction with county 4-H agents and state specialists and can serve as a model for other species and/or discipline volunteer associations. All currently enrolled 4-H Horse and Pony or Horseless Horse adult leaders are members and each of the six districts elects three directors. The association sponsors the following state events: clinics, hunt and dressage show, gymkhana, horse expo (educational events and show classes), and an annual leaders conference. A volunteer leader (all project areas) survey recently conducted in Wisconsin revealed the top reasons a person continues as a volunteer are: personal satisfaction, desire to serve community, friendships,

children still in program, and interest in specific project. A pre-survey of association directors revealed common reasons for volunteering were: enjoy working with youth and horses and a desire to contribute back to a program, which benefited them. Some of the challenges listed included trying to keep program costs minimal for leaders and youth, personal expense when attending association activities, and improving communi-

cation. Overall, directors consider the association to be highly effective in conducting 4-H/youth horse extension activities. These volunteers are examples of extremely dedicated individuals with a common interest - to offer youth quality educational programs.

Key Words: Volunteer association, 4-H/youth, Extension horse activities

ASAS/ADSA Forages and Pastures: Grazing

911 Evaluation of calf and forage production in rotational stocking systems for spring- and fall-calving beef cows. N. A. Janovick*¹ and J. R. Russell¹, ¹Iowa State University.

To evaluate two forage management systems, 24 spring-calving Angus-cross cows with calves were rotationally stocked in four 8.1-ha smooth brome-grass-orchardgrass-birdsfoot trefoil (SB-OG-BFT) pastures on April 22, 1999, and April 26, 2000. In a hay harvest (HH) system, spring-calving cows with calves grazed 2.03 ha for 58 d. Forage from the remaining 6.07 ha was harvested as first-cutting hay and incorporated into the rotational stocking system after 28 d. Over winter, cows were maintained in a drylot. In a first-last (FL) grazing system, six spring-calving cows with calves and 12 stocker cattle grazed paddocks in a rotational stocking system before six pregnant fall-calving Angus-cross cows for 55 d. In addition, forage from replicated 6.07 ha smooth brome-grass-red clover (SB-RC) and tall fescue-red clover pastures (TF-RC) was harvested as first-cutting hay and strip-grazed by spring-calving cows with calves and fall-calving cows for 50 d while stocker cattle grazed SB-OG-BFT pastures. Thereafter, stocker cattle were removed and spring- and fall-calving cows were again rotationally stocked in SB-OG-BFT pastures for 80 d. During winter, spring-calving cows grazed replicated 6.07 ha corn crop residues and stockpiled SB-OG pastures and fall-calving cows grazed stockpiled TF-RC pastures. Fall-calving and spring-calving cows were bred by natural service over 45 and 49 d in yr 1, respectively, and over 42 d in yr 2. No difference in average daily gains of spring calves and total growing animal production per hectare between systems was observed. Conception rates of spring-calving cows in the HH system were lower ($P < .01$) than spring-calving cows in the FL system in yr 1 and lower ($P < .01$) than fall-calving cows in the FL system in yr 2. Hay production per hectare did not differ between systems in yr 1, but was greater ($P < .05$) for the HH system than for the FL system in yr 2. Total perennial winter forage production per cow for the HH and FL systems were 1329, 4898 and 3272, 4681 kg DM in yr 1 and 2, respectively.

Key Words: beef cattle, rotational stocking, stockpiled forage

912 Liveweight and growth rate of cow-calf pairs grazing tall fescue pastures infected with either non-toxic (MaxQTM) or toxic endophyte strains. R.H. Watson*, M.A. McCann, J.A. Bondurant, J.H. Bouton, C.S. Hoveland, and F.N. Thompson, *The university of Georgia, Athens, GA.*

A trial was conducted to determine whether cow-calf pairs grazing tall fescue pastures infected with the non-toxic endophyte, MaxQTM, have better productivity than cow-calf pairs grazing tall fescue infected with the toxic, wild-type endophyte. Two 7.1 ha paddocks and two 7.3 ha paddocks were sown in tall fescue (*cv*: Georgia-5) infected with either the MaxQ or toxic endophyte. The 7.1 ha and 7.3 ha paddocks were stocked in early March with 15 and 16 cow-calf pairs respectively. The cow-calf groups were balanced for cow age, calving date, BW, and body condition-score (BCS). The pairs were grazed on their respective treatment pastures until the calves were weaned in late August. All cows and calves were weighed and blood sampled pre-treatment, and subsequently every 8 weeks, with a final weight recorded at calf weaning. Cows were visually assessed for BCS at these times. Blood samples were analyzed for prolactin as an indication of toxicosis. Serum prolactin levels were lower ($P < .01$) in cows and calves on toxic fescue (32 ng/ml, and 36 ng/ml respectively) than cows and calves on MaxQ fescue (94 ng/ml, and 101 ng/ml respectively). Cow BW and BCS were better ($P < .05$) at weaning in the MaxQ group compared with the toxic group (BW, 512 kg vs 486 kg respectively; BCS, 5.9 vs 5.3 respectively). Steer calves raised on MaxQ fescue had better ADG and weaning weights than all other groups of calves. Heifer calves raised on MaxQ fescue had better ADG and weaning weights than heifer calves raised on toxic fescue but were not different from steer calves raised on toxic fescue. The results indicate that grazing tall fescue infected with the MaxQ endophyte, as

opposed to toxic tall fescue, has the potential to eliminate toxicosis and greatly improve cow-calf productivity.

	Steer calves		Heifer calves	
	Toxic	MaxQ	Toxic	MaxQ
ADG (kg/d)	0.91 ^{a,b}	1.15 ^c	0.87 ^a	1.03 ^b
Weaning weight (kg)	226 ^{a,b}	260 ^c	207 ^a	230 ^b

^{a,b,c} Means on same row with different superscripts are different ($P < .05$)

Key Words: Cow-calf production, Toxic tall fescue, MaxQ

913 Non-toxic endophyte (MaxQTM) use for alleviating tall fescue toxicosis in stocker cattle. J.A. Bondurant*, M.A. McCann, J.H. Bouton, C.S. Hoveland, R.H. Watson, and J.G. Andrae, *The University of Georgia, Athens, GA.*

To address the problem of fescue toxicosis in grazing cattle, plant persistence-enhancing non-toxic endophytes from New Zealand have been incorporated into tall fescue cultivars grown in Georgia. The objectives of the present study were to determine animal performance and evaluate toxicosis in stocker steers and heifers grazing non-toxic endophyte-infected (MaxQTM), endophyte-free (EF), or toxic endophyte-infected (EI) tall fescue. Replicated (n=2) .809-ha tall fescue paddocks were established at the Central Georgia Branch Station near Eatonton, GA and at the Northwest Georgia Branch Station near Calhoun, GA with Jesup and Kentucky-31 tall fescue cultivars, respectively. Animals were stocked on the paddocks using put-and-take grazing management during four periods from Spring 1999-Fall 2000 that averaged 65 d each at Eatonton and 89 d each at Calhoun. Mean stocking rate at Eatonton was 7.1 hd/ha with no treatment differences ($P > .05$). At Calhoun stocking rate averaged 8.9 hd/ha and was higher ($P < .05$) on the toxic EI paddocks compared to the MaxQTM and EF paddocks. Forage available during grazing was approximately 3100 kg DM/ha at the central GA location and 1900 kg DM/ha at the northwest GA location. There were no differences ($P > .05$) seen among treatments for available forage with the exception that MaxQTM available forage levels were lower ($P < .05$) than toxic EI available forage levels during Fall 2000 at Calhoun. D-14+ serum prolactin was depressed ($P < .05$) on the toxic EI paddocks compared to the MaxQTM and EF paddocks during fall grazing at Eatonton and during both seasons at Calhoun. No differences ($P > .05$) were found in d-14+ rectal temperatures among the three treatments. ADG/hd and gain/ha were higher ($P < .05$) on the MaxQTM and EF paddocks than on the toxic EI paddocks in both trials. These results suggest that infecting tall fescue cultivars with non-toxic endophytes is a promising alternative for combating fescue toxicosis in stocker cattle.

Key Words: Tall fescue, Nontoxic endophytes, MaxQTM

914 Performance of beef cattle grazing endophyte-infected tall fescue or sod-seeded ryegrass. D.W. Sanson*¹ and D.F. Coombs², ¹Rosepine Research Station, ²Dean Lee Research Station, *LSU Ag. Center.*

Grazing endophyte-infected tall fescue was compared to grazing sod-seeded ryegrass in West Central Louisiana for two-years with mature beef cows. Seventy-six cows (551 kg) were randomized into four groups of 19 cows. Each group was assigned to 8.1 ha pastures that were subdivided into four 2 ha paddocks. Two pastures were previously established in endophyte-infected fescue along with bermudagrass and bahiagrass, while two bermudagrass/bahiagrass pastures were sod-seeded with ryegrass each fall. Cows were maintained on their assigned pastures throughout the year. Hay was available in the fall prior to calving when forage availability was not adequate for grazing. Cows, predominantly Angus, Simmental, and Hereford crosses, were exposed to Brangus bulls from late April to mid-June of each year. Conception rate was determined by rectal palpation in September. Calves were weaned in mid-October. The model for data analysis included treatment, year,