Mississippi State University

Animal and Dairy Sciences

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MISSISSIPPI STATE UNIVERSITY
College of Agriculture and Life Sciences

MISSISSIPPI STATE UNIVERSITY
EXTENSION SERVICE

MISSISSIPPI MAFES AGRICULTURAL & FORESTRY EXPERIMENT STATION

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Division of Agriculture, Forestry and Veterinary Medicine
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To Our Producers, Industry Leaders, Friends of the Department, and Others:

This year the faculty in the department of Animal and Dairy Sciences want to share some of their teaching, research, and Extension program summaries with you. This report is also available on the departmental web site at www.ads.msstate.edu. We hope you will visit our website to learn more about the Department of Animal and Dairy Sciences at Mississippi State University.

Our faculty are committed to serving the citizens of this state through teaching, research and extension programs. Research and extension centers are located strategically throughout the state. Animal research facilities at the Leveck Animal Research Center, Bearden Dairy Cattle Research Center, Prairie Research Unit, Brown Loam Research Station, and the White Sands Unit give faculty opportunities to investigate the challenges facing the livestock industry.

We have many new faculty members in the department who cover a wide array of disciplines and commodity interest. You are cordially invited to visit the ADS department anytime and, of course, we hope you will take advantage of the educational programs that are presented on campus and at our outlying units.

We are pleased to provide this report and hope that it will be useful to you. Please feel free to contact individual faculty members if you have questions or desire more information.

Sincerely,

Terry E. Kiser, Ph.D.
Professor and Head

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Mississippi State University does not discriminate on the basis of race, color, religion, national origin, sex, sexual orientation or group affiliation, age, disability, or veteran status.

MSU Block and Bridle Club

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Teaching Summary

Throughout August 2008 to April 2009, the Mississippi State University Block and Bridle Club actively worked on various activities, community service events, and social activities. The Block and Bridle Club met every first, third, and fifth Wednesday of the month in the Wise Center Auditorium. Twenty-five new members from various majors across campus completed the pledge requirements and joined the club. Currently, there are over 75 members in the Block and Bridle Club.

Introduction

The Block and Bridle Club is one of the various clubs run through the Department of Animal and Dairy Sciences. Block and Bridle is a national organization composed of students who are interested in agriculture and building friendships through livestock, social, and community service events. Throughout the U.S. there are 92 chapters of Block and Bridle located at both 2-yr and 4-yr institutions. At Mississippi State University, interested new members complete a series of requirements before they become full members of the club during initiation. Also, the club organizes and plans various activities throughout the yr.

Procedures

Joining Block and Bridle. In order for students to join Block and Bridle there are a series of steps that must be completed before the student is considered a full active member. Interested students learned about these requirements at the first meeting and welcome back fish fry. The first requirement to be a Block and Bridle member is students must pay $25 in club dues. Next, the pledges must halter break and prepare a calf to exhibit in the Little I showmanship show. Another requirement of pledges is they are auctioned off during the pledge sale for 10 h of labor. Finally, the last requirement for pledges to become members of the Block and Bridle Club is earning a 70 percent or higher on their pledge exam, composed of information about the national Block and Bridle organization. Pledges become full members during the initiation ceremony at the MSU Chapel of Memories.

Club Activities throughout the 2008 to 2009 Academic Yr. The first activity held by the Block and Bridle Club was the welcome back fish fry located on the Wise Center lawn. This event was designed to welcome back returning members and those interested in learning more about the club. Immediately after that first meeting pledges began working with a partner on halter breaking their calves under the guidence of club members . On October 18 the Little I show was held at the MSU Leveck Animal Research Center with both a novice and professional division. Next on the club's calandar was the pledge sale, where pledges were sold to the highest bidder for 10 h of labor. Funds generated from the sale were used to buy refreshments for meetings and supplies for other events throughout the yr. The next event the club completed was Halloween on the Farm. Halloween on the

Farm was a fundraiser for the club where members and pledges convert the beef barn at the Leveck Animal Research Center into a haunted house. Visitors take a spooky trailer ride from the MSU intramural soccer fields to the beef barn where they are escorted through a series of haunted rooms. Halloween on the Farm ran from October 30 through November 1 and was open to everyone in the Starkville community. During November and December, pledges and club members took a much needed rest, began planning for the spring semester, and celebrated the end of the semester with a Christmas party. When the spring semester began, the first club activity was the Dixie National Livestock Judging Contest. Club members and pledges traveled to Jackson to assist with showing cattle, serving as group leaders, and running cards during the judging contest. Next, it was time to initate the pledges as members into the club. Pledges completed their pledge exams and then went through the initation ceremony at the MSU Chapel of Memories. Club members then planned and organized their first campus bake sale to benefit Share Our Strength, a nonprofit organization that fights childhood hunger. With only a few wk of school left, members elected new officers for the 2009 to 2010 academic yr, organized the Block and Bridle/Animal and Dairy Sciences Award and Scholarship banquet, and hosted an end-of-the-yr crawfish boil.

Results

During the 2008 to 2009 academic yr, 25 new members completed all the requirements to become members in the Block and Bridle Club. The Little I showmanship show had 38 contestants, and in the novice division, Carla Williamson walked away with the grand champion ribbon. The professional division was won by Seth Sumrall. Halloween on the Farm was attended by approximately 550 adults and children and raised $1197.75 for the club during the 3-d event. The pledge sale sold 32 pledges and earned $492.00 for the club. The club's first bake sale for Share Our Strength netted $195.00. During the Block and Bridle/Animal and Dairy Sciences Award and Scholarship banquet awards were given to the following individuals: Courtney Law, outstanding pledge; Mack Brewer, outstanding member; Rob Watson, outstanding senior; Jeremy Duckworth, outstanding junior; and J. B. Farrell, outstanding sophomore. The election results for the 2009 to 2010 Block and Bridle officers were the following: President, Lee Hill; Vice President, J. B. Farrell; Secretary, Mandy Woods; Treasurer, Kirsten Futch; Pledge Marshalls, Courtney Law and Rob Watson; and Scrapbook Editor, Katie Jo Vanderslice.

Implications

The 2008 to 2009 academic yr was highly successfully for the Block and Bridle Club. Club members increased membership by initiating a strong pledge class of 25 individuals. Also, the club returned to the Dixie National Livestock Judging Contest after a yr of absence and assisted in improving the quality of the contest. Additionally, the club members tried out a new service activity, the Share Our Strength bake sale. Finally, at the Animal and Dairy Sciences scholarship banquet, the club was strongly represented as seven of the club members received scholarships.

Evaluation of Annual Breeding Proficiency Exam on Subsequent Ultrasound Body Composition Traits in Yearling Beef Bulls

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Research Abstract

The study objective was to examine the influence of a Breeding Soundness Exam (BSE) including electro ejaculation for semen collection on live animal body characteristics in the d following the BSE. Over a 2-yr study period, yearling bulls (Angus n=50, Hereford n=14 and Charolais n=21) completed a 120-d concentrate-based development test (utilizing either soybean hull-based or corn gluten feed-based diets) at which time body weight, hip height, scrotal circumference and real-time ultrasound body composition traits were collected for ribeye area, rib fat, intramuscular fat percentage (IMF) and rump fat. A blood sample was collected from each bull via tail vessel and serum harvested for evaluation of cortisol and testosterone concentrations by RIA. Bull temperament scores were assessed by 2 individuals during handling, and respiration rates recorded by visual observation during restraint in a handling chute. Bulls were randomly allotted to 1 of 2 treatment groups stratified by breed and previous diet for either performance of a BSE (treatment n=43; d 0) or no BSE (control, n=41). During the BSE, electro ejaculation equipment was set to a standard setting for all bulls. Bulls were returned to paddocks and diets after handling. Ultrasound for body composition traits, collection of blood for cortisol and testosterone concentrations, temperament scores and respiration rates were again collected from all bulls on d 1, 3 and 10 after initial yearling measurements and BSE. Breed of bull ($P = 0.001$) influenced body composition traits, body weights, ADG, scrotal circumference, and respiration rates. Day post-BSE influenced ($P = 0.001$) respiration rates and average temperament scores as well as cortisol and testosterone concentrations. However, a single breeding soundness evaluation, which included handling and electro ejaculation, did not have a negative effect on body composition traits in yearling beef bulls.

Introduction

Yearling performance measurements are routinely taken on registered beef bulls for assessment of production performance, genetic selection, and to provide information for use in cattle marketing. Individual breed associations require producers to submit certain performance data points in order to generate EPD for individual animals. Common yearling measurements include yearling weights, hip heights, scrotal circumference, and ultrasound body composition trait measurements. In addition, some breed associations record disposition scores and other information with yearling measurements. The Breeding Soundness Evaluation (BSE) routinely performed prior to bull marketing and often near yearling age involves a physical examination, scrotal circumference measurement, and a semen evaluation. Electro ejaculation with a mild

electrical stimulation administered rectally to the reproductive organs is a common method used in performing the semen collection of the BSE.

Ultrasound scanning for carcass traits is a useful tool for obtaining valuable carcass information from a live animal. Body composition traits that can be measured include 12th to 13th rib fat thickness, rump fat thickness, ribeye area, and intramuscular fat (IMF) percentage. Each of these traits is at least moderately heritable and is significant in the determination of red meat quality and yield for individual animals.

Many beef cattle producers also perform BSE on yearling bulls to identify and cull bulls that are not reproductively sound and in preparation for the breeding season and bull marketing (Spitzer and Hopkins, 1997). The impact of the stress of a BSE and handling on ultrasound body composition traits taken within a short time frame after electro ejaculation is unknown. Therefore, the objective of this research project was to examine the influence of a BSE with electro ejaculation for semen collection on live animal body composition characteristics in the days following the BSE. This information has tremendous practical application potential for beef cattle producers in terms of scheduling each of these routine production practices for optimal ultrasound scan results and associated marketability of bulls.

Procedures

Over a 2- yr period, yearling bulls (Angus n=50, Hereford n=14 and Charolais n=21) completed a 120-d concentrate based development test (utilizing either soybean hull-based or corn gluten feed-based diets; Table 1) at which time body weights, hip heights, scrotal circumference, and real-time ultrasound body composition traits were collected for ribeye area, 12^{th} to 13^{th} rib fat thickness, IMF, and rump fat. Bulls were randomly allotted to 1 of 2 groups stratified by breed and previous diet for either performance of a BSE (treatment, n=43) or no BSE (control, n=41). During the BSE, electro ejaculation equipment was set to a standard setting for all bulls as to standardize the amount and duration of pulses of the equipment.

Table 1. Diet comparisons for bulls assigned to treatment groups

Soybean Hull-Based Diet		Corn Gluten Feed-Based Diet	
Ingredient	Lbs/ton	Ingredient	Lbs/ton
Soybean Hulls	1485	Corn Gluten Feed	750
Corn	338	Corn	744
Soybean meal 49	152	Soybean Hulls	270
Limestone	4	Cottonseed Hulls	208
Dicalcium Phosphate	9	Limestone	4
Trace Mineral Salt	10	Trace Mineral Salt	10
Vitamin A, D, E	1	Vitamin A, D, E	1
Selenium 0.06	1	Selenium 0.06	1
As fed nutrient analysis: CP 12.6%, Crude Fiber 27.74%, TDN 71.14%, NEm/Mcal/lb 0.79, NEg/Mcal/lb 0.52, Ca 0.52%, P 0.32%. 7.62 lb feed per lb gain, $0.58 lbs/gain; 7.63 lb/gain		As fed nutrient analysis: CP 12.6%, Crude Fiber 13.58%, TDN 70.86%, NEm/Mcal/lb 0.78, NEg/Mcal/lb 0.52, Ca 0.51%, P 0.41%. 6.98 lb feed per lb gain, $0.52 lbs/gain; 6.97 lb/gain	

A blood sample was collected from each bull via tail vessel and serum harvested for evaluation of cortisol and testosterone concentrations determined by radioimmunoassay (RIA). Bull temperament scores were assessed by 2 trained individuals during handling and respiration rates recorded by visual observation during restraint in a handling chute. Chute temperament scores were based on a 1 to 5 scale with the following criteria: 1 = calm, no movement; 2 = restless, shifting; 3 = squirming, occasional shacking of the squeeze chute or scale; 4 = continuous vigorous movement and shaking of the device; and 5 = 4 plus rearing, twisting or violently struggling (Voisinet et al., 1997).

Bulls were returned to paddocks and diets after handling procedures and data collection. Ultrasound body composition traits, collection of blood for cortisol and testosterone concentrations, temperament scores and respiration rates were collected on all bulls on d 1, 3 and 10 after initial yearling measurements (d 0) and BSE. This project was a 2 (diet) x 2 (BSE treatment) factorial design with repeated measures. Data were analyzed by PROC Mixed procedure of SAS (SAS Institute, 2003) with main effects of diet, treatment, yr of study and breed of animal. Correlation coefficients with Fisher's r to z transformations were utilized to identify significant ($P < 0.05$) correlative trends among treatment groups.

Results

Treatment (BSE vs no BSE) did not affect ($P > 0.4$) cortisol or testosterone concentrations, body weight or ultrasound body composition traits during the d following electro ejaculation. Although differences ($P < 0.001$) in body weight, hip heights, body composition traits, ADG, and scrotal circumference did occur between the different breeds of bulls that is not the scope of this project, and the data will not be presented in this report. Each breed represented in this research project can provide producers with opportunities to

enhance their genetics and herds in different areas. Thus, this project was not designed to promote one breed over the other. The focus was to establish any influence of a performing a BSE with electro ejaculation on body composition traits. Additionally, the yr the study was performed did influence ($P < 0.001$) body weights, respiration rates, ADG, and scrotal circumference.

The diet the animals consumed did influence ($P < 0.01$) body weights and ADG. Bulls consuming the soybean hull-based diet were heavier (1163 ± 7.3 lbs) compared to bulls on the corn gluten feed-based diet (1118 ± 14 lbs). Bulls consuming the soybean hull-based diet had greater ($P < 0.001$) ADG (3.42 ± 0.05 lbs) compared to bulls consuming the corn gluten feed-based diet (2.66 ± 0.10 lbs).

Bulls in the control group had a greater ($P = 0.019$) respiration rate than bulls receiving a BSE (48.25 vs 46.41 breaths/min, respectively). In addition, respiration rates were also influenced by breed of bull ($P = 0.002$) and d of study ($P < 0.001$) that the respiration rate was taken. The greatest respiration occurred on d 1 of the study (52.44 breaths/min), followed by d 3 (48.99 breaths/min) and d 10 (45.19 breaths/min), and d 0 had the lowest respiration rates of the study (42.69 breaths/min). The average chute score was highest ($P = 0.002$) on d 0 and 1 (2.43 and 2.40 CS, respectively), then reaching the lowest chute score on d 3 (2.16 CS) and then almost back values seen on d 1 and on d 10 (2.33 CS; Figure 1). Bull body weights remained consistent throughout the study period ($P = 0.16$) and did not decrease throughout the study period (Figure 2). Ultrasound body composition traits for ribeye area, rib fat, rump fat and IMF were not negatively affected by handling of bulls over a 10 d period nor did performance of a BSE with electro ejaculation have an impact of these ultrasound measurements. Thus, producers wishing to schedule several yearling measurement events (i.e. BSE, ultrasound for body composition traits and body weights) within a 10 d window should not have any negative impact on the value of any of these measurements.

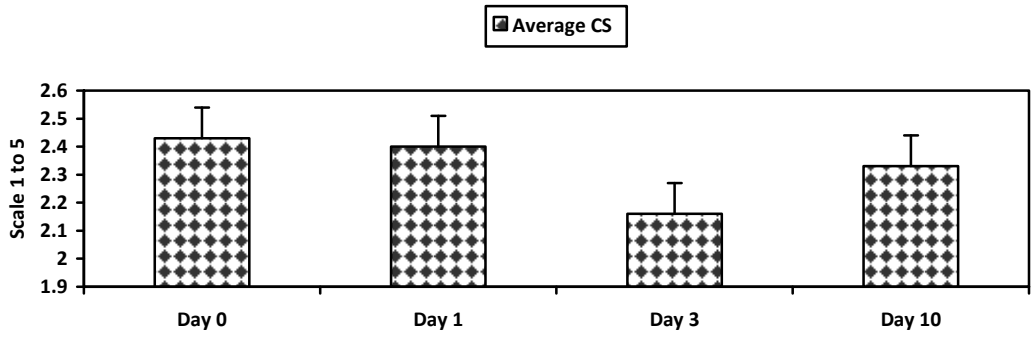

Figure 1. Average chute scores (CS) throughout the study for bulls on all treatment groups

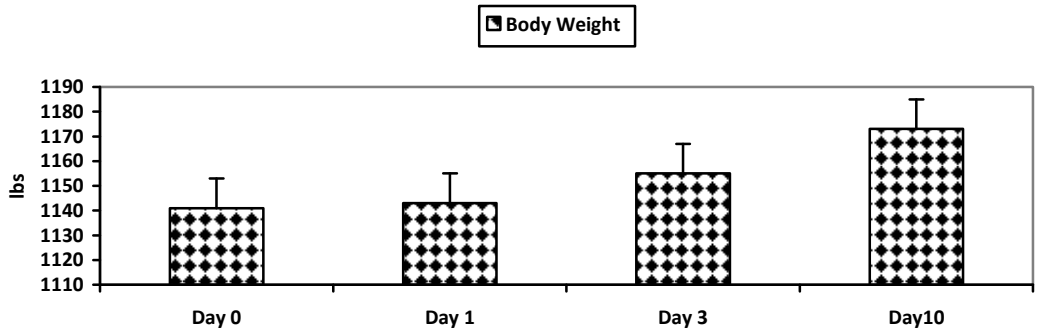

Figure 2. Bull body weights on sample days throughout study period

Implications

Ultrasound scanning technology is a useful tool for collecting body composition data on live animals. The resulting data are less expensive and time consuming to collect compared with actual harvest data from beef carcasses. This technology allows seedstock producers to collect body composition data on prospective breeding animals for use in genetic improvement efforts. In addition, BSE are a crucial part of bull selection for determination of reproductive soundness of the animal as well as serviceability and marketability of that animal in a breeding herd. Ultrasound measurements can be collected in a single cattle handling event with a BSE or within 10 d following a BSE without impacting these measurements.

Acknowledgments

The authors appreciate the cooperation of all Mississippi Agricultural and Forestry Experiment Station employees that assisted with the collection of this data as well as assistance from Mississippi State College of Veterinary Medicine for assistance with the breeding soundness evaluations.

Literature Cited

Spitzer, J. C. and F. M. Hopkins. 1997. Breeding soundness evaluations of yearling bulls. Veterinary Clinics of North America. Food Animal Practice 13:295-304.

Voisinet, B. D., T. Grandin, J. D. Tatum, S. F. O'Conner, and J. J. Struthers. 1997. Feedlot cattle with calm temperaments have higher average daily gains than cattle with excitable temperaments. J. Anim. Sci. 75:892-896.

Evaluation of Four Different Methods of Calf Birth Weight Data Collection

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Research Summary

Reporting accurate calf birth weight is important for accurate calculation of birth weight EPD and calving ease EPD and for assessing calving ease as it relates to birth weight. Calf birth weight information is used by cow-calf producers as an indicator trait for calving ease in animal selection and culling decisions to minimize the risk of dystocia in their herds. The objectives of this study were to: 1) evaluate the accuracy of the following birth weight collection methods: estimation via visual appraisal, estimation using hoof circumference tapes, and measurement with hand-held hanging spring scales in comparison with measurement using digital scales and 2) to determine if visual birth weight estimations change in accuracy with increasing operator experience as the calving season progresses. Within the first 24 h of life, birth weight estimates and measurements were collected on each calf (n = 587) born at the Mississippi Agricultural and Forestry Experiment Station Leveck Animal Research Center (Mississippi State, MS) and the Prairie Research Unit (Prairie, MS) during routine calf tagging and processing over a spring and autumn period at each location. Results indicate that birth weight records can vary due to the birth weight collection method used. When birth weight categories were examined, visual estimates and hoof tape measurements tended to underestimate heavy birth weights, whereas hoof tape measurements tended to overestimate light birth weights. Birth weight data collection via spring were most similar to measurements using digital scales.

Introduction

Reporting accurate calf birth weight is important for accurate calculation of birth weight EPD and calving ease EPD as part of national cattle evaluations and for assessing calving ease as it relates to birth weight. Calf birth weight information is used by cow-calf producers as an indicator trait for calving ease in animal selection and culling decisions to minimize the risk of dystocia. Naazie et al. (1989) reported calf birth weight as the most important variable influencing dystocia in heifers. Selection among or within breeds for reduced calving difficulty (or birth weight) should be effective and improve calf survival (Cundiff et al., 1986).

The influence of birth weight in cattle marketing is also apparent. Purebred bull sale results reveal that birth weight information greatly affects the prices beef producers are willing to pay for bulls. Monetary discounts escalate as either actual birth weight or birth weight EPD increase (Chvosta et al., 2001; Dhuyvetter et al., 1996, 2004). The importance of calf birth weights in both national cattle evaluations and cattle marketing programs necessitates accurate birth weight collection methods.

Several methods are available for collecting calf birth weights. To avoid handling calves, some producers simply visually estimate birth weight or weigh one or a few calves at the beginning of the calving season and estimate birth weights for calves born afterwards. Birth weights are also estimated using hoof circumference measuring tapes. Although these tapes are a convenient alternative to using scales, the tapes have been shown to overestimate light birth weights and underestimate heavy birth weights compared to hanging scales (LaShell et al., 2002). Hand-held hanging spring scales are used to measure birth weight by suspending the calf off of the ground in a sling or by a rope attached to the scale. Spring scales are typically read in 2-lb increments and must be manually held and read overhead. Calf movement or operator error in reading overhead may result in inaccurate measurements. The physical requirements for operating a spring scale may also preclude some cow-calf operators from utilizing this method. Digital scales are often used for collection of weaning and yearling weights but are not yet widely used to collect calf birth weights. Unlike hand-held spring scales, digital scales offer a higher degree of precision and do not require overhead lifting.

Currently little information exists regarding the accuracy of birth weights measured with digital scales in comparison to birth weight estimations (visual appraisal and hoof circumference tape use) or measurements using hanging spring scales. Evaluation of the accuracy of measuring calf birth weights with digital scales in comparison to using visual appraisal estimation, hoof circumference tape use, or hand-held spring scale use warrants investigation. Study objectives were to evaluate the accuracy of the following birth weight collection methods: estimation via visual appraisal, estimation using hoof circumference tapes, measurement with hand-held hanging spring scales, and measurement using digital scales and to determine if visual birth weight estimations change in accuracy as the calving season progresses with increasing operator experience.

Procedures

Cattle utilized for this study were managed under protocol 04-040 approved by the Mississippi State University Institutional Animal Care and Use Committee. Within the first 24 h of life, birth weight estimates and measurements were collected on each calf (n = 587) born at the Mississippi Agricultural and Forestry Experiment Station Leveck Animal Research Center (Mississippi State, MS) and Prairie Research Unit (Prairie, MS). Periods of data collection were January 7, 2004 to March 31, 2004 and September 7, 2007 to November 28, 2007 at the Leveck Animal Research Center and January 30, 2004 to February 22, 2004 and September 10, 2004 to November 8, 2004 at the Prairie Research Unit. January through March periods were classified as spring calving **(SPRING)**, and September through November periods were classified as autumn calving **(AUTUMN)**. Breed composition of calves evaluated at the Leveck Animal Research Center included Angus **(AN)**, Charolais, Hereford **(HP=Polled Hereford, HH=Horned Hereford)** purebred calves and crossbred calves representing predominantly AN and HP sire breeds, whereas breed composition of calves born at the Prairie Research Unit were crossbred calves out of the following sire breeds: AN, HP, HH, Brangus, Braford, and Gelbvieh. Calves were derived from embryo transfer, artificial insemination, and natural service breeding programs.

For each calf recorded, birth weights were first visually estimated **(VIS)** by 2 trained observers. Then birth weights were collected on each calf using a hoof circumference tape (Calfscale™ Birthweight Tape, Nasco, Fort Atkinson, WI; **TAPE)** where the tape was placed around the coronary band of the calf's anterior, right hoof. Hand-held hanging spring scales (Detecto® Hanging Dial Scale Model 11S200H, Cardinal Scale Manufacturing Co., Webb City, MO; **SPR)** were utilized next to measure calf birth weight by securing together the calf's 2 hindlimbs and one forelimb with a rope, attaching the spring scales to this rope with the scale's built-in hook, manually lifting the scales so that the attached calf became clear of the ground, and finally reading the weight indicated on the scale dial. Battery-powered digital scales (Pelouze® Straight Weigh Electronic Digital Receiving Scale Model # 4010, PELSTAR LLC, Bridgeview, IL; **DIG)** with 150-lb capacity and 0.2-lb resolution were employed in calf birth weight measurement by placing the digital scales under a plastic container large enough to hold a neonatal calf and then taring the scale indicator. Each restrained calf was individually placed in the container adjusted so that no part of it touched the ground or other solid surface. The digital scale reading was then recorded. Calving ease scores were assigned for each calf using the following scoring system: 1=no difficulty, no assistance; 2=minor difficulty, some assistance; 3=major difficulty, usually mechanical assistance; 4=Caesarian section or other surgery; and 5=abnormal presentation.

Statistical Analysis. The GLM Procedure in SAS (SAS Inst. Inc., Cary, NC) was used to estimate least squares means for the response variable birth weight with a model including the fixed effects of percentage of calf crop, calf gender, age of dam, calving season, calf breed, birth weight determination method, birth weight category, and interaction between birth weight category and method. Percentage of calf crop was designated as 1, 2, 3, and 4 indicating in what percentage (first 25%, second 25%, third 25%, and fourth 25%, respectively) of the calving season calves were born. Age of dam was categorized into 5 groups: 2, 3, 4, 5 to 10, and ≥ 11 yr. Standard deviation estimates were calculated from the DIG birth weight data and used to classify calves into the following 3 birth weight categories: light (< 71.56 lb, < -0.5 SD), moderate (71.56 to 84.57 lb, -0.5 to 0.5 SD), and heavy (> 84.57 lb, > 0.5 SD). Birth weight data were analyzed considering the DIG method as a standard and then making comparisons of the other 3 methods each versus the DIG method.

Results

Descriptive statistics for birth weight collection methods are reported in Table 1. Of the 587 calving ease scores assigned, only 10 were scores other than 1. No scores of 4 or 5 were assigned. This lack of variation in calving ease scores did not lend the data to analysis of potential differences in calving ease scores within birth weight data collection method.

Table 1. Descriptive statistics for calf birth weight collection methods

Birth weight data collection method[1]	Animals, n	Mean birth calf weight, lb	SD, lb	Variance, lb	Minimum, lb	Maximum, lb
VIS	587	79.61	12.17	67.31	35.03	120.11
TAPE	586	81.17	12.21	67.84	45.04	119.12
SPR	586	79.52	13.18	79.06	38.03	124.12
DIG	573	78.24	13.14	78.46	36.44	126.52

[1]Birth weight data collection method: VIS = visual estimation by 2 trained observers; TAPE = hoof circumference tape (Calfscale™ Birthweight Tape, Nasco, Fort Atkinson, WI); SPR = hand-held hanging spring scales (Detecto® Hanging Dial Scale Model 11S200H, Cardinal Scale Manufacturing Co., Webb City, MO); DIG = battery-powered digital scales (Pelouze® Straight Weigh Electronic Digital Receiving Scale Model # 4010, PELSTAR LLC, Bridgeview, IL).

No statistical differences were found among calf birth weight collection methods within calf gender or calving season (Table 2). However, bull calves were heavier ($P < 0.05$) than heifer calves, and calves born in the SPRING calving season were heavier ($P < 0.05$) than calves born during the AUTUMN calving season. There were no differences among calf birth weight collection methods among breeds.

Table 2. Calf birth weight (lb) least squares means and SE for calf gender and calving season by birth weight data collection method

	Calf gender		Calving season[2]	
Birth weight data collection method[1]	Male	Female	Spring	Autumn
VIS	$82.0^{a} \pm 0.71$	$77.6^{a} \pm 0.75$	$82.7^{a} \pm 0.73$	$76.9^{b} \pm 0.82$
TAPE	$85.1^{a} \pm 0.71$	$78.0^{a} \pm 0.75$	$84.2^{a} \pm 0.75$	$78.9^{b} \pm 0.82$
SPR	$81.4^{a} \pm 0.75$	$77.6^{a} \pm 0.79$	$82.0^{a} \pm 0.79$	$76.9^{b} \pm 0.86$
DIG	$80.2^{a} \pm 0.73$	$78.0^{a} \pm 0.77$	$81.4^{a} \pm 0.77$	$74.7^{b} \pm 0.84$

[a,b]Means with different superscripts differ ($P < 0.05$).
[1]Birth weight data collection method: VIS = visual estimation by 2 trained observers; TAPE = hoof circumference tape (Calfscale™ Birthweight Tape, Nasco, Fort Atkinson, WI); SPR = hand-held hanging spring scales (Detecto® Hanging Dial Scale Model 11S200H, Cardinal Scale Manufacturing Co., Webb City, MO); DIG = battery-powered digital scales (Pelouze® Straight Weigh Electronic Digital Receiving Scale Model # 4010, PELSTAR LLC, Bridgeview, IL).
[2] Periods of data collection were January 7, 2004 to March 31, 2004 and September 7, 2007 to November 28, 2007 at the Leveck Animal Research Center and January 30, 2004 to February 22, 2004 and September 10, 2004 to November 8, 2004 at the Prairie Research Unit. January through March periods were classified as spring calving, and September through November periods were classified as autumn calving.

No statistical differences were observed among calf birth weight collection methods within age of dam classification (Table 3). Calves born to dams within the age groups 4 yr and 5 to 10 yr were heavier ($P < 0.05$) at birth than calves born to dams within the age groups 3 yr and ≥ 11 yr. Calves born to 2 yr old dams were the lightest ($P < 0.05$) at birth of all of the age of dam groups.

Table 3. Calf birth weight (lb) least squares means and SE for age of dam by birth weight data collection method

	Age of dam, yr				
Birth weight data collection method[1]	2	3	4	5 to 10	11+
VIS	$72.8^{c} \pm 0.95$	$79.8^{b} \pm 1.21$	$83.3^{a} \pm 1.23$	$83.8^{a} \pm 0.75$	$79.1^{b} \pm 1.79$
TAPE	$75.6^{c} \pm 0.97$	$81.6^{b} \pm 1.23$	$85.3^{a} \pm 1.23$	$84.9^{a} \pm 0.77$	$80.5^{b} \pm 1.81$
SPR	$72.5^{c} \pm 1.01$	$79.6^{b} \pm 1.30$	$84.0^{a} \pm 1.30$	$83.6^{a} \pm 0.79$	$77.6^{b} \pm 1.92$
DIG	$70.8^{c} \pm 0.99$	$77.6^{b} \pm 1.26$	$82.5^{a} \pm 1.26$	$82.9^{a} \pm 0.77$	$76.9^{b} \pm 1.85$

[a,b,c]Means with different superscripts differ ($P < 0.05$).

[1]Birth weight data collection method: VIS = visual estimation by 2 trained observers; TAPE = hoof circumference tape (Calfscale™ Birthweight Tape, Nasco, Fort Atkinson, WI); SPR = hand-held hanging spring scales (Detecto® Hanging Dial Scale Model 11S200H, Cardinal Scale Manufacturing Co., Webb City, MO); DIG = battery-powered digital scales (Pelouze® Straight Weigh Electronic Digital Receiving Scale Model # 4010, PELSTAR LLC, Bridgeview, IL).

Birth weights taken by TAPE were higher ($P < 0.05$) overall when compared to weights collected via VIS, SPR, or DIG methods (Table 4). All birth weight data collection methods were positively correlated to the DIG method with TAPE measurements being the lowest at r=0.85 with a numerical difference in least squares means of 2.95 lb between the 2 methods, whereas SPR weights were the closest at r=0.95 with a numerical difference in least squares means of 1.28 lb between these 2 methods. The Pearson correlation between the VIS and DIG methods was intermediate to the previously mentioned correlations at 0.90 with a numerical difference in least squares means of 1.39 lb between the 2 methods.

Table 4. Calf birth weight (lb) least squares means, SE, and descriptive statistics for birth weight data collection methods

Birth weight data collection method[1]	Least squares means ± SE	Least squares means minus DIG least squares mean	Least squares means minus DIG least squares mean range
VIS	79.6 ± 0.51[b]	1.39	-16.01 to 18.01
TAPE	81.1 ± 0.51[a]	2.95	-26.21 to 26.21
SPR	79.6 ± 0.51[b]	1.28	-12.02 to 16.51
DIG	78.3 ± 0.53[b]	0	0

[a,b]Means with different superscripts differ ($P < 0.05$).
[1]Birth weight data collection method: VIS = visual estimation by 2 trained observers; TAPE = hoof circumference tape (Calfscale™ Birthweight Tape, Nasco, Fort Atkinson, WI); SPR = hand-held hanging spring scales (Detecto® Hanging Dial Scale Model 11S200H, Cardinal Scale Manufacturing Co., Webb City, MO); DIG = battery-powered digital scales (Pelouze® Straight Weigh Electronic Digital Receiving Scale Model # 4010, PELSTAR LLC, Bridgeview, IL).

There were no differences in least squares means among birth weight collection methods within birth weight categories (Table 5). The differences in birth weights collected via the DIG method from the VIS, TAPE, or SPR methods for the birth weight categories were compared to evaluate underestimation and overestimation of birth weights using the DIG method as a standard. For the light and moderate birth weight categories, the differences between VIS, TAPE, and SPR methods versus the DIG standard (3.5, 6.0, and 2.0 lb for the light category, respectively; 2.2, 3.5, and 1.5 lb for the moderate category, respectively) were all positive values indicating overestimation of birth weight for the VIS, TAPE, and SPR methods in relation to DIG standard. Additionally, the VIS and TAPE methods were greater ($P < 0.05$) than the differences for the SPR methods. The VIS and TAPE methods tended to overestimate the light birth categories more than the SPR method. For the heavy birth weight category, the differences between VIS, TAPE, and SPR methods versus the DIG standard (-1.5, -0.4, and -0.7 lb, respectively) were all negative values demonstrating that the VIS, TAPE, and SPR methods underestimated birth weights in comparison with the DIG method.

Table 5. Calf birth weight (lb) least squares means and SE for birth weight category by birth weight data collection method

Birth weight data collection method[2]	Birth weight category[1]		
	Light	Moderate	Heavy
VIS	66.1^{c} ± 0.57	80.7^{b} ± 0.49	91.1^{a} ± 0.57
TAPE	68.8^{c} ± 0.64	82.0^{b} ± 0.55	92.2^{a} ± 0.62
SPR	64.8^{c} ± 0.55	80.0^{b} ± 0.49	93.3^{a} ± 0.55
DIG	62.6^{c} ± 0.49	78.5^{b} ± 0.42	92.6^{a} ± 0.46
VIS minus DIG	3.5^{f} ± 0.4	2.2^{e} ± 0.4	-1.5^{d} ± 0.4
TAPE minus DIG	6.0^{f} ± 0.4	3.5^{e} ± 0.4	-0.4^{d} ± 0.4
SPR minus DIG	2.0^{e} ± 0.2	1.5^{e} ± 0.2	-0.7^{d} ± 0.2

[a,b,c]Means with different superscripts differ ($P < 0.05$).
[d,e,f]Means with different superscripts differ ($P < 0.05$).
[1] Birth weights were divided into 3 groups by using the standard deviation estimates from the DIG birth weight data: Light = > 71.56 lb (< -0.5 standard deviations); Moderate = 71.56 to 84.57 lb (-0.5 to 0.5 standard deviations); Heavy = > 84.57 lb (> 0.5 standard deviations).
[2]Birth weight data collection method: VIS = visual estimation by 2 trained observers; TAPE = hoof circumference tape (Calfscale™ Birthweight Tape, Nasco, Fort Atkinson, WI); SPR = hand-held hanging spring scales (Detecto® Hanging Dial Scale Model 11S200H, Cardinal Scale Manufacturing Co., Webb City, MO); DIG = battery-powered digital scales (Pelouze® Straight Weigh Electronic Digital Receiving Scale Model # 4010, PELSTAR LLC, Bridgeview, IL).

Within percentage of calf crop, no differences were found among birth weight collection methods within the first or second 25% of calves born during a calving season (Table 6). However, within the third and fourth 25% of calves born during a calving season, DIG measurements were greatest ($P < 0.05$) among the 4 collections methods. In the fourth 25% of calves born during a calving season, VIS estimates were lowest ($P < 0.05$) among the collection methods. Differences ($P < 0.05$) between VIS estimates and DIG weights decreased as the calving season progressed. This implies that visual estimations of calf birth weight become more accurate with increasing operator experience weighing calves throughout a calving season.

Table 6. Calf birth weight (lb) least squares means and SE for percentage of calf crop by birth weight data collection method

	Percentage of calf crop[1]			
Birth weight data collection method[2]	1	2	3	4
VIS	75.6^{c} ± 1.04	79.8^{b} ± 0.97	79.8^{b} ± 0.90	73.2^{c} ± 1.06
TAPE	78.0^{c} ± 1.04	82.5^{b} ± 0.97	81.1^{b} ± 0.93	77.8^{b} ± 1.01
SPR	73.9^{c} ± 1.08	80.7^{b} ± 1.04	79.6^{b} ± 0.97	78.5^{b} ± 0.95
DIG	73.2^{c} ± 1.06	77.8^{b} ± 1.01	84.0^{a} ± 1.01	83.1^{a} ± 0.97
VIS minus DIG	2.58^{d}	1.87^{de}	1.23^{ef}	0.09^{f}

^{a,b,c}Means with different superscripts differ ($P < 0.05$).
^{d,e,f}Means with different superscripts differ ($P < 0.05$).
[1]Percentage of calf crop was designated as 1, 2, 3, and 4 indicating in what percentage (first 25%, second 25%, third 25%, and fourth 25%, respectively) of the calving season calves were born.
[2]Birth weight data collection method: VIS = visual estimation by 2 trained observers; TAPE = hoof circumference tape (Calfscale™ Birthweight Tape, Nasco, Fort Atkinson, WI); SPR = hand-held hanging spring scales (Detecto® Hanging Dial Scale Model 11S200H, Cardinal Scale Manufacturing Co., Webb City, MO); DIG = battery-powered digital scales (Pelouze® Straight Weigh Electronic Digital Receiving Scale Model # 4010, PELSTAR LLC, Bridgeview, IL).

Additional time and care were needed in recording DIG measurements to ensure that the calf container was squarely placed on the digital scales and calf struggling ceased to impact scale reading. Improper technique could impact SPR measurements, particularly during calf struggling and when reading the scale dial overhead from an angle not square with the scale dial. Likewise, TAPE measurements were subject to technique problems if the location and snugness of the band around the calf's hoof were not appropriate and consistent. Operator error could affect birth weight measurements regardless of collection method.

Implications

Birth weight records can vary due to the birth weight collection method. Visual estimates and hoof tape measurements tended to underestimate heavy birth weights, whereas hoof tape measurements tended to overestimate light birth weights. Birth weight data collection via spring scales were most similar to digital scale measurements. Inaccurate calf birth weight data could be submitted to breed associations for calculations of birth weight and calving ease predictors if less accurate data collection methods are utilized and precautions are not taken to ensure proper collection technique. Cattle producers should consult with breed associations regarding allowed birth weight data collection methods for use of birth weight data in national cattle evaluations, select the most accurate collection method feasible, and use care in the technique for collecting birth weight data.

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Literature Cited

Chvosta, J., R. R. Rucker, and M. J. Watts. 2001. Transaction Costs and Cattle Marketing: The Information Content of Seller-Provided Presale Data at Bull Auctions. Amer. J. Agric. Econ. 83:286.

Cundiff, L. V., M. D. MacNeil, K. E. Gregory, and R. M. Koch. 1986. Between- and Within-Breed Genetic Analysis of Calving Traits and Survival to Weaning in Beef Cattle. J. Anim. Sci. 63:27.

Dhuyvetter, K. C., T. C. Schroeder, D. D. Simms, R. P. Bolze, and J. Geske. 1996. Determinants of Purebred Beef Bull Price Differentials. J. Agric. Resource Econ. 21:396.

Dhuyvetter, K. C., T. K. Turner, T. Marston, and R. Jones. October 2004. Factors Influencing the Selling Prices of Purebred Angus Bulls. MF2664. Kansas State Univ. Agric. Exper. Sta. Coop. Ext. Serv., Manhattan, KS.

LaShell, B. A., D. R. Selzer, B. Rowley, A. Ackley, and D. D. Zalesky. January 2002. The comparison of actual birth weights and hoof tape measurements. Fact Sheet 2002-C4. San Juan Basin Research Center, Hesperus, CO.

Naazie, A., M. M. Makarechian and R. T. Berg. 1989. Factors Influencing Calving Difficulty in Beef Heifers. J. Anim. Sci. 67:324.

Understanding the Stress Response of Cattle during Transportation

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Research Summary

To evaluate the stress associated with transportation; 22 heifers (718 ± 103 lb) were randomly assigned to control or transport group. On d 0, 12 h prior to transportation, heifers were weighed, fitted with indwelling rectal temperature (RT) probe, and jugular catheters. On d 1, heifers were haltered and tied for 2 h prior to transportation. After the 2 h period heifers were weighed, controls returned to tie stall and transported heifers loaded on the trailer for transport. Blood samples were obtained throughout the 4 h transport period (control and transported heifers) at 30-min intervals. After transport, transported heifers were taken to an unfamiliar location unloaded and weighed; blood samples were obtained for 2 h post-transport. Heifers were allowed a rest period for 14 h. After the rest period on d 2, heifers were subjected to a second transport period. Serum was analyzed for cortisol. The first transport resulted in a 6% loss in BW for the transported heifers as compared to a 2.5% loss for the control heifers ($P < 0.001$). Overall BW loss was 2% greater ($P > 0.02$; transport 1 and transport 2 combine) for transported heifers compared to control heifers. During transport 1 transported heifers had elevated RT compared to control heifers. Prior to- and post-transport (both transport 1 and transport 2) cortisol did not differ between the treatment groups. Differences ($P < 0.05$) in cortisol were observed starting 1 h into the first transport and 30 min into the second transport. After three h in transit, no difference ($P \geq 0.05$) was observed in cortisol for both the first and second transport. Results of this study indicate that transportation can cause a stress response, as seen with increased cortisol concentrations, increased RT and increased BW losses. After 3 h, it appears that heifers are able to acclimate to stress induced by transportation.

Introduction

The management of cattle through typical marketing and production settings results in various stressors. Most stressful stimuli induced two types of responses, a general stress response or an individual response (Pacak and Palkovits, 2001). A general stress response, common to all stressors, involves the release of adrenal corticotrophic hormone (ACTH) followed by adrenal secretion of cortisol. An individual stress response is mediated by conditioning factors, such as genetic and predisposition factors. Stress has been shown to suppress appetite, reduce growth rate, alter digestive function, and compromise immune function (Loerch and Fluharty, 1999).

One stressor most, if not all, cattle encounter in a typical management system is transportation stress. Transportation stress has been shown to elicit physiological responses such as elevated rectal temperature during the transport period; however cortisol did not differ between pre-

and post-transport samples in this study (Burdick et al., 2008). Other researchers have reported an increase in circulating glucocorticoid after transport (Crookshank et al., 1979; Locatelliu et al., 1987). Transportation stress is an ever present concern due to the fact at some point during the production system or during the life of livestock, animals are transported. Changes in physiological function have been reported pre-and post-transport; however, there is no data reporting the physiological change observed during the transport period.

The objectives of this study were to elucidate the endocrine stress response of cattle during transportation and after feed and water withdrawal to simulate normal industry practices associated with cattle being held at sale barns or sorting facilities prior to transport.

Materials and Methods

All animal-use procedures were reviewed and approved by the Institutional Animal Care and Use Committee at Mississippi State University (Animal Use and Protocol #08-041).

Twenty-two heifers (718 ± 103 lb) were housed on pasture and for a period of 10 wk were handled to break heifers to human contact and restraint in tie stalls. Seven days prior to initiation of transport stress, heifers were weighed and randomly assigned to their respective treatments (control and transport stress). On d 0, heifers were weighed, fitted with heart rate monitors, rectal temperature probes and indwelling jugular catheter for serial blood collection. Rectal temperature was recorded at 1 min intervals for each heifer using an automatic rectal temperature monitoring device (Reuter, 2007) for the duration of the project.

Transportation 1. On d 1, heifers were weighed, haltered and moved into tie stalls. Blood samples were obtained from heifers at 30-min intervals for 2 h prior to transport (baseline). At the conclusion of the 2-h pre-transport period, transport heifers were loaded onto a modified stock trailer with 12 individual 24”-X-5’ stanchions. Once all heifers were loaded a blood sample was obtained simultaneously on transport and control heifers. After collection of this first sample, transportation was initiated and continued for a period of 4 h. For the collection of samples, three trained individuals were stationed on the trailer with the heifers, and had access to jugular catheters during transit. The serial sampling period commenced with the first sample taken prior to the trailer moving for both groups (time 0). During the serial sampling period, blood samples were collected at 15-min intervals for the first h, followed by 30-min intervals for the remaining 3 h. Upon completion of the transit period, transported heifers were returned to an unfamiliar working facility. Heifers were unloaded from the trailer and placed in tie stalls. After a 2-h post transport blood collection, heifers (control and transported) were untied, weighed and returned to a dry lot with water access.

Transportation 2. Control and transport heifers were allowed access to water for a total of four h after collection of the last blood sample (Phase 1); after which water was removed and heifers were subjected to 12-h water withdraw. On d 2, heifers in the control group were weighed, haltered and moved to their tie stalls. Simultaneously, transported heifers were weighed, haltered and moved to the tie stalls in unfamiliar. The first blood samples were obtained from all heifers at 30-min intervals for 2 h prior to the transport phase (baseline). After the 2-h pre-transport time

period, transported heifers were loaded on the trailer. Once the last heifer was loaded on the trailer, blood samples were simultaneously collected on the transport and control heifers before the second transportation portion of the study was initiated. The second transportation portion of the study was conducted following the exact same procedures reported in Phase 1. The first blood sample was collected (control and transport heifers) upon the moving of trailer, thus initiating the second transport phase. The collection of samples followed the procedures reported in Phase 1. At the conclusion of the second 4-h transit period the transported heifers were return to the unfamiliar working facility. Transported heifers were unloaded placed in tie stalls. Once transported heifers were unloaded the 2-h post-bleeding period began and simultaneously the control heifers began their 2-h post-transport bleeding period. Upon completion of the 2-h post-transport bleed all heifers were untied, weighed and returned their paddocks.

Serum cortisol concentration was determined by radioimmunoassay (Coat-A-Count; DPC, Los Angeles, CA) per the manufacture's protocol in a single assay with a detection limit of 2-ng/mL and less than 5% intra-assay coefficient of variation.

Statistical Analysis. The data consisted of repeated measurements of heifers over time to evaluate changes in cytokines and cortisol, as well as rectal temperature over time. The response to the transportation over time was analyzed by ANOVA with the MIXED procedure of SAS (Version 9.1, SAS Inst. Inc., Cary, NC). The model included sampling time and treatment as a fixed effect, and a BY statement was used to partition each d. Rectal temperature was recorded at 1-min intervals, but subsequently averaged over 30-min intervals t facilitate comparisons to other measures of the innate immune response. When *F*-test were significant ($P < 0.05$) means were separated using LSD.

Results

During the first transport, transported heifers had a 6% loss in BW as compared the 2.5% loss for control heifers ($P < 0.001$; Figure 1). There was no difference in percent of BW loss between transported and control heifers during the second transport ($P > 0.05$). When total weight loss was compared, BW loss was 2% greater ($P < 0.02$) for transported heifers as compared to control heifers.

Prior to the first transport there were no differences in rectal temperature (RT) between transported and control heifers ($P > 0.05$; Figure 2). There was a difference in rectal temperature between transported and control heifers during the first transportation ($P < 0.05$; Figure 2). Ninety min after the onset of transportation 1, transported heifers reached maximal RT (103.8^{o}F), but returned to baseline (101.8^{o}F) at 120-min time interval (Figure 2). No other differences were observed in RT during the transportation 1 ($P > 0.05$). There were also no differences in RT post-transport between transported and control heifers ($P > 0.05$; Figure 2).

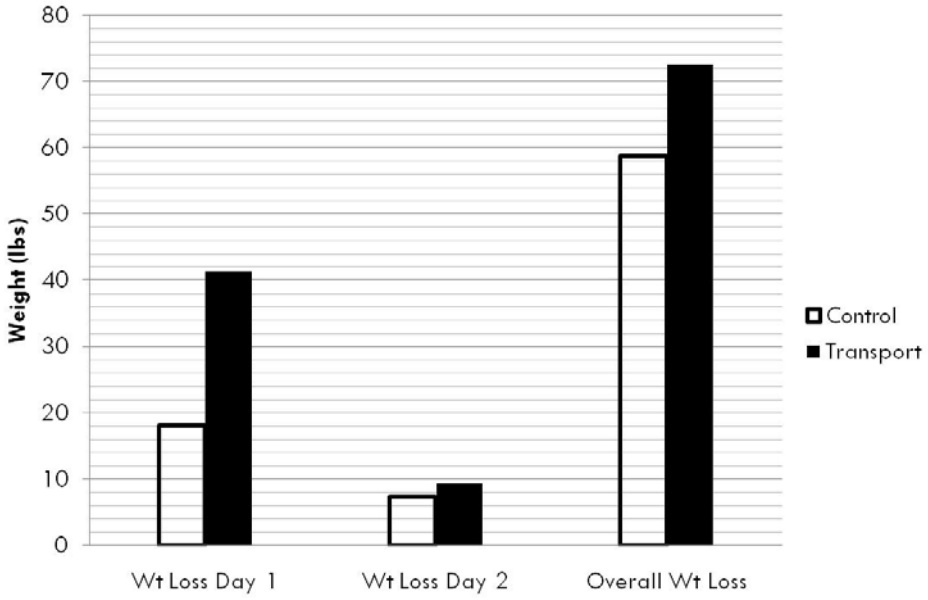

Figure 1. Weight loss during the trial for all heifers

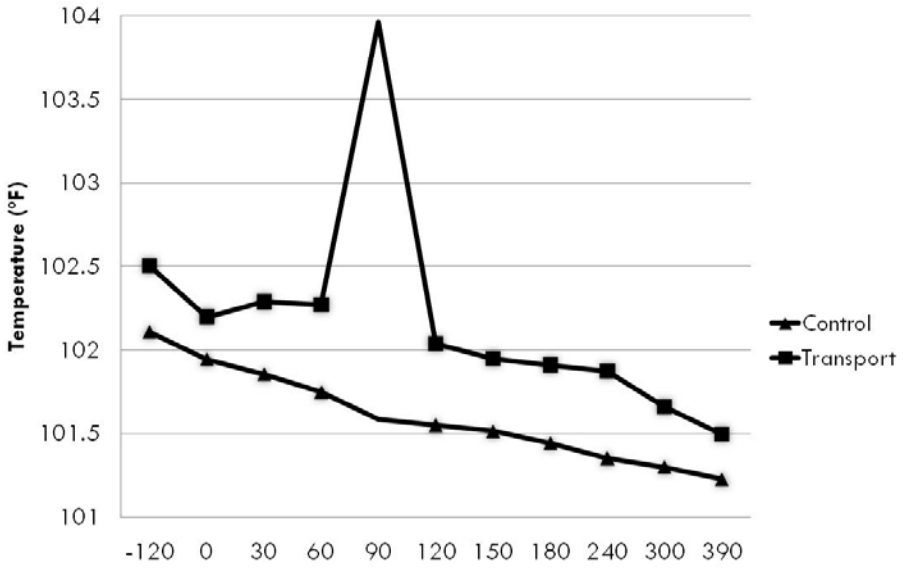

Figure 2. Rectal temperature over time on Day 1 for all heifers

During transportation 2, there were no differences ($P > 0.05$) in rectal temperature prior to transport, during transport and post-transport (Figure 3) for both heifer groups. Rectal temperature gradually declined from initial temperature observed at -120 min pre-transport to 390 min post-transport (Figure 3).

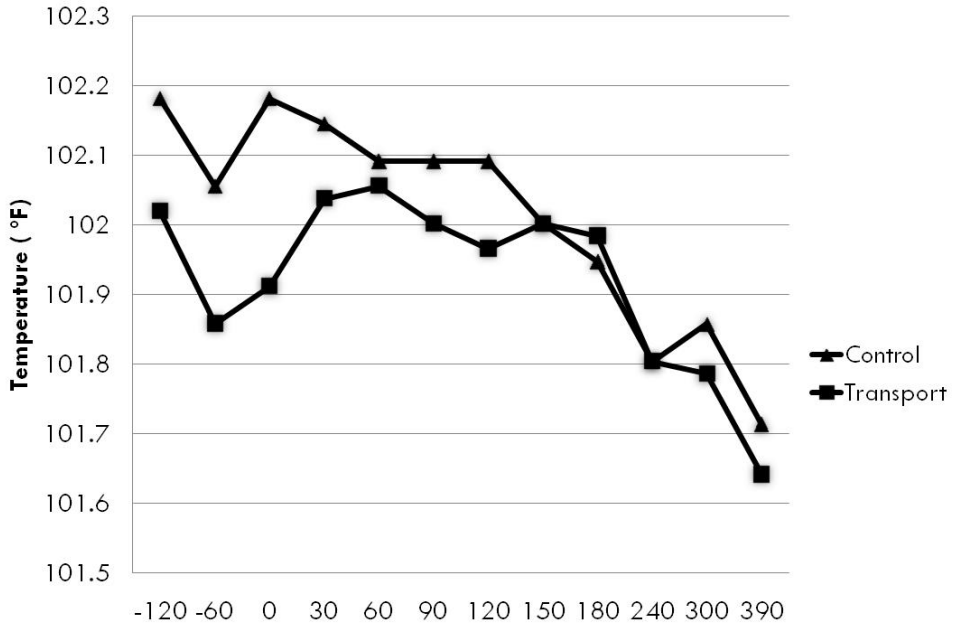

Figure 3. Rectal temperature over time on Day 2 for all heifers

During transportation 1, there were no differences ($P > 0.05$) in pre-transport cortisol concentrations between the heifer groups (Figure 4). During the first 30 min of transport, transported and control heifers did not differ ($P > 0.05$) in cortisol concentration. Sixty-min after onset of transportation, cortisol concentrations were elevated ($P < 0.05$) and remained elevated compared to control heifers for the duration of the transportation 1; excluding the 150-min time interval when no difference was observed between the groups ($P > 0.05$; Figure 4). There were no difference ($P > 0.05$) observed in post-transport cortisol concentrations between transported and control heifers (Figure 4).

During transportation 2, there were no differences ($P > 0.05$) in pre-transport cortisol concentrations between transported and control heifers (Figure 5). At the onset of transportation 2, (0 min) there were no differences ($P > 0.05$) between the groups. Thirty-min from the onset of transportation, transported heifers had elevated ($P < 0.05$) cortisol concentrations for the duration of transportation 2; excluding the 180 and 240-min time intervals when no difference was observed between the groups ($P > 0.05$; Figure 5). There were no difference ($P > 0.05$) observed in post-transport cortisol concentrations between transported and control heifers (Figure 5).

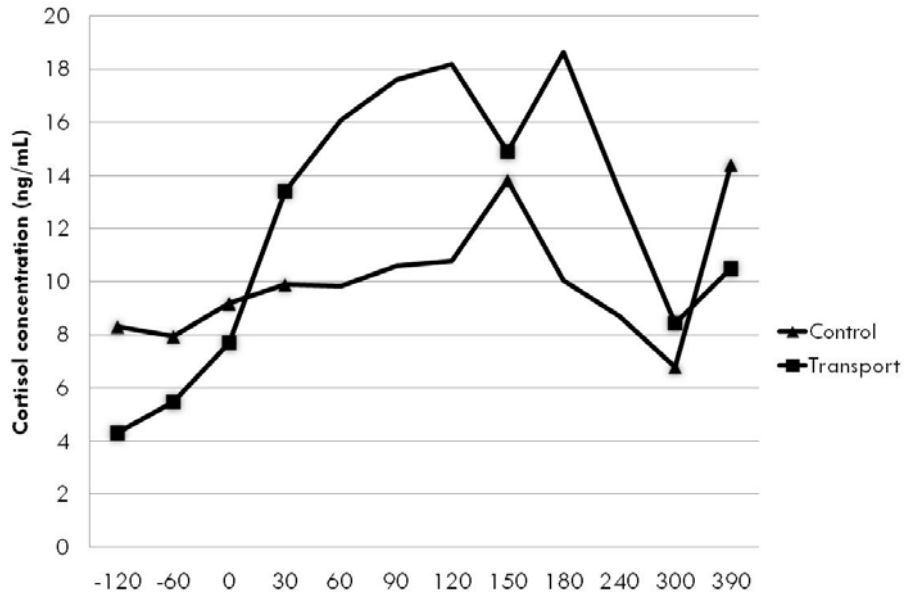

Figure 4. Cortisol concentration over time on Day 1 for all heifers

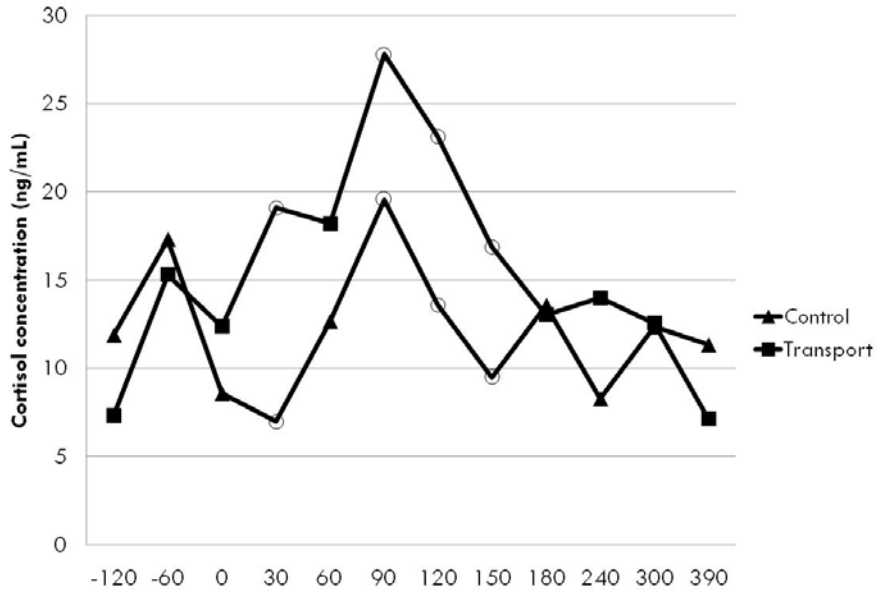

Figure 5. Cortisol concentration over time on Day 2 for all heifers

This study investigated whether rectal temperature and the secretion of cortisol would change in response to transportation. In this study heifers were subjected to 4 h of transportation. Transportation did not induce an increase in RT between the transported and control heifers; there was an alteration in cortisol secretion between transported heifers and controls heifers during the physical transportation of the study. No differences for cortisol were observed between the

groups for pre-and post-transport samples, which is in agreement with research from Burdick et al. (2008).

Rectal temperature during transportation-1 indicated an increase in the transported heifers 90 min after the onset of transportation, and then gradually decreased in both groups throughout the remainder of transportation. This trend then continues through to post-transport. Similarly, RT during transportation-2 gradually decreased overtime. This decrease began prior to transport and continued through to the post-transport phase. This change in RT as indicated by a decrease initiating during the pre-transport phase may indicated that this is the result of handling stress and not related to transportation. Data during transportation-1 are comparable to data reported by Burdick et al. (2008) in which Brahman bulls transported for a period of 8 h displayed a peak in RT 30-min after the onset of transportation followed by a decrease in RT for the remainder of the transportation. The decrease in rectal temperature over time is similar to data in the current study for both transportation 1 and 2. Whereas there was not an initial increase in RT during transportation-2, this could be associated with handling on d 1. Conversely, Burdick et al., (2009) observed an increase in RT overtime beginning during the pre-transport phase continuing through the post-transport phase. Other research using a digital thermometer did not detect differences before or after a 9-h transport of bulls (Buckham Sporer et al., 2008). However, RT was not measured during transportation and the current study as well as the studies conducted by Burdick et al., (2008 and 2009) measured RT throughout transportation. Therefore, it is unknown if any changes during transport were observed.

Cortisol. Concentrations of cortisol were greater in the transported heifers relative to the control heifers during transportation, there were no differences between pre-and post-transportation concentrations of cortisol between the groups. To our knowledge there have been no other studies conducted evaluating the stress response associated with transportation during the transportation period. Other studies have evaluated pre-and post-transportation cortisol concentrations in cattle and have determined that there were no differences in cortisol concentration (Blecha et al., 1984; Burdick et al., 2008). Conversely, other research has suggested that pre-transport samples differ from samples taken at different time points during transportation (Buckham Sporer et al., 2008; Crookshank et al., 1979; Odore et al., 2004). Data from the current study would suggest that transportation does cause activation of the stress axis and transported animals have greater concentrations of cortisol initially during transport. Cortisol does return to baseline concentrations within 3 to 4 h during transport and therefore samples obtained pre-and post-transport would appear that there is no change in cortisol. Furthermore, initial response during the onset of transportation maybe coupled with the handling and loading of the cattle on the trailer. Although control heifers were handled at the same time as transported heifers were loaded on the trailer; transported heifers exhibited greater cortisol concentrations.

Implications

In conclusion, RT and cortisol do increase during the initial transportation process. While there are differences during the 4 h of transport, there still does not appear to be differences in samples taken pre-and post-transport. Therefore this data

does not completely explain the stressor associated with transportation and more research needs to be conducted to understand the relationship handling has on the initial increase in physiological parameters during transportation. Nonetheless, handling is an aspect of the transportation process and therefore the current study would suggest that transportation does cause a stress response, but physiological parameters return to baseline within 4 hours after the onset of transportation.

Literature Cited

Blecha, F., Boyles, S.L., Riley, J.G., 1984. Shipping suppresses lymphocyte blastogenic responses in Angus and Brahman X Angus feeder calves. J. Anim. Sci. 59, 576-83.

Buckham Sporer, K.R., Weber, P.S., Burton, J.L., Earley, B., Crowe, M.A., 2008. Transportation of young beef bulls alters circulating physiological parameters that may be effective biomarkers of stress. J. Anim. Sci. 86, 1325-34.

Burdick, N. C., J. A. Carroll, R. Randel, R. Vann, S. Willard, L. Caldwell, J. W. Dailey, L. E. Hulbert, T. H. Welsh, Jr. 2008. The influence of bovine temperament on rectal temperature and stress hormones in response to transportation. J. Anim. Sci. 86(E. Suppl. 2):349. (Abstr. #374)

Burdick, N. C., J. A. Carroll, R. D. Randel, S. T. Willard, R. C. Vann, C. C. Chase, Jr, D. A. Neuendorff, A. W. Lewis, J. W. Dailey, L. E. Hulbert, L. C. Caldwell, J. G. Lyons, and T. H. Welsh, Jr. 2009. Use of an automated sampler to assess bovine adrenal hormone response to transportation. J. Anim. Sci. 87(E. Suppl. 2). (Abstr. #388)

Crookshank, H. R., M. H. Elissalde, R. G. White, D. C. Clanton, and H. E. Smalley. 1979. Effect of transportation and handling of calves upon blood serum composition. J. Anim. Sci. 48:430.

Locatelli, A., F. Agnes, and P. Sartorelli. 1987. Effects of road and simulated transportation for 30 min. on blood values in calves. Arch. Vet. Ital. 38:81.

Loerch, S. C., and F. L. Fluharty. 1999. Physiological changes and digestive capabilities of newly received feedlot cattle. J. Anim. Sci. 77:1113-1119.

Odore, R., D'Angelo, A.D., Badino, P., Bellino, C., Pagliasso, S., Re, G., 2004. Road transportation affects blood hormone levels and lymphocyte glucocorticoid and β-adrenergic receptor concentrations in calves. Vet. J. 168, 297-303.

Pacak, K. and M. Palkovits. 2001. Stressor specificity of central neuroendocrine responses: implications for stress-related disorders. Endocrine Reviews. 22:502-548.

Reuter, R. R., J. A. Carroll, J. W. Dailey, C. C. Chase, Jr., S. W. Coleman, D. G. Riley, D. E. Spiers, R. L. Weaber, and M. L. Galyean. 2007. Development of an automatic, indwelling rectal temperature probe for cattle research. J. Anim. Sci. 85(Suppl. 2):12. (Abstr.)

Dixie National Junior Round-Up

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Extension Summary

In late January into early February, 4-H youth brought their livestock projects to Jackson for the Dixie National Junior Round-Up Livestock Shows. This show is the showcase for Mississippi 4-H Livestock Programs and site of the largest junior market livestock show in Mississippi. Those animals that received a blue ribbon at their District Livestock Show qualified for the Dixie National Junior Round-Up. Despite difficult economic times, 2,073 animals were exhibited, the most since 2000. These data further support the strength of Mississippians and the dedication and interest that still existed in showing livestock when economic times were challenging for many.

Introduction

The Dixie National Junior Round-Up is the largest junior livestock show held in Mississippi. Youth and their families begin preparing for this show many months in advance. Much thought and decision goes into selecting the animal for show, and then the process starts to provide the animal with proper nutrition, care, and training of the animal in preparation for show. Through this process, youth learn about aspects of nutrition, reproduction, genetics, selection, and exhibition with their livestock. This enables youth to be competitive in education contests held in conjunction with the Dixie National Junior Round-Up, where scholarships can be won to help with their educations when they reach college. Therefore, the objective of the Dixie National Junior Round-Up livestock shows is to offer youth with the opportunity to showcase the progress they have made with their livestock project in the show ring while providing them with opportunities to obtain monies through education contests to aid them as they pursue postsecondary instruction.

Procedures

Qualification for Dixie National Junior Round-Up. In order to show livestock at the Dixie National Junior Round-Up, youth compete with their animals at 1 of 5 district shows, depending on their county of residence. At these shows, all animals that received a blue ribbon qualified for the Junior Round-Up. In the market shows at the district competition, youth were allowed to show up to 6 market hogs, 6 market goats, 6 market lambs, and 3 market steers. From these animals that qualified, youth were allowed to weigh-in and show 2 market animals in those species at the Dixie National Junior Round-Up. For breeding animals, youth were allowed to enter and show up to 6 beef cattle, 6 dairy cattle, 6 dairy goats, and 6 commercial meat goat does at the Dixie National Junior Round-Up. For the education contests, youth enter competition by submitting applications that were scored prior to on-site competition. In addition, their performance in the remaining aspects of the contests held during the livestock shows contribute to overall rankings.

Results

One thousand, five-hundred twenty-one 4-H and FFA youth exhibited 2,073 animals at the 2009 Dixie National Junior Round-Up, an increase of 2.5% in number of animals shown from 2008. This was the most animals shown at this event since 2000, when 2,128 animals were exhibited. The following is a breakdown of the number of entries in 2009 along with the change in number of animals shown from 2009 to 2008 shows in parenthesis: 743 beef cattle (-8); 192 dairy cattle (-3); 557 market hogs (+5); 206 market lambs (+3); 161 market goats (-53); 95 commercial meat goat does (first year to be shown); and 119 dairy goats (+11). The decline in market goats exhibited was due to the addition of the commercial meat goat doe show, which took away some goats that would have been shown in the market goat show. The goat program has gained in popularity since its inception in 2001, when 67 goats were shown, with growth totaling over 380% since then. The dairy goat program has also grown by over 30% from the initial dairy goat show held in 2006.

The education contests also saw an increase in participation at the 2009 Dixie National Junior Round-Up. At the Premier Exhibitor contests, there were 41 participants in the beef division, 13 in the dairy division, 11 in the lamb division, 25 in the swine division and 20 in the goat division, totaling 110 youth who participated in these contests. This reflects a 20.8% increase from 2008, when 91 youth competed in these contests. In the Academic Scholarship Program, awarded by the Sale of Junior Champions, 53 applications were received, an increase in 32.5% from 2008 when 40 youth entered this contest. From the 53 applicants, 25 scholarships were awarded. In addition, the Dixie National Booster Club awarded 6 $1,000 scholarships to the highest placing graduating senior for each species in showmanship.

Implications

The Dixie National Junior Round-Up was a successful event on a number of levels. Many of the species held constant the number of animals shown compared with previous years, and with the growth and interest in the goat program, the overall number of animals exhibited at the Junior Round-Up increased from 2008. The valuable information that youth learn about their livestock project enables them to be competitive in the education contests and scholarship program, and the growing number of participants is encouraging. These data show that Mississippi youth are resilient, hard-working individuals who are enjoy the challenges associated with showing livestock and competing for scholarship monies.

Dixie National Sale of Junior Champions

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Extension Summary

The Dixie National Junior Round-Up Livestock Show is the site of the largest junior market livestock show in Mississippi. Each year, the champions and reserve champions in the junior market shows are selected to participate in the Sale of Junior Champions. Of the 1,488 market animals exhibited at 1 of 5 District Livestock Shows, 41 market animals qualified for the 40th Sale of Champions auction in 2009. These animals sold for $233,380, with 80% of the money going to the exhibitor and 20% into a scholarship fund and to pay expenses of the sale. In addition, 33 youth were recognized for their academic accomplishments and successes with breeding animals, and $41,000 was awarded to these individuals. Even though this was a difficult year from a financial standpoint for many buyers and contributors, the hard work of the promotion committee paid off with the monies raised for Mississippi youth.

Introduction

The Dixie National Junior Round-Up is the largest junior livestock show held in Mississippi. This show culminates each year with the Sale of Junior Champions, where the champion and reserve champion exhibitors in the market shows earn the privilege to sell their animal in a live auction. Youth and their families begin preparing for this show many months in advance in hopes of qualifying an animal for the sale. Much thought and decision goes into selecting the animal for show, and then the process starts to provide the animal with proper nutrition, care, and training of the animal in preparation for show.

Membership on the Sale of Champions Promotion Committee includes adults, businesspeople, and the Extension 4-H Livestock Specialist who are interested in promoting the junior livestock program in Mississippi. These members work diligently to bring potential buyers and contributors to the sale each year to invest in the future of Mississippi youth. The committee seeks to 1) promote the 4-H and FFA livestock program in Mississippi; 2) promote economic, educational and personal development opportunities for youth; and 3) to motivate and increase interest in the junior livestock program. Not only are youth recognized for qualifying their animal for the sale, but other youth exhibitors are rewarded for their achievements in education contests and with their breeding animals.

Procedures

The Sale of Junior Champions Promotion Committee met several times in the latter part of 2008 to discuss potential buyer and contributor lists. Each committee member was challenged with contacting these businesses and individuals to encourage them to participate in the upcoming sale. The number of animals qualifying for the sale varies each year, with approximately 40 animals being sold annually. Youth receive 80% of the sale of the animal, while 15% of the money goes into the scholarship fund and 5% covers the expense of the sale. Money in the

scholarship fund was used to recognize youth winning education contests (Premier Exhibitor contests), being a graduating senior without qualifying an animal for the sale (Academic Scholarships), and for exhibiting animals that won supreme awards (Supreme Animal Scholarships).

Results

One thousand, four-hundred eighty-eight market animals were exhibited at one of five District Livestock Shows in an attempt to qualify for the Dixie National Junior Round-Up. Of these market animals, 1,014 animals were exhibited at the Junior Round-Up from which 41 market animals qualified for the Sale of Junior Champions. The sale included 8 market steers, 12 market hogs, 12 market lambs and 9 market goats. These 41 animals sold for $233,380, making it the 15th consecutive year the sale grossed over $100,000. To date, the 40 combined sales have grossed $3.97 million dollars.

While the exhibitor is allowed to keep 80% of the money from the proceeds of the animal, 15% of that money is used in the scholarship program. Twenty-five Academic Scholarships (each worth $1,200) were awarded to graduating seniors who did not have an animal that qualified for the sale (totaled $30,000). Fifty three applications were received, an increase of 32.5% from 2008. In addition, the Premier Exhibitor contest recognized the winner of each of the 5 species shown (beef, 41 entries; dairy, 13 entries; sheep, 11 entries; swine, 25 entries; and goat, 20 entries) with $1,500 scholarships, totaling $7,500. Participation in the Premier Exhibitor Contest increased 20% from that in 2008. Finally, the exhibitor of the Supreme Beef Bull, Supreme Beef Female and Supreme Dairy Animal received a $1,000 Supreme Animal Scholarship, totaling $3,000. Altogether, $40,500 in scholarships was awarded to 33 youth by the Sale of Champions Promotion Committee. The scholarship program was initiated in 1993, and to date, 333 scholarships have been awarded for a total of $355,200.

Implications

Despite a decline in the 2009 Sale of Junior Champions gross sale total, all committee members were pleased with its outcome and for recognizing the largest number of animals to qualify for the sale. Difficult economic times prevented some previous buyers and contributors from giving as willingly as in the past, but the number of youth served in this program was substantial. These data demonstrate the generosity of Mississippians when it comes to helping put youth in a position to be successful later in life. That is the goal of the Sale of Champions, to work toward the personal development of youth who participate in livestock programs.

2009 Mississippi 4-H Congress

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Extension Summary

Mississippi 4-H Congress is an annual event where senior 4-H youth are given opportunities to compete in educational contests involving livestock. Over the course of a 3-d period, youth compete in visual presentation contests, judging contests, quiz bowl competitions and poster contests. More entries were received for the 2009 4-H Congress in livestock events as compared to the past 3 yr. Winning teams in the Meats Judging Contest and Dairy Quiz Bowl advance to represent Mississippi in national competition. Though youth enjoy their time during 4-H Congress, they are very competitive and display knowledge and abilities in a variety of contests.

Introduction

Mississippi 4-H Congress is an annual state event designed to supplement county 4-H programs. This event provides positive leadership and educational opportunities for senior 4-H members from across the state in an effort to develop these young people to their full potential, allowing them to become productive citizens and catalysts for positive change and ready to meet the needs of a diverse and changing society. In late May, on the campus of Mississippi State University, senior 4-H members (age 14 to18 yr) are given opportunities to compete in a variety of livestock-related contests. Senior 4-H members give Visual Presentations related to Beef, Sheep, Swine, Goats, Dairy Animals, and Dairy Foods. There are Meats and Dairy Products Judging Contests in addition to Meats and Dairy Quiz Bowls. State Congress provides 4-H members with friendly competition and opportunities to meet 4-H'ers from across the state, attend educational workshops, and have a lot of fun during their visit to the campus. Therefore, the objective of the Mississippi 4-H Congress is to improve youth's knowledge and skills through experiential learning, life skills training, and leadership development opportunities. In addition, winners in state competitions are selected.

Procedures

At 4-H Congress, a variety of competitions are offered to senior youth. The Visual Presentation contest is divided into several areas, including Beef, Sheep/Swine/Meat Goat, Dairy Foods, and Dairy Animals Visual Presentations. Youth present on a topic of their choice, using posters or Microsoft PowerPoint to supplement their presentation. In Meats Judging, individuals and teams judge 6 classes of products, identify 25 retail cuts of beef, pork and lamb, and present 2 sets of oral reasons on 2 placing classes. The winning senior Meats Judging team advances to national competition in Denver, CO. Dairy Products Judging includes scoring samples of milk, cottage cheese, cheddar cheese, and ice cream, rating each sample for overall impression and scoring any taste defects. Two quiz bowls are offered, a Dairy Quiz Bowl and Livestock Quiz Bowl. Dairy Quiz Bowl involves a multi-phase event with a scored quiz and rounds of questions asked to each team. The

winning senior Dairy Quiz Bowl team advances to national competition in Louisville, KY. The Livestock Quiz Bowl was a pilot contest that is designed as a Jeopardy-style contest with questions written from source books about cattle, sheep, swine, meat goats, and dairy goats. The final competition available to youth is a Dairy Poster Contest where youth, ages 8 to 18 yr, design a poster based on the national dairy mo motto for that yr.

Results

There was increased participation in the educational contests held during 4-H Congress this past year. In the visual presentations, there were a total of 20 participants (5 in Sheep/Swine/Meat Goat; 9 in Beef; 3 in Dairy Foods; and 3 in Dairy Animals). In Meats Judging, there were 7 teams and 32 youth that competed in the contest. Dairy Products had a large increase in participation, with 11 teams and 49 total youth judging the dairy product samples. Increased participation was also noted in Dairy Bowl, with 5 teams and 21 youth, as well as Livestock Bowl, with 5 teams and 20 youth. A total of 49 youth submitted posters in the Dairy Poster Contest using the theme "Fuel Up with Milk". In this contest, there were 19 participants in the 8 to 10 yr old division, 18 participants in the 11 to 13 yr old division and 12 participants in the 14 to 18 yr old division. Altogether, 191 youth competed in livestock-related educational contests during 4-H Congress.

Implications

Many people think of livestock shows when the 4-H Livestock Program is mentioned. It is important to emphasize the valuable characteristics youth can learn by giving presentations, judging meats and dairy products and justifying their decisions with oral reasons, and using their knowledge of livestock in quiz bowl competitions. These are productive contests that allow youth to exercise their true capabilities and understandings of what they have learned with their own animals. Participation is always encouraged to allow youth to develop the self-confidence to speak to a group of people about a livestock topic of their interest. It should be noted that the 2008 to 2009 and 2009 to 2010 Mississippi 4-H State Presidents' main project interests have been the livestock program. These livestock-related educational contests held during 4-H Congress are critical to the 4-H Livestock Program as they allow youth to gain needed experiences in communication and decision-making that will enable them to be successful in life.

2008 Mississippi 4-H Horse Championships

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Extension Summary

The highlight of the yr for youth interested in the 4-H Horse Program is the Mississippi 4-H Horse Championships. Many of these youth had to qualify for this show by placing well at one of 4 district horse shows held across the state. In 2008, 647 youth competed at district shows on 1,083 horses, with a total of 2,881 total entries in these shows. Overall, 67 counties had youth represented at the district shows. At the state horse show, 466 youth (representing 61 counties) competed on 680 horses, with a total of 1,295 entries being shown. The district and state shows offered numerous opportunities for junior and senior youth to compete in education contests. Altogether, 259 youth competed in these education contests. In our creative contests, Horse Art, Horse Photography and County T-shirt Design, there were 179 youth entered and 10 counties that submitted entries. The Mississippi 4-H Horse Program was well represented by youth at national contests, attesting to the quality of the youth involved in this program.

Introduction

The State 4-H Horse Championships is the largest 4-H horse show held in Mississippi. Youth and their families begin preparing for this show many months in advance. Much time and effort goes into training and working with the horse and rider to make them best suited for competition. During this process, youth gain valuable insight regarding proper nutrition for their horse and preparation for the district and state horse shows. In addition to an understanding of nutrition, youth learn about aspects of reproduction, genetics, selection, and exhibition with their horses, thereby enabling them to be competitive in education contests held in conjunction with the State 4-H Horse Championships, where senior winning individuals and teams are selected to represent Mississippi in national contests. Therefore, the objective of the State 4-H Horse Championships is to offer youth the opportunity to showcase the progress they have made with their horses in competition while providing opportunities to use their knowledge and training about horses in educational contests.

Procedures

There are 2 types of classes offered through the Mississippi 4-H Horse Program: District Only classes where youth must qualify their horses to advance to state competition and State Only classes where youth compete on their horses at the state show without having to qualify for that class. State Only classes require some equipment that all district shows are not able to obtain, such as jumps and fences for over fences classes. At the district horse shows (Northeast: Verona, MS; Northwest: Batesville, MS; Southeast: Meridian, MS; Southwest: Canton, MS), all junior (age 8 to 13) educational contests are held, with the top 3 teams and/or individuals (depending on the contest) advancing to compete at the state show against other winning juniors. Senior 4-H youth compete at the state competition held during the state horse

show. During the state horse show, all education contests are held prior to the horse classes. Education contests offered at these shows include Horse Public Speaking, Horse Individual Demonstration, Horse Team Demonstration, Horse Bowl, Horse Judging, and Hippology (senior-only event). In addition, creative contests are offered for youth to compete in as individuals and as a county, including Horse Art, Horse Photography, County T-shirt Design Contest, and County Educational Display Contest. Winners are announced at the Opening Ceremony. Of the classes offered during the state horse show, 42 horses were chosen to advance to the Southern Regional 4-H Horse Championships. Winners of the senior educational contests received some travel support to compete at the Western National 4-H Roundup in the Horse Classic in Denver, Colorado.

Results

At the District 4-H Horse Shows held in 2008, 647 youth rode 1,083 horses with a total of 2,881 entries. Overall, 67 counties had youth represented at the 4 district shows. At the state horse show, 466 youth (representing 61 counties) competed on 680 horses, with a total of 1,295 entries being shown. At the state show, senior 4-H participation in education contests increased in all contests except for Horse Individual Demonstration. Altogether, 259 youth competed in these educational contests at the district and state horse shows. In our creative contests, 61 youth had exhibits in Horse Art, 118 youth had exhibits in Horse Photography and 10 counties entered the County T-shirt Design Contest. The winning senior youth in the educational contests that competed in national competition in January 2009 were quite successful, and Mississippi placed 2nd overall out of 30 states in the Horse Classic, the highest placing ever achieved as a state.

Implications

It is important for youth to learn communication skills in 4-H. The Mississippi 4-H Horse Program provides many opportunities for youth to gain valuable experiences in educational contests that will help them as they progress towards college. Competition in these events is friendly but fierce, similar to what is seen in our classes. Despite participation being down somewhat from 2007, Mississippi youth performed well at regional and national contests, demonstrating the depth of the quality of youth at these district and state shows. Preliminary data from the 2009 horse shows indicate increased participation and will be documented next year.

Mississippi Livestock Quality Assurance Program for Youth Producers

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Extension Summary

Youth producers in the 4-H and FFA programs must do all they can to ensure the safety and quality of the animals they take to the show ring. A livestock quality assurance program was developed that was mandatory for all Mississippi 4-H and FFA youth (n = 459 junior age youth, n = 716 senior age youth) to complete, along with their parents, volunteers, and other adults (n = 71). The program was centered on developing and maintaining good production practices in their program. A short quiz was administered to all attendees before and after the training. All 3 groups had improved scores after the training, indicating comprehension of the presented material. These data indicate an increased awareness of youth livestock producers about their role in this process and the importance of raising their livestock in an appropriate manner.

Introduction

Livestock quality assurance programs are producer-driven and involve all sectors of the industry, from producers to consumers. These programs are designed to help in the production of healthy, wholesome and quality products that are free from defects such as injection-site lesions and bruises. It is critical that youth in the livestock program understand the importance of good production practices, a set of guidelines for the safe, healthy, efficient and humane production of livestock, and establish these on their ranches to do their part in raising quality animals that may enter the food chain. The purpose of the Mississippi Livestock Quality Assurance Program for Youth Producers is to increase food safety awareness by educating youth producers of their role in this process and the importance of raising their livestock in an appropriate manner. By following a quality assurance program, youth can improve their animal care and management practices in order for their animal(s) to achieve optimal performance levels while providing a safe, wholesome product for consumers.

Procedures

In order to accomplish a mandatory program for all youth and adult participants, interactive video resources were used to create the training materials. Resources for program development came from the Arkansas Beef Quality Assurance Program and the National Pork Board's Youth PQA Plus Training Manual. From these sources, 10 good production practices were identified that would be beneficial to Mississippi youth livestock producers. These good production practices included the following points.

- Identifying and tracking all treated animals;
- Maintaining medication and treatment records;
- Properly storing, labeling, and accounting for all drug products and medicated feeds;
- Obtaining and using veterinary prescription drugs through a licensed veterinarian based on a

valid veterinarian/client/patient relationship;
- Educating all family members about treating animals, properly administrating products, and general care of livestock;
- Establishing an efficient and effective herd health management plan;
- Providing proper animal care to improve animal well-being;
- Following appropriate on-farm feeding procedures;
- Regularly reviewing and updating the youth quality assurance program; and
- Making ethical decisions regarding livestock projects.

This information was incorporated into a Microsoft PowerPoint presentation that was initially presented during in-service training at the 2007 Annual Mississippi State University Extension Service Conference to 4-H agents to get feedback on the materials in the training program. During this in-service training session, agents were instructed about several hands-on opportunities to get youth involved in the learning process, and this was demonstrated during this session. Agents provided some feedback resulting in minor changes and the presentation was then recorded on video and made available on a compact disc (CD) along with a publication written by the Extension 4-H Livestock Specialist to supplement the video. Distribution of the quality assurance program CD was aided by a Beef Quality Assurance grant, which allowed copies of the program to be made available for all Mississippi Extension offices and FFA Chapters.

A quiz was developed to assess the comprehension of the material presented to participants. Junior participants were asked 5 multiple-choice questions, and senior and adult participants were asked the same 5 questions in addition to 5 more challenging questions about livestock quality assurance. The same questions were administered prior to participating in the training as well as immediately after the training. All junior participants were required to participate in taking the quiz, whereas adults were encouraged to do so. Statistical analysis was performed to determine differences between and among participants.

Results

A total of 1,246 participants were included in the program, including 459 junior youth (age 8 to 13), 716 senior youth (age 14 to 18) and 71 adults. Each group of participants showed significant increases in scores from the pretest to the posttest (juniors: 3.2 ± 0.7 correct pretest improved to 3.9 ± 0.6 correct posttest; seniors: 7.3 ± 0.7 correct pretest improved to 8.5 ± 0.7 correct posttest; adults: 7.5 ± 0.2 correct pretest improved to 8.9 ± 0.2 correct posttest) . Adults answered a greater percentage of posttest questions correctly ($86.4\% \pm 3.7\%$) than junior or senior youth ($73.4\% \pm 1.5\%$ and $75.2\% \pm 1.2\%$, respectively). There was no difference in posttest percentage score among youth.

Implications

Participants who have completed the Mississippi Livestock Quality Assurance Program should have a better understanding of food safety awareness and the importance of raising livestock in an appropriate manner. If youth put the good production practices into regular use, they can improve their animal care and management practices to allow their livestock to achieve optimum performance levels while producing a safe, wholesome product for consumers.

4-H/FFA Beef Heifer Replacement Contest

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Extension Summary

4-H and FFA livestock projects have been successful at teaching youth and their families about responsibility and care for their livestock. The Replacement Beef Heifer Development Contest is a year-long event where the contestant is personally responsible for the daily management of their heifers. During the year, youth maintain records about their project to justify management decisions. At the end of the contest, they turn in a record book (30% of the contest), have their heifers evaluated (20% of the contest), and make a presentation about their project during an interview (50% of the contest). In the initial year of competition, 26 entries were received in September, and 9 completed the contest. It is anticipated that youth in this contest will be able to educate adult beef cattle producers about management practices and become good stewards of their cattle.

Introduction

Livestock shows have always been popular among Mississippi youth. Showing livestock provides youth with a variety of avenues to learn about their animals, including aspects of nutrition, reproduction, genetics, selection, and exhibition. As youth grow in the program, they are better able to utilize and understand this information to make enhanced decisions regarding their livestock projects. A common misconception about livestock shows is that the most successful youth are those who have unlimited resources from which high-quality livestock and equipment can be obtained for shows. This has been known to discourage some youth and families from participating in livestock shows. Some youth, regardless of whether they show cattle, are integral parts of family cattle operations and have obtained experiences that will enable them to make sound heifer management decisions. Therefore, the objective of the Replacement Beef Heifer Development Contest is to recognize those youth that have a true passion for raising beef cattle. In doing so, youth will learn about proper heifer development practices and procedures and can be a positive influence on adult producers involved in raising cattle.

Procedures

Contest Design. The 4-H and FFA Heifer Development Contest is a 12-mo project that started on September 1, 2008, and concluded August 15, 2009. Contestants must be 4-H or FFA members who compete as individuals unless 2 or more brothers or sisters (each at least 14 yr of age but not over 18 yr of age as of January 1 of the year in which the contest begins) of a family constitute a joint entry. If the entrant is in college, he/she must personally manage and care for their heifers on a daily basis by commuting to and from home and school. It is not permissible to have someone else care for contest heifers while away at school.

The heifer development project must consist of 3 heifers (purebred or commercial) that are either autumn born from the previous year or spring born of the

year in which the contest begins. While not mandatory, the heifers can be exhibited in junior shows. Heifers can be purchased from a purebred or commercial producer or be selected from operations of an immediate family member (parent, stepparent, brother, sister, half-brother, half-sister, grandparent, or legal guardian). This contest is designed to evaluate the youth producer's ability to manage the heifers rather than the genetic makeup of the heifers. Therefore, participants using purebred and commercial heifers will be judged together without preference given for breed or breed type. Contestants will be judged on all managerial aspects of their heifer development project. Participants were encouraged to take advantage of Extension agents, advisors, and experienced producers in selecting quality heifers and discussing production costs.

Evaluation System. Youth submitted entry forms with a description of the 3 heifers they entered in the contest by September 1, 2008, to the Extension 4-H Livestock Specialist. Initial criteria to be included on the entry form included each animal's age, weight, breed, and starting value (purchase price). In addition, each entrant submitted their goals for the project. If registered heifers were used, the entry included a photocopy of that animal's(s') registration paper.

Heifers chosen for the contest must have been born in the autumn of 2008 or the spring of 2009. Any heifer with a sign of 3-yr-old teeth were eliminated at the contest site, regardless of a registered or printed birth date for that heifer.

In order to verify that the 3 animals entered in the contest were the same 3 brought to the contest site, electronic identification (EID) tags were inserted in each heifer's ear at the time of entry. An alternative to using an EID tag included checking an ear tattoo for registered beef heifers to match the tattoo on that heifer's registration paper. Upon arrival to the contest site, all entered heifers were checked to confirm that the heifer was entered in the contest.

The 4-H and FFA Heifer Development Contest consists of 3 components: a visual appraisal of the heifers, a record keeping system, and an interview process.

- **Visual Evaluation:** A committee of judges evaluated each group of 3 heifers managed by the contestant. Criteria that were evaluated included weight, frame score, growth, body condition score, health, structural/skeletal soundness, and reproductive ultrasound evaluation. In addition, each entrant was judged on their salesmanship skills and overall knowledge of phenotypic characteristics of their heifers. *This component of the contest was worth 20%.*

- **Records:** Youth were required to submit records kept throughout the 12-mo project by August 1, 2009. At the start of the project, contestants were asked to list short- and long-term goals for their heifer project. During each mo of the project, contestants should have recorded management practices performed on his/her heifers. Examples include recording the amount of feed, hay or other nutritional supplements purchased or fed, veterinarian expenses and other health-related costs, breeding decisions, rotational grazing of pastures, a complete budget/expense sheets and any other

management issue in which the youth made a decision for the continued development of his/her heifers. At the conclusion of the project, youth should have addressed whether they achieved their goals set at the start of the project. These records were judged on their completeness and exactness during the contest year. *This component of the contest was worth 30%.*

- **Interview:** A committee of judges interviewed the exhibitor on their individual production practices. Exhibitors gave a 10 to 15 minute presentation (Microsoft PowerPoint slides or other visual aids) to summarize his/her heifer development project. This presentation included anything relevant to the contestant's project (goals for project and if they were accomplished, pictures to illustrate the project, etc). Each exhibitor then answered questions from the committee in regard to their project, such as the process used to select the heifers, record keeping system used, nutrition program, bull used for breeding purposes, health records and any production practices utilized by the exhibitor during this contest. *This component of the contest was worth 50%.*

Judges for this contest were chosen from Extension area livestock agents, cattle producers, Extension specialists, and cattle association members. All ties were to be broken using the interview score followed by the record book.

Results

In the initial yr of this contest, 26 entries were received. At the conclusion of the contest, 9 contestants remained. Throughout the year, several educational opportunities were made available to youth to assist them with their heifer project. A workshop was provided to youth during State 4-H Club Congress on replacement heifer selection and general health care practices. Over 45 youth and 4-H agents participated in this session to learn more about the contest. In addition, an interactive video session about the contest was held with 10 counties participating, totaling over 40 adults and youth who wanted to learn about the design of the contest.

This contest is a big endeavor for youth, and it was important to reward them justly. While the education and knowledge learned about heifer development will benefit youth long-term, it was important to provide valuable prizes for winning. To date, prizes to be awarded for the Replacement Beef Heifer Development Contest include a bumper-pull livestock trailer, Dell laptop, truck/trailer hitches, cash prizes, and complementary artificial insemination school registrations for all participants. The announcement of winners and awarding of prizes will take place during the Mississippi State Fair. The winning youth will present their contest results and what they learned about heifer development during the 2010 Mississippi Cattlemen's Association annual convention.

Implications

The Replacement Beef Heifer Development Contest provides an authentic experience for youth that choose to participate. Not only do youth learn valuable information that they can use for a

lifetime, but the cattle industry benefits as young cattlemen and cattlewomen will be educated producers in the future. These youth can be a positive influence on their own family's cattle production system and share their insights with other cattle producers around the state, causing adults to think more about their own management decisions.

Miss. Premium Replacement Beef Heifer Program

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Extension Summary

A consignment program was developed to address the need for properly and economically developing replacement beef heifers in Mississippi. Extension Beef Cattle Specialists and commodity representatives developed guidelines based on successful programs in other states. Briefly, heifers should be at least 11 mo of age, 675 lb, vaccinated for blackleg and respiratory diseases, dehorned and healed. There was no minimum number of head required to consign if the heifers fit the projected breeding season. Sixty-five heifers were consigned and delivered to a custom beef replacement heifer development center in Philadelphia, MS (November 2009). On arrival, the heifers had been vaccinated for blackleg and respiratory diseases (modified live) and weighed an average of 701 lb. After delivery, they were vaccinated for Vibrio (*Campylobacter fetus*) and Lepto (*Leptospira canicola-grippotyphosa-hardjo-icterohaeorrhagiae-pomona*) to guard against poor fertility. Sixty d into the program, a pelvic area measurement and reproductive tract score was taken (avg. = 175 cm^2 and 4.3, respectively). Nutritional management was based on a total mixed ration of annual ryegrass baleage, commodity feeds, and a complete mineral mix. Average daily gain was 2.6 lb per head. The heifers were AIed after estrous synchronization and a clean-up bull was introduced for 60 d beginning 7 d after AI. Pregnancy rate to AI was determined by ultrasound after 30 d (79.6%; 43/54). The heifers were returned to the consigner 50 d after the latest possible pregnancy to avoid pregnancy loss due to shipping stress. The total cost to consigners averaged $324 per heifer returned pregnant, which included cost of open heifers and culls from insufficient pelvic area measurement and reproductive tract scores. This program provided a low-cost option for producing heifers that should be long lived in the cow herd.

Introduction

Selection and development of beef heifers, to replace culled cows or increase herd numbers, impacts the economics of a cow-calf operation through genetics and longevity. Improved genetics can enhance growth performance and carcass value, while eventual longevity of the heifer as a mature cow is influenced by reproductive success during the first breeding season.

Based on these concepts, the "Miss. Premium Replacement Heifer Program" was initiated for Mississippi beef cattle producers to have heifers developed in an economic way that ensures their longevity in the cow herd. It was also intended to make more resources available for the mature cow herd that would otherwise be used to develop replacements.

Procedures

Guidelines were initially developed to ensure that a consistent product would be produced, regardless of what facility or ranch provided the custom development service. The intention was to develop a reputation for reproductive soundness and

longevity of females developed through this program. These guidelines are listed in the document entitled "Miss. Premium Replacement Heifer Program Rules and Regulations for 2008 – 2009", available upon request.

Nutritional management was based on a total mixed ration of annual ryegrass baleage, corn gluten feed, dried distillers grain, soybean hulls, peanut skins and a complete mineral mix. The heifers were kept in pasture traps with adequate bunk space, shade and shelter. The nutritional goal was to maintain an ADG of roughly 1.5 lb.

Pelvic area measurements and reproductive tract scores were taken in mid January. The width and height of the pelvis are measured at the narrowest point using a specially designed caliper. Those distances are multiplied to estimate the pelvic area in square centimeters. Originally, this measurement was related back to the age and weight of the heifer through a series of calculations to determine the maximum size calf that heifer could calve without assistance. Now, the most common use for pelvic area measurements is to set a cutoff measurement to cull heifers that do not meet or exceed it. For instance, the cutoff measurement for "Miss. Premium" heifers is 150 cm^2 when measured at 12 mo of age and roughly 800 lb.

Reproductive tract scores estimate the sexual maturity of heifers. The technician palpates the uterus for size and tone and the ovaries for structures that would indicate attainment of puberty. Reproductive tract scores range from 1 to 5, with a score of 1 indicating that the heifer has not begun to mature and a score of 5 indicating that the heifer is displaying normal estrous cycles. Practical use of reproductive tract scoring is to cull heifers below a score of 3 and keep heifers with a score of 3, 4 or 5. If estrous synchronization with Melengesterol acetate (MGA) or a controlled intervaginal drug releasing (CIDR®) devise will not be used, culling heifers that score a 3 might improve overall pregnancy rates.

Estrous synchronization of heifers began in mid February with CIDR® application and injection of Cysterelin® (GnRH). Seven days later, the CIDR® was removed and an injection of Lutalyse® (Prostaglandin) was given. Each heifer was AIed, to a bull the consigner chose, 12 h after the first display of standing heat. Heifers were then placed with a clean-up bull for 60 d beginning 7 d after insemination.

Pregnancy was diagnosed by ultrasound 30 d after AI. Normally, pregnancy is diagnosed at least 30 d after the bull is removed. Heifers were checked earlier for accuracy in determining the difference between AI and natural service and were re-checked before being returned to the consigner. Heifers were returned to consigners 50 d after the latest possible pregnancy to avoid pregnancy loss from shipping stress.

The cost of replacement beef heifer development was based on a budget formulated by Dr. John Anderson in the Department of Agricultural Economics at Mississippi State University. Payments were made in three installments: one third at delivery into the program, one third at AI and the final one third upon return of the bred heifers. Open heifers were sold at local auction with those proceeds credited back to the consigner's account.

Results

Average daily gain of heifers was 2.6 lb per head, surpassing the nutritional goal of maintaining an ADG of 1.5 lb per head. This was likely due to increased performance and efficiency from the effect of heterosis and management. Hand-feeding and extremely calm dispositions could have positively influenced performance.

Four of the original 65 consigned heifers were culled for pelvic area less than 150 cm^2 while no heifers were culled for reproductive tract score less than 3. Eight heifers did not display standing heat and received another injection of Lutalyse® 10 days after the initial Lutalyse® injection. One heifer responded to that injection and the others were put with the clean-up bull without having been bred using AI. The single-service AI conception rate for this group was 79.6% (43/54). The total cost of this program averaged $324 per head returned pregnant. Cost determination included pelvic area culls and open heifers.

Implications

The initial Miss. Premium Replacement Beef Heifer Program was extremely successful and a winning proposition for both the custom developer and consigner. The most often cited benefits for the consigner were that having heifers custom developed on a different farm reduced overall costs per bred heifer returned and made land and time available to focus on breeding the cow herd and managing the calf crop.

This program provided a low-cost option for producing heifers that should be long lived in the cow herd. The program should be sustainable, and plans have already been made for subsequent rounds of replacement beef heifer development with the current developer. Plans are in development to provide additional sites in Mississippi to provide the same service. The specific goal is to have custom heifer developers (who use the guidelines of this program) in north, central, and south Mississippi.

Development of Extension Programming for Feeder Cattle Marketing: Assessment of Need, Demonstration, and Education

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Extension Summary

The need for education and assistance in marketing feeder cattle was expressed by commercial cattle producers across the state of Mississippi through Producer Advisory Meetings and personal communications. The objectives of this programming were to 1) assess and characterize the need for marketing feeder cattle, 2) determine the most appropriate type of programming needed and 3) implement programming that results in facilitation from Extension personnel but leadership from the beef cattle producers. The first objective was accomplished by electronically polling 164 representative beef cattle producers at 12 multi-county Cattlemen's Association meetings. Polling results were used to formulate programming to address marketing feeder cattle. Of those responding, 40% expressed a willingness to participate in a state-wide marketing program. A committee of representatives from 4 commodity associations and a panel of producers and marketing agents developed a sale customized to the specific needs. The final design was a board sale offering 48,000 to 50,000 lb "load lots" of uniform calves with similar weaning and vaccination management. This accommodated a larger volume of cattle than would be ready to sale and ship on a single day. Two annual sales have been established with more than 7,000 calves marketed in the first two years. With the combination of value-added management and marketing practices applied through these sales, assessing the financial impact of each is not possible. However, the cumulative effect resulted in an average increase in calf value of $20.85 and $44.80 for steers and heifers, respectively, above the value of similar weight feeder calves at Mississippi markets sold the week feeder calf sales were held. More importantly, oral evaluations provided by consigners and other beef cattle producers in the state indicated that the third objective was accomplished.

Introduction

Marketing feeder calves in the southeastern United States is often accomplished through auction facilities where ownership and management of individually sold calves is not known to the buyer. In this scenario, the financial value of reputation and improved management for genetic potential and health is not realized. Additionally, the cost of marketing in this situation can be excessive when commission, yardage and shrink (weight loss) are considered. Cattle producers have become more aware of these issues and are working to capture more revenue for genetic and management improvements.

Employees with beef cattle responsibilities in the Mississippi State University Extension Service strive to respond to needs expressed by cattle producers in the state. Each year, Producer

Advisory Meetings are held across Mississippi where representatives from many commodity groups express concerns and needs for research and Extension programming to improve profitability. At these meetings, a consistent request from beef cattle producers was assistance in marketing feeder calves. Therefore, the objectives of these programs were to 1) assess and characterize the need for marketing feeder cattle, 2) determine the most appropriate type of programming needed and 3) implement programming that results in facilitation from Extension personnel but leadership from the beef cattle producers.

Procedures

Objective 1: Evaluating the Situation. To accomplish the first objective of assessing and characterizing the need for feeder cattle marketing assistance, 164 cattle producers at 12 multi-county Cattlemen's Associations were asked the following series of questions prior to a presentation outlining one possible marketing option.

1) How do you market your calves?
    a. Sale barn
    b. Direct to buyer
    c. Direct to feedlot
    d. Retain ownership through feeding
    e. Other
2) Were you satisfied with the revenue from your last calf crop?
    a. Yes
    b. No
3) Are you satisfied with your current marketing options?
    a. Yes
    b. No

After the marketing presentation, in which a "Board Sale" format was explained (the content of this presentation will be described later in this section), these follow-up questions were asked:

1) Would you be interested in consigning to this sale?
    a. Yes
    b. No
2) If so, how many calves will you consign?
    a. (responses were in the form of continuous numerical data)

Responses to these questions were recorded using the Classroom Performance Systems (CPS™; eInstruction®, Denton, TX). This package of hardware and software interfaces with Microsoft PowerPoint to record answers to the projected question via response pads given to each individual in the audience that transmit to a central receiver unit through infrared or radio frequency transmissions. Individual responses are imported to a spreadsheet for data analysis.

Objective 2: Program Development. The presentation, given between the two sets of questions, outlined a preliminary marketing format that addressed the second goal. This format was developed by a committee of representative from the Mississippi State University Extension Service, the Mississippi Farm Bureau Federation, the Mississippi Beef Cattle Improvement Association, and the Mississippi Cattlemen's Association in cooperation with seedstock and commercial cattle producers who provide leadership in these groups and have an interest in improving feeder cattle marketing in Mississippi.

The process for developing the marketing format began with a comprehensive and objective evaluation of previous attempts to address this issue that were not sustainable. Several feeder calf marketing programs had been previously

attempted and were relatively unsuccessful. Many of the committee members were involved with those programs and cited a number of reasons for their ineffectiveness in attracting competitive bidding. Those reasons included:

- Low volume
- Requirements that restricted producer involvement
- Ineffective lot size
- Inappropriate timing
- Lack of support from marketing agents

The resulting preliminary feeder cattle marketing format was then modified to reflect information gathered from the first objective.

The final marketing format, and result of the second objective, is outlined in "Feeder Calf Board Sale Terms and Conditions", available upon request. Briefly, the program was designed as a board sale to address the issue of volume. By auctioning lots to be delivered over a three-month period, calves that were not yet ready to be shipped could be sold at the same time. This increased volume of trade from hundreds of head ready to ship on the day of the sale to thousands of head for future delivery. The cattle were represented by still pictures or video clips available for viewing several days prior to the auction. Pictures and videos were accompanied by a detailed description of genetic background and management practices.

Another limitation to volume was noted as restrictive requirements to participation. Specifically, many of the previously attempted marketing programs attempted to apply a single health management protocol to all the calves consigned. To circumvent that issue, health protocols had to be similar only within a lot. This approach enabled several different vaccination protocols that might be effective for different types of cattle to be used but reduced the opportunity for health problems that might arise from comingling differently managed cattle. This approach also applied to age and source verification.

The ineffective lot size was addressed by coordinating individual consignments into truck-load lots of between 48,000 to 50,000 lb of total calf weight. This was intended to make lots more appealing to buyers by reducing the amount of time and logistical scheduling required to fully utilize freight cost. The concept of increased unit value for larger lot sizes has been demonstrated (Startwell et al., 1996). The committee also implemented a freight adjustment to protect the buyer in the case that a lot weighed less than 48,000 lbs. at load-out. Calves were nominated by producers completing "Feeder Calf Board Sale Consignment Form", available upon request. After the forms were received, lots were matched with regard to age, weight, genetic background, location and management to make each lot as consistent as possible. Hide color was a secondary consideration in matching lots.

To garner more support from marketing agents in Mississippi, sales were bonded and cattle were represented by licensed livestock marketers. Each sale was hosted by one livestock marketing agent but the option remained for each load to be represented and bonded by a different marketing agent if that agent agreed to abide by the rules and regulations. This element was established because some consigners desired to remain committed to marketing agents they had used for many years. Other components of the final format included a 2% or less calculated shrink at delivery, a $5.00/cwt price slide on loads that exceeded the projected delivery weight, a $1.00 per

head pass out (PO) fee and insurance to protect the consigner during weighing and load-out.

Objective 3: Producer Leadership. Through each of the developmental steps, close attention was given to the concept that this type of marketing program should be producer-lead and personnel from Extension and commodity groups should only function as facilitators. This was to ensure that the objectives remained in line with needs of those financially vested. Additionally, a producer-guided program seems to lend more validity and attract more participation, which leads to more educational impact.

Beef cattle Extension personnel and commodity group representatives were more involved in regulating the initial sale. After the first auction, a follow-up meeting was held to discuss improvements and appoint a producer committee that would propose future changes. Support personnel plan to turn more responsibility over to the marketing agent and producers as these marketing options become more self-sustainable.

Results

Participation and Revenue. Since its inception in 2008, three sales have been held under the program guidelines. Two Mississippi Homeplace Producers' Sale, held the first Monday in August at the Southeast Mississippi Livestock Auction LLC (Hattiesburg, MS) and one Cattlemen's Exchange Feeder Calf Sale held in April by the Winona Stockyard (Winona, MS). A total of 7,031 calves in 101 load-lots were marketed in these 3 sales. Total net receipts from these sales exceeded $4.6 million. Steers and heifers enrolled in this marketing program received an average of $20.85 and $44.80, respectively, above the value of similar weight feeder calves at Mississippi markets the week they were delivered.

While not directly tested, anecdotal evidence would suggest that marketing cost was significantly reduced. The option for 2% or less calculated (pencil) shrink limited weight loss prior to establishing pay weight. Based on previous research findings reviewed by Coffey and coworkers (2001), if cattle are to transported more than 50 miles prior to load-out, consigners can choose to sell that lot with 0% shrink. The 2% commission is less than most other established marketing methods in Mississippi. Other internet and television based marketing options exist and, in most cases, are more established than the sales described here. However, one of the most important aspects of these auctions is that this cash flow and revenue stream remain in Mississippi and local economies.

Implications

The objectives of this Extension programming were achieved. Implementing the philosophy of fully characterizing the need and tailoring the feeder calf marketing program to address that need specifically was effective in stimulating positive change. Mississippi beef cattle producers and order buyers from across the country readily accepted these marketing options. Sentiment from facilitators has also been positive. Indications suggest that these programs will prove sustainable as producer-driven options that capture the full effect of value-added feeder cattle and return more revenue to the local economies of Mississippi.

Literature Cited

Sartwelle, J.D., III, J.R. Mintert, F.K. Brazle, T.C. Schroeder, R.P. Bolze, Jr. and M.R.

Langemeier. 1996. "Improving the Value of Your Calf Crop – The Impact of Selected Characteristics on Calf Prices." *Kansas State Univ. Coop. Ext. Serv. Bull.* MF-2142.

Coffey, K.P.; W.K. Coblentz, J.B. Humphry and F.K. Brazle. 2001. Basic principles and economics of transportation shrink in beef cattle. *Professional Animal Scientist*. 17:4, 247.

Review of Mississippi Beef Cattle Improvement Association Bull Sales, 2003-2009

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Extension Summary

The Mississippi Beef Cattle Improvement Association (MBCIA) Bull Sale Program has a 40-yr history of promoting beef cattle improvement within Mississippi. The present study explores the recent history from 2003 to 2009 of this program to determine recent trends relevant to potential MBCIA bull sellers and buyers. This summary of recent MBCIA bull sales is intended to 1) review recent sale participation levels, 2) identify recent sale expense levels and trends, and 3) inform potential consignors and buyers of recent sale results history in terms of sale price levels. Results show that while participation in the Fall MBICA Bull Sales peaked in 2006 and has waned since that time, there is evidence of renewed interest in the program via the Spring MBICA Bull Sale. The MBCIA Bull Sales offer Mississippi beef cattle breeders and bull test participants with bull marketing opportunities twice a year at very competitive sale expense levels. General sale price averages have held steady over the last 6 yr, but sale prices for individual bull lots have been highly variable. This emphasizes the need for high-quality bull consignments to MBCIA bull sales for individual consignors to achieve marketing success through these sales.

Introduction

The Mississippi Beef Cattle Improvement Association (MBCIA) was established in 1968 for the purpose of unifying beef cattle breeders and promoting beef cattle improvement within Mississippi. The MBCIA is a member of the Beef Improvement Federation, which was formed as a means to standardize beef cattle performance programs and methodology and to create greater awareness, acceptance, and usage of beef cattle performance concepts. The MBCIA membership includes purebred and commercial beef cattle producers, commodity association representatives, and Mississippi State University Extension Service and Mississippi Agricultural and Forestry Experiment Station personnel.

In keeping with its purpose, in 1969 MBCIA initiated a bull sale program with the objective of encouraging production and identification of genetically superior bulls by purebred breeders and promoting the purchase and use of these bulls by commercial producers. The MBCIA bull sale program consists of purebred bull consignment sales open to consignments from Mississippi cattle producers. Out-of-state cattle producers are also invited to nominate bulls for this sale provided the bulls were performance tested on either the Hinds Community College Bull Test, a 112-d grain-based bull performance test established in 1982 in Raymond, MS, or the South Mississippi Gain-on-Forage Bull Test, a 140-d forage-based bull performance test established in 1986 near Tylertown, MS. The MBCIA Fall Bull Sale conducted its 40th annual sale in 2008 and is hosted annually on the second Thursday in November. Additionally, a MBCIA Spring

Bull Sale began in 2008 and is held annually in conjunction with the Hinds Community College Bull Test sale on the first Thursday in March.

Bulls offered through MBCIA sales are required to have passed a breeding soundness examination within 30 d prior to the sale date, met minimum growth and scrotal circumference requirements, and are backed with extensive performance information. Bulls are also screened for structural soundness and other defects such as temperament problems prior to being accepted for sale participation. Over the 40-yr history, MBCIA bull sale requirements have been updated on several occasions to reflect industry changes and new performance goals. These changes have impacted both specific bull consignments and sale participations levels.

Furthermore, the bull sale order rewards bulls for achieving specific weight per day of age levels; scrotal circumference levels; and EPD percentile rankings for birth weight or direct calving ease, weaning weight, yearling weight, ribeye area, and intramuscular fat EPD. In addition, bulls move closer to the start of the sale order with high visual appraisal scores and by having documented ultrasound body composition scan results. This has likely impacted the specific bull consignments to the MBCIA sales by shifting emphasis to performance data and EPD.

Though the MBCIA Bull Sale Program has a 40-yr history, it is worthwhile to explore the recent history of this program to determine recent trends relevant to potential MBCIA bull sellers and buyers. The present summary of recent MBCIA bull sales is intended to 1) review recent sale participation levels, 2) identify recent sale expense levels and trends, and 3) inform potential consignors and buyers of recent sale results history in terms of sale price levels.

Procedures

The MBCIA sale manager, Extension Beef Cattle Specialist, provided sale expenses and return data from November 2003 to March 2009 for this review. This data included 6 MBCIA Fall Bull Sales from 2003 to 2008 and 2 MBCIA Spring Bull Sales from 2008 to 2009. Simple descriptive statistics were determined from the sale data to illustrate recent sale trends for participation levels, expenses, and prices received.

During the period studied, several noteworthy changes to the sale occurred that should be factored into any interpretation of the results. Beginning with the Fall 2006 MBCIA Bull Sale, live broadcasts began from the Raymond sale site over the Mississippi State University Extension Service distance education system. Interactive video bidding sites included in the Panola County Extension office in Batesville, MS and the North MS Research and Extension Center in Verona, MS. To date, several MBCIA Bull Sale bids, including winning bids, have been placed over the interactive video system.

Sale eligibility requirements were altered over time with the goal of strengthening the overall quality of MBCIA sale offerings. Adjusted 365-d yearling weight requirements were put in place for the Fall 2005 MBCIA Bull Sale at 850 lb, increased to 900 lb with the Fall 2007 MBCIA Bull Sale, and finally set at 1000 lb with the Spring 2008 MBCIA Bull Sale. Eligible bull age ranges were widened to include bulls from 13 to 39 mo of age starting with the Fall 2005 MBCIA Bull

Sale and then later narrowed down to 13 to 26 mo of age starting with the Spring 2008 MBCIA Bull Sale. Sale eligibility requirements were changed effective with the Fall 2006 MBCIA Bull Sale such that at least one of the following 1) ultrasound EPD, 2) carcass EPD, or 3) ultrasound body composition scan results were required for bulls to meet sale eligibility.

Results

The number of bulls marketed in MBCIA sales from November 2003 to March 2009 peaked at 42 bulls in 2006 (Tables 1 and 2). The previous year, 2005, marked the largest number of breeds (n = 5) and consignors (n = 23) during the period reviewed. Sale participation in the Fall MBCIA Bull Sales for all categories (bulls, breeds, and consignors) has trended downward since 2006.

Yet there appears to be renewed interest in MBCIA Bull Sales via the Spring Bull Sale Program. The Spring MBCIA Bull Sale caters to bull buyers utilizing a spring breeding season, the predominant breeding season in Mississippi (Lacy et al., 2003; Little et al., 2003). The numbers of bulls, breeds, and consignors to the Spring 2009 MBCIA Bull Sale exceeded those for the Fall 2008 MBCIA Bull Sale. In addition, the sale offering of the Hinds Community College Bull Test Sale held in conjunction with the Spring MBCIA Bull Sale adds to the total number of bulls, breeds, and consignor represented at a single sale event, effectively increasing the total number of bulls offered for sale at once.

Higher numbers of bull consignments serves to spread sale expenses across more lots potentially decreasing per lot sales expense and potentially attract more prospective buyers, both desirable occurrences for bull consignors. However, if an increase in number of bulls offered at a single sale event is not received with an adequate corresponding increase in bidding competition, then there is potential for the sale price per lot to decrease. The MBCIA data are not sufficient to determine if this occurred during the review period.

The average sale expense per bull marketed in a MBCIA sale from November 2003 to March 2009 ranged from $69.81 to $131.36 (Tables 1 and 2). Sale expenses as a percentage of gross sales for the 8 MBCIA sales held during this time period ranged from 3.2 to 8.8 percent. These values are well below industry averages for purebred bull consignment sales, which often exceed 15 percent. The relatively low MBCIA sale expenses are attributed to complementary sale facility use, competitive auctioneer fees, and streamlined expenses in advertising and supply categories.

Table 1. Mississippi Beef Cattle Improvement Association Fall Bull Sale participation and sale expense summary, 2003 to 2008

Sale year	Bulls in sale, n	Breeds in sale, n	Consignors to sale, n	Average sale expenses, $/bull in sale	Sale expenses, % of gross sales
2003	36	3	11	69.81	3.20
2004	41	4	12	87.44	5.34
2005	36	5	23	104.62	5.12
2006	42	4	19	102.14	5.52
2007	35	4	15	131.36	8.80
2008	18	3	9	116.03	7.26

Table 2. Mississippi Beef Cattle Improvement Association Spring Bull Sale participation and sale expense summary, 2008 to 2009[1]

Sale year	Bulls in sale, n	Breeds in sale, n	Consignors to sale, n	Average sale expenses, $/bull in sale	Sale expenses, % of gross sales
2008	14	4	4	128.70	7.83
2009	28	4	12	71.80	4.31

[1]The Mississippi Beef Cattle Improvement Association Spring Bull Sale was held in conjunction with the Hinds Community College Bull Test Sale. The values presented here do not include the data from the Hinds Community College Bull Test Sale.

The high selling lot price ranged from $2,450 per bull to $4,750 per bull and was highly variable from November 2003 to March 2009 (Figures 1 and 2). The average sale price was much more consistent during this time period, ranging from $1,708 per bull to $2,260 per bull. It is also notable that these low and high average sale prices occurred at consecutive bull sales during November 2007 and March 2008, respectively. Many factors impacted prices received for bulls at consignment sales including current market price levels, bull supply and demand factors in the marketing region, and bull quality attributes.

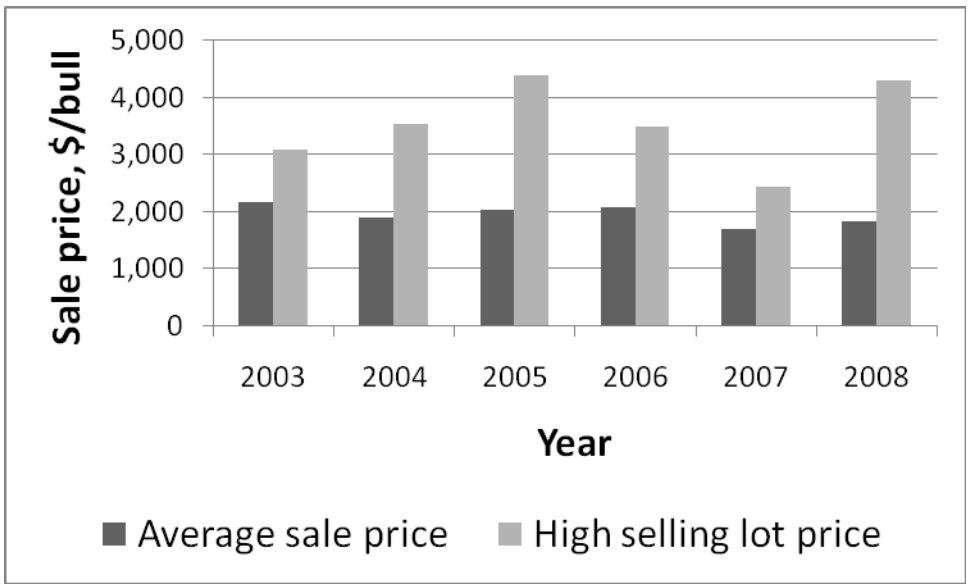

Figure 1. Sale price trends for the Mississippi Beef Cattle Improvement Association Fall Bull Sale, 2003 to 2008

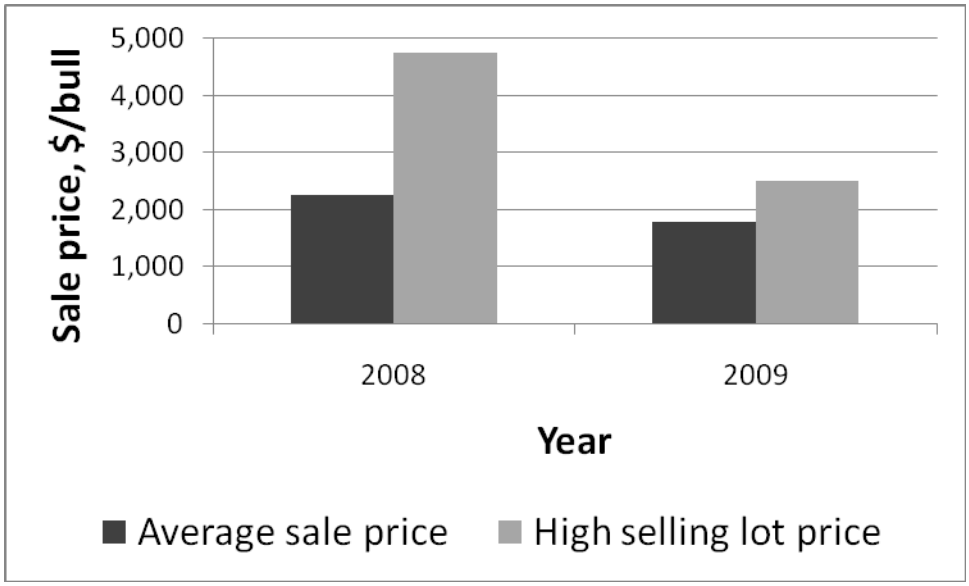

Figure 2. Sale price trends for the Mississippi Beef Cattle Improvement Association Spring Bull Sale, 2008 to 2009

Implications

Mississippi BCIA has a long history of promoting beef cattle improvement and quality genetics through annual bull sales. Potential consignors to MBCIA Bull Sales should consider previous sale expense and return levels in making decisions about sale participation. The MBCIA Bull Sales offer Mississippi beef cattle breeders and bull test participants with bull marketing opportunities twice a year at very competitive sale expense levels. General sale price averages have held steady over the last 6 yr, but sale prices for individual bull lots have been highly variable. This emphasizes the need for high-quality bull consignments to MBCIA bull sales for individual consignors to achieve marketing success through these sales.

Literature Cited

Lacy, R. C., R. D. Little, C. S. Forrest, and T. L Gregory. 2003. Attitudes of Small Beef Producers Toward Selected Production and Marketing Practices. Bulletin 1126. Mississippi Agricultural and Forestry Experiment Station. Mississippi State, MS.

Little, R. D., R. C. Lacy, C. S. Forrest, and T. L Gregory. 2003. Attitudes of Large Beef Producers Toward Selected Production and Marketing Practices. Bulletin 1128. Mississippi Agricultural and Forestry Experiment Station. Mississippi State, MS.

Mississippi Beef Cattle Improvement Association Centralized Ultrasound Scanning Program

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Extension Summary

Ultrasound scanning for carcass traits is a useful tool for obtaining valuable carcass information from a live animal. Body composition traits measured using ultrasound include: rib fat thickness, rump fat thickness, ribeye area, and intramuscular fat percentage (marbling). Each of these traits is at least moderately heritable and significant in the determination of red meat quality and yield. It may be advantageous for several producers in an area to arrange for an ultrasound field technician to service multiple farms in one area in one trip. This may help lower the cost of scanning for an individual farm by spreading the travel costs of the technician across several farms. The Mississippi Beef Cattle Improvement Association (MBCIA) identified facilitation of centralized ultrasound body composition data collection as an association priority in 2005. Through the centralized ultrasound scanning program, MBCIA facilitates ultrasound body composition scanning of registered Mississippi cattle by accommodating ultrasound scanning sessions at centralized locations for multiple breeders at one time. The objectives of the MBCIA centralized ultrasound scanning program are to: 1) educate Mississippi beef cattle producers on ultrasound scanning procedures and results interpretation, 2) to encourage collection of ultrasound scans for body composition in Mississippi seedstock beef cattle operations, and 3) to promote utilization of carcass trait information in beef cattle selection decisions within Mississippi. Each new program yr additional producers participate in the program, and the number of cattle breeds represented increases. Producer feedback has consistently been positive about the MBCIA ultrasound scanning program. Most of the participants are small scale seedstock breeders. This data helps determine genetic improvements needed in individual herds and can be used to improve marketability of these seedstock. The MBCIA centralized ultrasound scanning program has been instrumental in furthering adoption and understanding of this technology by Mississippi beef cattle operations.

Introduction

Ultrasound scanning for carcass traits is a useful tool for obtaining valuable carcass information from a live animal. Ultrasound technology uses sound waves to develop images of body composition. Body composition traits that can be measured include 12th to 13th rib fat thickness, rump fat thickness, ribeye area, and intramuscular fat percentage (marbling). Each of these traits is at least moderately heritable and is significant in the determination of red meat quality and yield for individual animals.

An Ultrasound Guidelines Council (UGC) certified technician can perform ultrasound body composition scanning services for a fee. The U.S. Beef Breeds Council charged the UGC with responsibility for developing, maintaining

and governing the proficiency-testing protocol and standards for beef cattle ultrasound technician certification. The UGC coordinates proficiency testing and certification for image collection (field certification) and laboratory interpretation (lab certification). Arranging for a UGC certified technician to scan cattle often needs to be scheduled well in advance of the desired scanning date. Breed associations may have additional breed-specific ultrasound guidelines and publish a list of technicians that are certified for the particular breed.

It may be advantageous for several producers in an area interested in having their bulls or heifers scanned to arrange for an ultrasound field technician to service multiple farms in one area in one trip. This may help lower the cost of scanning for an individual farm by spreading the travel costs of the technician across several farms. The Mississippi Beef Cattle Improvement Association (MBCIA) identified facilitation of centralized ultrasound body composition data collection as an association priority in 2005.

The MBCIA is a group of purebred and commercial beef cattle producers, commodity association representatives, and Mississippi State University Extension Service and Mississippi Agricultural and Forestry Experiment Station personnel with the common purpose of promoting beef cattle improvement within Mississippi. Through the centralized ultrasound scanning program, MBCIA facilitates ultrasound body composition scanning of registered Mississippi cattle by accommodating ultrasound scanning sessions at centralized locations for multiple breeders at one time. The objectives of the MBCIA centralized ultrasound scanning program are to: 1) educate Mississippi beef cattle producers on ultrasound scanning procedures and results interpretation, 2) to encourage collection of ultrasound scans for body composition in Mississippi seedstock beef cattle operations, and 3) to promote utilization of carcass trait information in beef cattle selection decisions within Mississippi.

Procedures

The MBCIA board of directors approved a new qualification requirement, beginning with the 2006 Fall Bull Sale, for bulls to meet BCIA Fall Bull Sale eligibility. This sale eligibility requirement states that at least one of the following: 1) ultrasound EPD, 2) carcass EPD, or 3) yearling ultrasound body composition scan results accepted by the respective breed association are required. At the November 10, 2005, MBCIA board of directors meeting, Dr. Rhonda Vann, a UGC certified field technician, volunteered to ultrasound scan bulls at central ultrasound scanning sites to assist in qualifying bulls for the BCIA sale. Both the Hinds Community College Bull Test facility representatives and individual MBCIA board members volunteered their locations as potential centralized ultrasound scanning sites for the new MBCIA program. Set scanning dates including both spring and autumn dates were recommended by the board at the inception of the program.

The MBCIA bull sale manager agreed to work with Dr. Vann to contact previous bull sale consignors and other potential interested producers with scanning details. The price for scanning was set at $15 per head to cover expenses including image interpretation by a UGC certified laboratory. Information on breed association requirements, scanning age ranges, and other relevant program details were distributed to all MBCIA members and additional beef cattle producers via the

MBCIA monthly newsletter; MBCIA website, *msucares.com/livestock/beef/mbcia/*; announcements at state, county, and area producer meetings; popular press articles, and MBCIA display booth.

Interested program participants were directed to contact Dr. Vann to arrange scanning sessions. In the spring of 2006, the program evolved from solicitation of producer participants on set, advertised scanning dates to flexible scheduling of scanning sessions based on producer demand. Scanning locations also varied depending on producer demand for the program. At the November 2007 MBCIA board of directors meeting, the board took action to expand ultrasound scanning opportunities to all beef cattle including bulls that are not marketed through MBCIA sales and heifers.

Breeders interested in finding a technician and scanning cattle on their own ranches outside of the MBCIA program were provided with information on locating a UGC certified ultrasound technician. The UGC approved field technician list was also posted on the MBCIA website and direct mailed to MBCIA newsletter recipients on several occasions. The Mississippi Beef Quality Assurance Program and Mississippi Master Cattle Producer Program resource materials were updated in 2006 and again in 2008 to include information on ultrasound scanning beef cattle for body composition. Finally, the Mississippi State University Extension Service Publication 2509, *Ultrasound Scanning Beef Cattle for Body Composition*, was published in 2008 to serve as an additional information resource for Mississippi beef cattle producers on this technology.

Results

In 2005, only 4 producers participated in the ultrasound program (Table 1). In 2006 and 2007 the number of annual program participants grew slightly to 6 producers. Then in 2008, producer participation more than doubled with 14 producers participating. In 2009, producer participation increased again to 18 producers participating in the MBCIA ultrasound program (Table 2). Each new program yr additional producers participate in the program, and the number of cattle breeds represented increases.

Table 1. Participation in the Mississippi Beef Cattle Improvement Association centralized ultrasound scanning program, 2005 to 2008

Program Yr	Animal Breed and Gender	No. of Animals	Producer Participants
2005	Angus bulls	3	2
	Charolais bulls	3	1
	Simmental bull	1	1
2006	Angus bulls	15	3
	Brangus bull	1	1
	Charolais bull	1	1
	Red Angus bulls	2	1
2007	Angus bulls	16	3
	Brangus bulls	6	1
	Charolais bulls	2	1
	Gelbvieh bulls	4	1
2008	Angus bulls	16	5
	Angus heifers	12	4
	Brangus bulls	2	1
	Charolais bulls	10	1
	Charolais heifers	6	1
	Simbrah bull	1	1
	Santa Gertrudis bull	1	1

Producer feedback has consistently been positive about the MBCIA ultrasound scanning program. Most of the participants are small scale seedstock breeders who are now building herd IMF and REA EPD databases by submitting ultrasound body composition data to breed associations for use in these calculations or simply documenting ultrasound body composition data for breeds that do not yet utilize this data to calculate EPD. This data helps determine genetic improvements needed in individual herds as well and can be used to improve marketability of these seedstock inventories.

Table 2. Participation in the Mississippi Beef Cattle Improvement Association centralized ultrasound scanning program, 2009

Program Yr	Animal Breed and Gender	No. of Animals	Producer Participants
2009[1]	Angus bulls	24	5
	Angus heifers	2	1
	Beefmaster bulls	8	4
	Beefmaster heifers	4	1
	Brangus bulls	3	1
	Hereford bulls	4	1
	Hereford heifers	8	1
	Gelbvieh bulls	3	1
	Red Brangus bulls	4	2
	SimAngus bull	1	1
	South Poll bull	1	1

[1]The 2009 program yr includes data from January 1, 2009 to July 31, 2009.

Implications

Ultrasound scanning technology is a useful tool for collecting body composition data on live animals. The resulting data are less expensive and time consuming to collect compared with actual harvest data from beef carcasses. This technology allows seedstock producers to collect body composition data on prospective breeding animals for use in genetic improvement efforts. Ultrasound scanning results help breeders select cattle that best fit market specifications. This information provides breeders with powerful information for seedstock marketing as well. The MBCIA centralized ultrasound scanning program has been instrumental in furthering adoption and understanding of this technology by Mississippi beef cattle operations.

Acknowledgments

The authors appreciate the cooperation from the Hinds Community College Bull Test and Mississippi beef cattle breeders in hosting MBCIA centralized ultrasound scanning sessions.

Mississippi Master Cattle Producer Program Update

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Extension Summary

The Mississippi Master Cattle Producer Program began in 2006 as a comprehensive training offered by the Mississippi State University Extension Service in major beef cattle production topic areas. The 8-session interactive course is designed for persons interested in learning more about improving beef cattle production and marketing practices. This training approach complements in-depth subject matter training programs such as short courses. Training focuses on improving overall management and decision-making skills and developing a broad beef cattle production knowledge base. The Master Cattle Producer Program was updated in 2009 with new course materials and format including Internet-based training modules to meet the needs of persons wanting to complete the training at their own pace and schedule. Each online module consists of an Adobe Acrobat file with approximately 70 to 80 slides with associated scripts. The examination for each training topic is an interactive Adobe Acrobat form containing 15 multiple-choice questions derived from the training materials. The Beef Quality Assurance training module is additionally offered as a video-based training via MediaSite. Future additions to the program will include development of a comprehensive Mississippi Beef Cattle Producers Guide reference.

Introduction

Master Cattleman-type educational programs are offered by state Extension Services to beef cattle producers in numerous U.S. states. These highly visible programs typically consist of a series of instructional sessions on a variety of general beef production topics. Many of the Master Cattleman programs certify participants as "Master Cattlemen", upon completion of a particular curriculum and set of basic requirements.

The Mississippi Master Cattle Producer Program is a comprehensive training offered by the Mississippi State University Extension Service in major beef cattle production subject areas. The 8-session interactive course is designed for persons interested in learning more about improving beef cattle production and marketing practices. This training approach complements in-depth subject matter training programs such as short courses. Training focuses on improving overall management and decision-making skills and developing a broad beef cattle production knowledge base.

Procedures

The Mississippi Master Cattle Producer Program was first launched in Mississippi in January 2006 as a collaborative effort with the Auburn Cooperative Extension System taught over the Extension interactive video system. At that time, the training program consisted of eight 3-hr sessions on the following topics: 1) beef cattle nutrition, 2) forage systems, 3) reproductive management, 4) selection for optimum genetics, 5) management and marketing, 6) herd health and handling

practices, 7) the product: Yield and Quality Grades, and 8) Beef Quality Assurance (BQA). From course initiation in 2006 through 2008, course participants were required to complete at least 6 of the 8 sessions and become BQA certified to graduate as a Mississippi Master Cattle Producer.

This training opportunity was offered at 10 distance education sites in each state, including Attala, Clarke, Forrest, George, Hinds, Lafayette, Lee, Oktibbeha, Pike, and Winston counties in Mississippi. Nearly 400 beef cattle producers in Mississippi and Alabama completed the comprehensive Master Cattle Producer Training Program via interactive video from January to March 2006. This initial training was videotaped and made available as a self-study course on digital video disc as a 4-disc set with printed course handouts after March 2006. The self-study course was designed for persons interested in learning more about Mississippi beef cattle production at their own pace.

The Master Cattle Producer Program was updated in 2009 with a new format, course materials, and topic areas. Training currently consists of 8 modules in beef cattle production subject areas. However, producers must now successfully review all course materials and complete the exams for all 8 training topics to be eligible for Master Cattle Producer certification. Beef cattle producers enrolled in the Master Cattle Producer program complete approximately 24 h of training which now includes the following: 1) beef cattle nutrition, 2) forage systems, 3) beef cattle reproduction, 4) breeding and genetics, 5) economics and marketing, 6) herd health and handling, 7) beef end product, and 8) BQA.

The Mississippi Master Cattle Producer Program Internet-based training modules, first made available in 2009, are online at *msucares.com/livestock/beef/mcp*. Course participants can view online training modules and download training materials free of charge. Alternately, participants completing the program can receive printed course materials, a metal farm sign (Figure 1), Master Cattle Producer cap, and certificate of completion for a course fee of $75. The online version of the Mississippi Master Cattle Producer Program is also made available to Mississippi State University Extension Service agents for up to 24 h of in-service training credit.

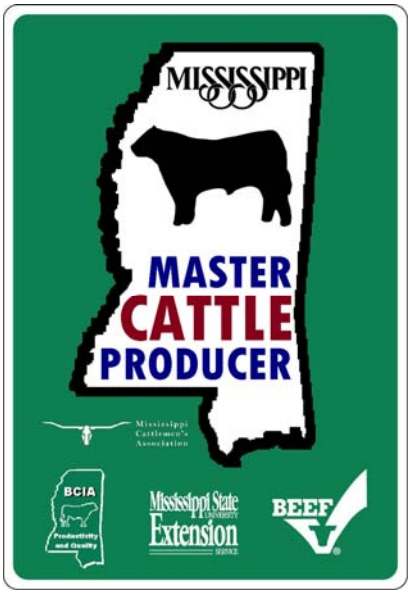

Figure 1. Mississippi Master Cattle Producer Program metal farm sign

Each online module consists of an Adobe Acrobat file with approximately 70 to 80 slides with associated scripts. The training materials cite current Mississippi State University Extension Service publications as supporting references and contain information on how to access those publications on the Internet at *msucares.com/livestock/beef/beefpubs.html*. These reference materials contain detailed

information beyond what is covered in the Master Cattle Producer training slides. Contact information for the Extension Beef Cattle Specialists is also included in the training materials to encourage course participants to seek answers to any questions they may have when reviewing training materials.

The examination for each training topic is an interactive Adobe Acrobat form containing 15 multiple-choice questions derived from the training materials. The examinations can be e-mailed directly to the Extension Beef Cattle Specialist administering the program by clicking the "E-mail form" button on the form. These forms can also be saved and then e-mailed or printed and then faxed or mailed to the program administrator. Participants must answer a minimum of 12 out of 15 (80 percent) questions correctly to successfully complete a particular examination and receive credit for the associated training module. Examinations may be taken multiple times if needed to pass them.

The BQA training module is additionally offered as a video-based training via MediaSite. The BQA video training consists of 5 MediaSite presentations including: Mississippi BQA Program introduction, targeted breeding, responsible culling, proper management, and Mississippi BQA Program conclusions. These video presentations include a speaker addressing Mississippi BQA Program topics utilizing the BQA program display booths. A Microsoft PowerPoint slide show runs simultaneously on the computer screen and corresponds to the video presentation.

Results

Though the majority of past and present participants in the Mississippi Master Cattle Producer Program are Mississippi beef cattle producers, Mississippians from other segments of the beef cattle industry, such as feed retailers, as well as out-of-state beef cattle producers participate in the program. Despite its recent availability, the online version of the program already has numerous participants actively enrolled. It is expected that course participation will increase as popular press, newsletter, and radio advertisements announcing program availability and details are launched in Autumn 2009.

Implications

The Mississippi Master Cattle Producer Program provides interested participants with a comprehensive training opportunity in 8 major beef cattle production topic areas. The program is offered via the Internet as a self-study training to meet the needs of persons wanting to complete the training at their own pace and schedule. A live Internet-based Master Cattle Producer training is scheduled for January 2010. Future additions to the program will include development of a comprehensive Mississippi Beef Cattle Producers Guide reference and continued updates to program materials as warranted.

MSUcares Beef Cattle and Small Ruminant Website Expansions

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Extension Summary

The Mississippi State University Extension Service and Mississippi Agricultural and Forestry Experiment Station joint website MSUcares, *http://msucares.com*, includes beef cattle and small ruminant websites. Both of these commodity-specific websites address the educational needs of the Mississippi beef cattle, goat, and sheep industries and have undergone notable expansions in recent years. Website usage statistics indicate that the average time spent on web pages within both the beef cattle and small ruminant websites increased over the last 3 calendar yr. Both websites were widely utilized. During this period, the top 3 most viewed web pages within the MSUcares beef cattle website were the beef cattle home page, Mississippi Hay Directory page, and Mississippi Beef Cattle Improvement Association home page. The most viewed web pages within the MSUcares small ruminant website were the small ruminant home page, publications, youth, and Meat Goat Memos pages. The MSUcares beef cattle and small ruminant websites are constantly adapting to meet industry educational needs with at least weekly updates and routine website expansions as new educational programs or resources materials are developed.

Introduction

The Mississippi State University Extension Service and Mississippi Agricultural and Forestry Experiment Station (MAFES) share a common web address. The Internet home page for both organizations is, MSUcares, *msucares.com*. The acronym 'cares' in this joint website address stands for 'Coordinated Access to the Research and Extension System'.

Links to commodity-specific Extension and research websites are located the main MSUcares homepage. Among these commodity-specific websites are the MSUcares beef cattle and small ruminant websites, both of which have undergone notable expansions in recent years. Other livestock-related MSUcares websites include youth livestock, equine, dairy cattle, and swine websites.

Procedures

The MSUcares beef cattle website, *msucares/livestock/beef* addresses the educational needs of the Mississippi beef cattle industry. It currently consists of 35 web pages including a home page, calendar of events, and contact information page. Other web pages within the MSUcares beef cattle website are dedicated to the following topics: Extension publications, *Cattle Business in Mississippi* articles, Cattle Market Notes, Leading Edge newsletters, Mississippi Master Cattle Producer program, Mississippi Beef Quality Assurance program, Mississippi State University artificial insemination school, Extension beef cattle short courses, Mississippi Beef Cattle Improvement Association (10 web

pages including home page, membership application, board of directors, by-laws, newsletter, monthly management calendar, bull sale information, bull sale results, Hinds Community College bull test, and South Mississippi Gain-on-Forage bull test pages), Cattlemen's Exchange, stocker cattle, feeder calf board sales, Farm to Feedlot Program (includes program information and contest web pages), heifer development, MAFES beef cattle herds, MAFES livestock production sale, Mississippi Animal Disease and Disaster Preparedness Program, beef cattle drought resources, beef cattle hurricane resources, Mississippi Hay Directory, commodity feed sources directory, and Mississippi beef cattle seedstock directory.

The initial recent expansion of the MSUcares beef cattle website was in 2004. Since then, new web pages have been added to the website each yr. The website has also been redesigned twice to improve navigation, organization, and appearance.

The MSUcares small ruminant website, *msucares/livestock/smallruminant* addresses the educational needs of the Mississippi goat and sheep industries. It was launched in November 2007 as part of the livestock section of the MSUcares website. The MSUcares small ruminant website currently consists of 7 web pages including a home page, calendar of events, publications page, Meat Goat Memos newsletter page, youth page, links of interest page, and contact information page.

Results

Website usage statistics indicate that the average time spent on web pages within both the beef cattle and small ruminant websites increased over the last 3 calendar yr. For the beef cattle web pages, the average viewing time spent per page was 1 min 23 s in 2007, 1 min 32 s in 2008, and 1 min 36 s in 2009. Likewise, the average viewing time spent per page on the small ruminant web pages was 1 min 3 s in 2007, 1 min 17 s in 2008, and 1 min 20 s in 2009.

From January 1, 2007 through August 17, 2009, the beef cattle website recorded 80,766 page views (47,867 unique page views) in 2007; 56,554 page views (32,797 unique page views) in 2008; and 31,073 page views (19,446 unique page views) in 2009. During this period, the top 3 most viewed web pages within the MSUcares beef cattle website were the beef cattle home page, Mississippi Hay Directory page, and Mississippi Beef Cattle Improvement Association home page. Other web pages making the top 10 most viewed beef cattle pages in at least 2 out of the last 3 calendar yr were the publications, feeder calf, Mississippi Commodity Feed Source Directory, *Cattle Business in Mississippi* articles, MAFES beef cattle, and Beef Quality Assurance pages.

The ranking of each web page within the MSUcares beef cattle website corresponds with Extension programming expansions and updates. For example, a large number of beef cattle Extension publications were developed and listed on the publications page in 2008 and 2009. This web page rose from the eleventh most viewed page within the beef cattle website in 2007 to seventh in 2008 and then up to fourth in 2009. Similarly, the feeder calf web page was initiated in 2008 in conjunction with initiating the feeder calf board sale program and ranked as the fifth most viewed page within the beef cattle website in both 2008 and 2009. In addition, the beef cattle calendar of events and artificial insemination school web pages consistently rose in the beef cattle page view

rankings from 2007 to 2009, corresponding to efforts to increase the visibility of both.

From November 3, 2007 through August 17, 2009, the small ruminant website recorded 361 page views (168 unique page views) in 2007; 5,659 page views (3,055 unique page views) in 2008; and 3,818 page views (2,323 unique page views) in 2009. During this period, the top 2 most viewed web pages within the MSUcares small ruminant website were the small ruminant home page and publications page. The youth and Meat Goat Memos web pages ranked third and fourth, respectively, for page views within the small ruminant website from 2007 to 2009.

Implications

The MSUcares beef cattle and small ruminant websites are constantly adapting to meet the educational needs of Mississippi's beef cattle, goat, and sheep industries. Website updates occur at least weekly. Website expansions are routinely undertaken as new educational programs or resources materials are developed. Website usage data show that these 2 websites are widely utilized.

Mississippi Hay Directory Data Summary, 2006-2009

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Extension Summary

An Internet-based hay directory was established in Mississippi in July 2006 in response to beef cattle producer requests. Mississippi Hay Directory listing criteria and submission methods were chosen by Extension personnel to collect statewide hay production demographics and producer communication method utilization information. Analysis of directory listings over a 3-yr period provided Extension personnel with valuable information for future producer education efforts. Average hay prices through the directory were $30.41 per bale for large round bales and $4.40 per bale for small square bales. The number of large round bales listing was nearly 3 times that of small square bale listings. The predominant large round bale packages were 4 ft wide and 5 ft in diameter, and the most often listed small square bale packages were 44 to 55 lb. Bermudagrass and mixed grass were the forage species noted in over 3 in 5 directory listings. Alicia and Tifton 44 bermudagrass were the most commonly specified forage cultivars among listings. The most frequently offered service was loading for buyers with advance notice at 73.5 percent of listings, whereas only 5.8 percent of listings offered forage quality analyses. In addition, forage species and cultivars were commonly misspelled. Directory use by producers exceeded expectations and continues to provide current demographic information for Mississippi hay production.

Introduction

An Internet-based hay directory was initiated by the Mississippi State University Extension Service in July 2006. The directory began in response to beef cattle producer requests during a period of drought and hay scarcity in Mississippi. The Extension beef cattle specialist administering the hay directory developed specific listing criteria and collected directory information over a 3-yr period to obtain demographics about Mississippi hay production for use in Extension programming.

Mississippi State University Extension Service personnel designed the Mississippi Hay Directory listing criteria to include key demographics regarding hay production in the state. Information requested from hay producers included specific details in the following categories: 1) producer contact information, 2) forage species and cultivars, 3) quantity of hay offered, 4) bale type and size, 5) services offered, 6) pricing method and level and 7) additional hay description. The objectives of analyzing data submitted through the Mississippi Hay Directory are to 1) determine hay production and marketing demographics for Mississippi and 2) identify of educational needs of producers.

Procedures

Clientele utilizing the Mississippi Hay Directory to advertise hay for sale were provided multiple listing submission options including: 1) complete and submit portable

document format form online, 2) download and later e-mail submission of online form, 3) fax printed form, 4) mail printed form, and 5) contact via telephone for oral data submission. County and area Extension educators were supplied with printed copies of the directory listing submission form and were encouraged by state specialists to assist producers with listing submission upon request. The listing submission form was direct mailed to members of the Mississippi Beef Cattle Improvement Association and distributed at county meetings of the Mississippi Cattlemen's Association during the initial 6 mo of the directory. The Mississippi Cattlemen's Association magazine, *Cattle Business in Mississippi*, included hay directory advertisements in many issues. This publication was distributed 10 times per yr to approximately 4,000 persons each issue. Directory guidelines, listing submission forms, and relevant producer education information were posted on the Mississippi State University Extension Service beef cattle website, *msucares.com/livestock/beef/mshay.html*, along with the directory.

Directory listings were received by the state Extension beef cattle specialist administering the directory. Listings were updated at least weekly and often within 48 h of listing submission. Thorough review and editing of listing submission information was necessitated by spelling errors, irrelevant information, and listing claims that were deemed inappropriate for the directory. Listings were posted on the Mississippi Hay Directory website *msucares.com/livestock/beef/mshay.html* for 60 d.

Results

In the first 3 yr of Mississippi Hay Directory existence 400 listings were submitted and posted to the directory (yr 1, n = 103; yr 2, n = 203; yr 3, n = 94). Directory usage fluctuated over time. Listings by month and year appear in Figure 1. Listing submissions tended to increase in the late spring months as hay production increased, steadily increase throughout the summer months coinciding with peak hay production, and then decline throughout the autumn and winter months as hay harvests slowed and supplies were utilized for winter feeding programs. Listings were received from 68 out of 82 (82.9 percent) Mississippi counties. The top 10 counties for number of directory listings were Rankin (n = 33), Simpson (n = 27), Pearl River (n = 19), Neshoba (n = 17), Scott (n = 14), Stone (n = 14), Jones (n = 12), Tate (n = 12), Benton (n = 11), and Oktibbeha (n = 11).

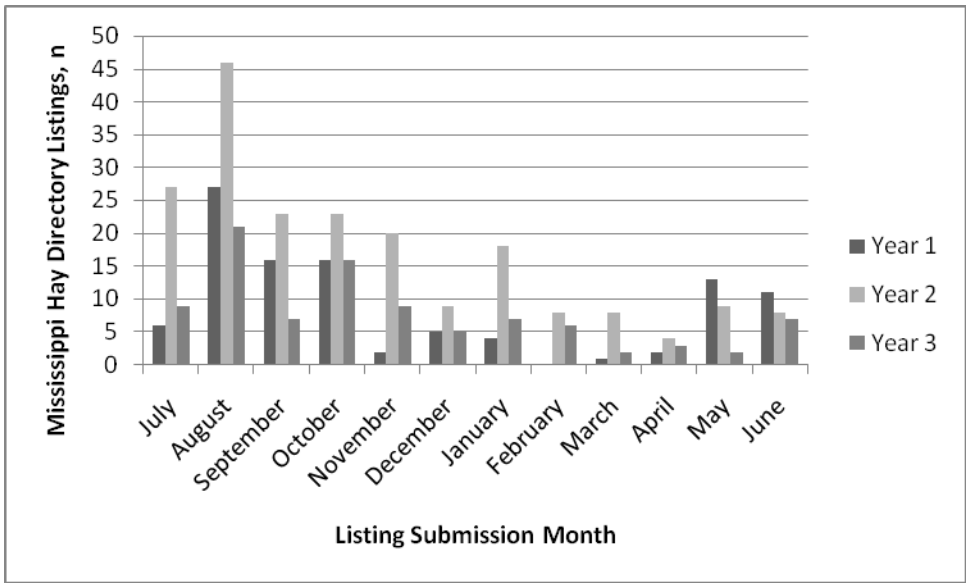


Figure 1. Mississippi Hay Directory listing submissions by month and year, July 2006 to June 2009

Multiple directory listing submission methods were offered to gauge producer use of these different communication methods. This information assisted Extension personnel in planning future producer communications. Use of electronic methods of communication (Internet and e-mail submission) accounted for 43.4 percent of listing submissions (yr 1, 38.8 percent; yr 2, 42.4 percent; yr 3, 50.0 percent) over the 3-yr period. This indicates that a significant and increasing proportion of Mississippi hay producers are willing to use electronic communication methods. Fax submission of hay directory listings (37.8 percent) was the next most utilized method of communication. Direct mail (9.3 percent) and telephone (9.5 percent) submissions were the least utilized communication methods over the 3-yr period.

In Mississippi, 2006 and 2007 were generally considered drought yr in which in-state hay demand exceeded supplies. Over the 3-yr period, hay quantities offered through the directory averaged 307 large round bales and 1,947 small square bales per listing. The average number of both large round bales and small square bales per directory listing was highest in yr 2 (Table 1).

Table 1. Descriptive Statistics for Mississippi Hay Directory per listing hay bale quantities, July 2006 to June 2009

	Large Round Bale Quantity			Small Square Bale Quantity		
Directory Year	Average, bales/listing	Maximum, bales/listing	Minimum, bales/listing	Average, bales/listing	Maximum, bales/listing	Minimum, bales/listing
1	306	2,500	10	1,610	6,000	23
2	323	3,300	10	2,166	25,000	50
3	271	1,000	26	1,629	5,000	200
Total	307	3,300	10	1,947	25,000	23

Average, maximum, and minimum hay prices for large round hay bales and small square hay bales by directory yr appear in Table 2. General hay price levels on the directory tended to decline throughout this 3-yr period, particularly for small square bales. All listings indicating pricing method showed hay priced on a per bale basis. Hay was not priced on a per ton basis in any of the listings. Negotiable prices were offered by 5.3 percent of hay suppliers. During the study period, out-of-state hay was often relatively expensive compared with in-state hay due to added freight cost.

Table 2. Descriptive Statistics for Mississippi Hay Directory listing hay bale prices, July 2006 to June 2009

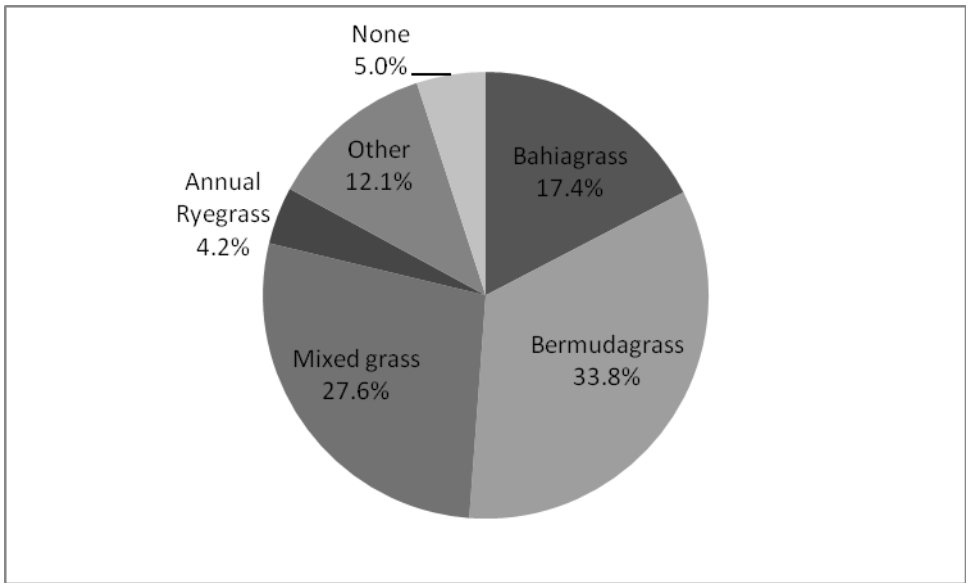
	Large Round Bale Price			Small Square Bale Price		
Directory Year	Average, $/bale	Maximum, $/bale	Minimum, $/bale	Average, $/bale	Maximum, $/bale	Minimum, $/bale
1	30.18	60.00	10.00	5.29	10.00	3.50
2	31.92	55.00	15.00	4.14	7.00	2.00
3	29.36	50.00	10.00	4.05	5.50	3.00
Total	30.41	60.00	10.00	4.40	10.00	2.00

Most hay listings (81.3 percent) offered hay in large round bale packages. Small square bales were offered in 32.3 percent of the listings. Some listings did not denote the bale package, and no listings indicated that hay was baled in large square units or as baleage. Of the large round hay bales, the majority (56.3 percent) were 4 ft wide and 5 ft in diameter. The 5 ft wide and 5 ft in diameter and 5 ft wide and 5 ft in diameter large round bale sizes accounted for 25.2 and 14.8 percent, respectively, of the large round bale listings. Of the small square hay bale listings, the majority (48.8 percent) listed bale weight in the 45 to 55 lb range. Small square bales weighing in the 55 to 65 lb, 65 to 75 lb, and > 75 lb ranges made up 31.8, 8.5, and 2.3 percent, respectively, of small square bale listings.

The most common service offered was loading hay for buyers. Nearly three-quarters (73.5 percent) of the hay suppliers offered this service. About 3 in 10 (29.3 percent) directory listings specified that pre-purchase arrangements for later pick-up or

delivery were offered. Even fewer (22.5 percent) of hay listings stated a willingness to provide delivery services. Of those, the average delivery range offered was 80.5 mi from the hay source. Only 5.8 percent of hay listings indicated that forage analysis results were available. However, subjective hay quality terminology such as 'horse quality hay' and 'excellent quality' were commonly included in directory listing submission information despite most of these listings not noting availability of forage analysis results.

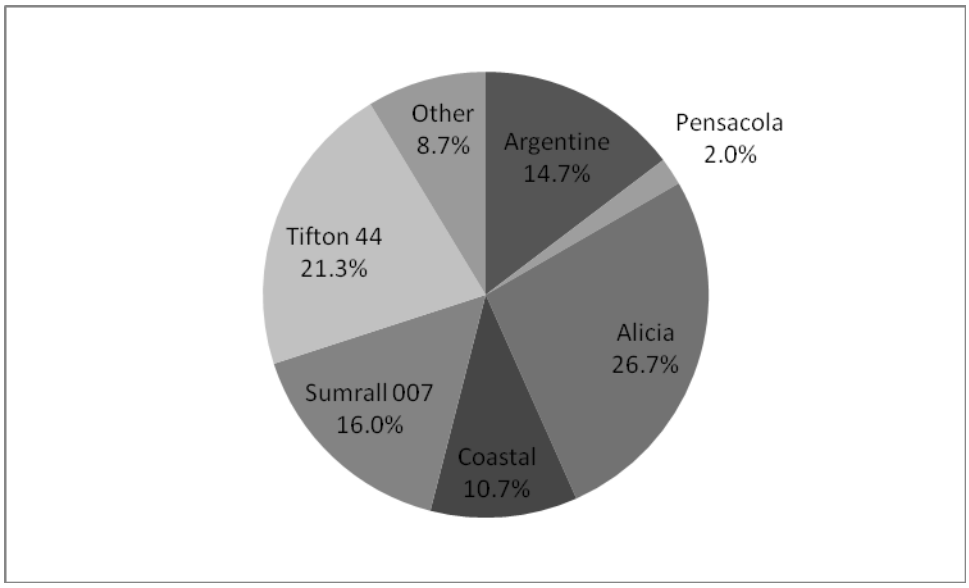
Forage species was noted in 95.0 percent of directory submissions. The top 4 forage species among the listings for frequency of listing were bermudagrass, mixed grass, bahiagrass, and annual ryegrass (Figure 2). Other forage species listed included dallisgrass, Johnsongrass, crabgrass, broadleaf signalgrass, tall fescue, orchardgrass, timothy, wheat straw, alfalfa, sericea lespedeza, crimson clover, ball clover, soybean, and peanut vines.



[1]Percentage of all listings

Figure 2. Mississippi Hay Directory forage species citations, July 2006 to June 2009[1]

Only 33.3 percent of listings provided forage cultivar (variety) information. The 4 of the top 5 most commonly cited forage cultivars were bermudagrass cultivars, Alicia, Tifton 44, Sumrall 007, and Coastal (Figure 3). The bahiagrass cultivars, Argentine and Pensacola, were the 4th and 6th most frequently cited forage cultivars.



[1]Only 33.3% of directory listings noted forage cultivars.

Figure 3. Mississippi Hay Directory forage cultivar citation percentages, July 2006 to June 2009[1]

Forage species and cultivars were commonly misspelled. Bahiagrass was the most frequently misspelled forage species, with 'Byhaliagrass' being the most often used misspelling. This may be in part due to the existence of a town in Marshall County, MS named 'Byhalia'. In addition, forage species and cultivar did not always match.

Website usage statistics show that, in the first 15 mo of existence, the directory listings were downloaded 12,184 times. In the second yr, the directory website recorded 8,362 unique page visits. Increased utilization of the beef cattle Extension website also resulted.

Implications

The Mississippi Hay Directory was readily adopted by producers as a means to advertise hay for sale on a statewide basis. The directory rapidly achieved use levels in the first 3 yr of existence that provide adequate information to adapt beef cattle Extension programming efforts to better service producer needs. Specific educational gaps were identified based on listing submissions in 2 primary areas, 1) forage quality and 2) forage species and cultivars. Information generated by the directory provides current educational material for presentations at local beef cattle production and cattlemen's association meetings. The directory remains a valuable source of demographics on hay production and marketing as well as producer use of various communication methods throughout the state.

Mississippi Animal Disease and Disaster Preparedness Program

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[3]Mississippi Board of Animal Health, Jackson, MS

Extension Summary

The Mississippi Animal Disease and Disaster Preparedness Program began in 2006 to develop a state-level producer contact list to assist livestock producers and equine owners in an animal health disease situation or disaster. The MADDPP is designed to establish a communication network amongst these operations and state animal health officials prior to emergency events. Enrollment in the MADDPP is accomplished in 3 simple steps: 1) fill out a producer registration form, 2) return completed forms to the State Veterinarian at the Mississippi Board of Animal Health, and 3) receive a unique producer registration confirmation in the mail. The information provided as part of this state animal disease preparedness program is accessed only on an as-needed basis by animal health officials in the event of an animal health emergency. In the initial year of MADDPP availability, 1,766 participants enrolled in the program. However, enrollment rates slowed in subsequent months. Efforts to increase program visibility were undertaken to encourage enrollments. By July 26, 2009, enrollment in the MADDPP was 7,822 participants, a 364 percent increase over the number of participants 18 mo earlier. It is estimated that there are over 29,000 potential MADDPP participants, which means that 26.7 percent of potential enrollments were completed by July 2009. This shows recent progress in program adoption rates, but future enrollment increases are needed to fully achieve program objectives. Beef cattle and equine operations are the largest segments of the Mississippi animal agriculture industries in terms of number of operations and have the highest rates of participation in MADDPP to date. Therefore, these industries are essential targets for program adoption.

Introduction

The Mississippi Animal Disease and Disaster Preparedness Program (MADDPP) was initiated in 2006 and formally named MADDPP in Spring 2007 as a very simple and useful program for livestock producers and equine owners. Its basic objective is to develop a state-level producer contact list to assist livestock producers and equine owners in an animal health disease situation or disaster. The program is administered by the Mississippi Board of Animal Health (MBAH).

It is very important that Mississippi livestock producers and equine owners move forward as an industry to safeguard the health of individual herds. The danger of a contagious disease outbreak in the national herd, whether by natural occurrence or terrorist attack, makes it imperative that the location of producers and their herds be readily available to animal health officials. Producer cooperation is essential for rapid disease response in the instance of a contagious disease outbreak.

Rapid response to disease events is critical to maintain the health of the state

herd. Certain diseases endanger the entire industry, and they could cripple the nation's economy if not controlled. Diseases such as Foot and Mouth Disease, Bovine Tuberculosis, or Johne's Disease have far-reaching potential for major economic impact on cattle producers. Similarly, Equine Viral Arteritis, Equine Herpesvirus, and Equine Infectious Anemia are examples of major diseases of concern for the horse industry. Quick and effective disease containment is vital for keeping a disease from affecting additional producers.

Another benefit of producer enrollment in the MADDPP is that it gives state animal health officials contact information for aid and relief efforts for natural disasters. Hurricanes, tornadoes, and floods are just a few of the possible relevant scenarios in Mississippi that may stimulate appreciation for this aspect of the program. A similar state-level program in Colorado has already benefited cattle producers in disasters. Colorado ranchers with registered farms were called by the Colorado Department of Agriculture's State Veterinarian's Office during blizzards. Those phone calls helped locate animals and find out if they had access to feed. Emergency hay drops then followed. Similarly, a state-level animal disease and disaster preparedness program in Mississippi would prove invaluable when severe weather or other disasters threaten local animal agriculture.

Procedures

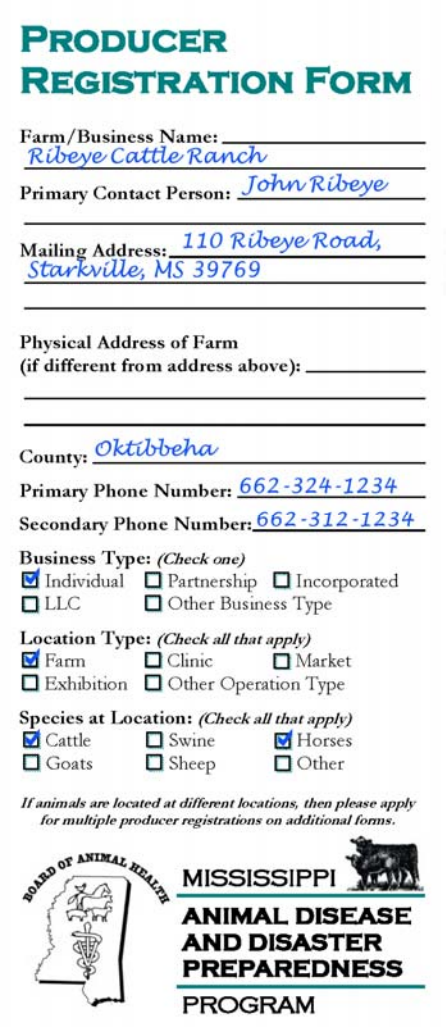
Enrollment in the MADDPP is accomplished by in simple steps: 1) fill out a producer registration form, 2) return completed forms to the State Veterinarian at the MBAH, and 3) receive a unique producer registration confirmation in the mail. Producer registration forms are available in brochures from the Mississippi State University Extension Service, MBAH, or local veterinarians. Filling out a producer registration form means basic contact information is made available to state animal health officials for use only in the event of an animal health emergency.

The Mississippi State University Extension Service assists livestock producers and equine owners in obtaining and filling out these forms. A sample completed form appears in Figure 1. Online forms are available on the website Mississippi State University Extension Service beef cattle website at *msucares.com/livestock/beef/diseasedisaster.html* and the MBAH website at *www.mbah.state.ms.us*. The Extension website additionally contains a Spanish-language version of the MADDPP brochure along with drought and hurricane resource pages.

Completed producer registration forms can be mailed, faxed, e-mailed, or completed online. Blank forms for completion are included in this publication. Contact information for the State Veterinarian's office is included on the producer registration form. The form is also designed as a prepaid postage self-mailer for producer convenience.

A random registration number is assigned to each completed producer registration form. The registered location is then covered under the program. Participating livestock producers and equine owners receive a letter from the State Veterinarian's office confirming receipt of registration information. In the event of an animal health emergency, this information is used to respond rapidly to protect each participant's animals and Mississippi's livestock industries. Otherwise, this basic

contact information remains locked in a database at the MBAH.



PRODUCER REGISTRATION FORM

Farm/Business Name: Ribeye Cattle Ranch

Primary Contact Person: John Ribeye

Mailing Address: 110 Ribeye Road, Starkville, MS 39769

Physical Address of Farm (if different from address above):

County: Oktibbeha

Primary Phone Number: 662-324-1234

Secondary Phone Number: 662-312-1234

Business Type: *(Check one)*
☑ Individual ☐ Partnership ☐ Incorporated
☐ LLC ☐ Other Business Type

Location Type: *(Check all that apply)*
☑ Farm ☐ Clinic ☐ Market
☐ Exhibition ☐ Other Operation Type

Species at Location: *(Check all that apply)*
☑ Cattle ☐ Swine ☑ Horses
☐ Goats ☐ Sheep ☐ Other

If animals are located at different locations, then please apply for multiple producer registrations on additional forms.

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ANIMAL DISEASE AND DISASTER PREPAREDNESS PROGRAM

Figure 1. Sample completed Mississippi Animal Disease and Disaster Preparedness enrollment form

Enrollment in the program is free to Mississippi livestock producers and equine owners. In an emergency, animal health officials cannot help protect Mississippi's livestock or horses if they do not know where animals are located. This basic contact information opens the lines of communication between producers and animal health officials. Registering a location means program participants will be alerted quickly when there is a potential animal disease threat. Livestock producers and equine owners then have the information and assistance needed to take action and protect both animals and associated investments.

Results

In the initial year of MADDPP availability, 1,766 participants enrolled in the program (Table 1). Despite the initial rate of program adoption, enrollment increases slowed in subsequent months, with only 385 additional program enrollments in 2007. Efforts to increase MADDPP participation were undertaken. These efforts included website development; development and distribution of promotional posters and brochures to all Extension offices in all 82 Mississippi counties; Extension publication development and distribution; authoring articles on MADDPP for the Mississippi Beef Cattle Improvement Association newsletter, Cattle Business in Mississippi magazine, and Mississippi Farm Country magazine; incorporation of the MADDPP into the Mississippi Beef Quality Assurance and Mississippi Master Cattle Producer program materials; presentations at field days, short courses, and livestock producer meetings; display booth development and utilization; and personal contacts with potential program participants.

Table 1. Mississippi Animal Disease and Disaster Preparedness Program participation by animal species and program year

	Animal Species									
Program Year	Cattle/Bison	Deer/Elk	Emu	Goats	Horses	Llamas	Poultry	Sheep	Swine	Total[1]
2006	1,070	13	6	105	304	12	114	66	60	1,766
2007	181	0	0	17	74	0	16	10	43	385
2008	4,193	2	0	361	1,501	2	477	236	151	5,143
2009[2]	417	3	1	31	99	4	18	21	26	516
Total	5,871	18	7	515	1,980	18	625	333	280	7,822

[1]Some program participants are listed under multiple animal species categories. Total reflects all program participants by counting participants listed in multiple animal species categories one time only.
[2]The 2009 program yr data are from January 1, 2009 to July 29, 2009.

Efforts to increase program visibility translated into 5,143 program registrations in 2008. By July 26, 2009, enrollment in the MADDPP was 7,822 participants, a 364 percent increase over the number of participants 18 mo earlier. It is estimated that there are over 29,000 potential MADDPP participants, which means that 26.7 percent of potential enrollments were completed by July 2009. This shows recent progress in program adoption rates, but future enrollment increases are needed to fully achieve program objectives.

Enrollments in the MADDPP spanned all of the following animal species categories: 1) cattle and bison, 2) deer and elk, 3) emu, 4) goats, 5) horses, 6) llamas, 7) poultry, 8) sheep, and 9) swine. Some program enrollees listed multiple animal species categories on their registration forms. These participants were only listed once in calculating the total number of program enrollees. Participants housing cattle or bison accounted for 5,871 (75.1 percent) of the 7,822 program participants as of July 26, 2009. The next largest MADDPP enrollee group by animal species housed horses. These 1,980 MADDPP equine participants represented 25.3 percent of all program enrollees.

Implications

In the event of an animal health emergency, livestock producers and equine owners may need assistance from outside entities to safeguard their animals. The MADDPP is designed to establish a communication network amongst these operations and state animal health officials prior to emergency events. Hurricanes Katrina and Rita in 2005 raised awareness of the need for such a program in Mississippi. Beef cattle and equine operations comprise the largest segments of the Mississippi animal agriculture industries in terms of number of operations and have the highest rates of participation in MADDPP to date. Therefore, these industries are essential targets for program adoption.

Acknowledgments

The authors wish to acknowledge the Mississippi Board of Animal Health, Office of the State Veterinarian, for providing funding to assist in MADDPP education materials development and dissemination.

Physical Units

°F = Degree Fahrenheit
cal = calorie
Da = dalton
Eq = equivalent
fl oz = fluid ounce
ft = foot(feet)
gal = gal
Hz = hertz
IU = international unit
in = inch(es)
J = joule
lb = pound(s)
lx = lux
M = molar (concentration; preferred over mollL)
MPH = miles per hour
mol = mole
N = normal (concentration)
RPM = revolutions per minute
T = ton(s)
V = volt
W = watt
yd = yard(s)

Units of Time

s = second(s)
mm = minute(s)
h = hour(s)
d = day(s)
wk = week(s)
mo = month(s)
yr = year(s)

Statistical Symbols and Abbreviation

ANOVA = analysis of variance
CV = coefficient of variation
df = degree(s) of freedom
F = F-distribution (variance ratio)
LSD = least significant difference
LSM = least squares means
MS = mean square
n = sample size
NS = nonsignificant
p = probability
r = simple correlation coefficient
r^2 = simple coefficient of determination
R = multiple correlation coefficient
R^2 = multiple coefficient of determination
S^2 = variance (sample)
SD = standard deviation (sample)
SE = standard error
SED = standard error of the differences of means
SEM = standard error of the mean
SS = sums of squares
t = *t*- (or Student) distribution
α = probability of Type I error
β = probability of Type II error
μ = mean (population)
σ = standard deviation (population)
σ^2 = variance (population)
χ^2 = chi-squared distribution

Other Abbreviations

AA = amino acid(s)
ACTH = adrenocorticotropic hormone
ADF = acid detergent fiber
ADFI = average daily feed intake
ADG = average daily gain
ADIN = acid detergent insoluble nitrogen
ADL = acid detergent lignin
ADP = adenosine diphosphate
AI = artificial insemination
AIA = acid insoluble ash
AMP = adenosine monophosphate
AOAC = Association of Official Analytical Chemists International
ARS = Agricultural Research Service
ATP = adenosine triphosphate
ATPase = adenosine triphosphatase
Avg = average
BCS = body condition score
BLUP = best linear unbiased prediction
Bp = base pair
BHBA =β-hydroxybutyrate
BSA = bovine serum albumin
bST = bovine somatotropin
BTA = *Bos taurus* chromosome
BUN = blood urea nitrogen
BW = body weight
cDNA = complementary deoxyribonucleic acid
cRNA = complementary ribonucleic acid
CIEBP = CAAT-enhancer binding protein
cfu = colony-forming unit
CLA = conjugated linoleic acid
CoA = coenzyme A
CN = casein
CNS = coagulase-negative staphylococci
Co-EDTA = cobalt ethylenediaminetetraacetate
CP = crude protein (N x 6.25)
D = dextro
DCAD = dietary cation-anion difference
diam. = diameter
DE = digestible energy
DEAE = (dimethylamino)ethyl (as in DEAEcellulose)
DFD = dark, firm, and dry (meat)
DHI = Dairy Herd Improvement
DHIA = Dairy Herd Improvement Association
DIM =days in milk
DM = dry matter
DMI = dry matter intake
DNA = deoxyribonucleic acid
DNase = deoxyribonuclease
EBV = estimated breeding value
eCG = equine chorionic gonadotropin
EBV = estimated breeding value
ECM = energy-corrected milk
EDTA = ethylenediaminetetraacetic acid
EFA = essential fatty acid
EIA = enzyme immunoassay
ELISA = enzyme-linked immunosorbent assay
EPD = expected progeny difference
ETA = estimated transmitting ability
Eq. = Equation(s)
Exp. = experiment
FCM = fat-corrected milk
FDA = Food and Drug Administration
FFA = free fatty acid(s)
FSH = follicle-stimulating hormone
G = gravity
GAPDH = glyceraldehyde 3-phosphate dehydrogenase
GC-MS = gas chromatography-mass spectrometry
GE = gross energy
G:F = gain-to-feed ratio
GLC = gas-liquid chromatography
GLM = general linear model
GnRH = gonadotropin-releasing hormone
GH = growth hormone
GHRH = growth hormone-releasing hormone
h_2 =heritability
hCG = human chorionic gonadotropin
HCW = hot carcass weight
HEPES = *N*-(2- hydroxyethyl)piperazine-*N* -2ethanesulfonic acid)
HPLC = high-performance (pressure) liquid chromatogram
HTST = high temperature, short time
i.d. = inside diameter
Ig = immunoglobulin
IGF = insulin-like growth factor
IGFBP = insulin-like growth factor-binding protein(s)
IL = interleukin
IFN = interferon
IMI = intramammary infection
IVDMD = in vitro dry matter disappearance
IVTD = in vitro true digestibility
kb = kilobase(s)
KPH = kidney, pelvic, heart fat
L = levo
LA = lactalbumin
LD_{50} = lethal dose 50%
LG = lactoglobulin
LH = luteinizing hormone
LHRH = luteinizing hormone-releasing hormone
LM = longissimus muscle
LPS = lipopolysaccharide
mAb = monoclonal antibody
mRNA = messenger ribonucleic acid
ME = metabolizable energy
MIC = minimum inhibitory concentration
Misc. = miscellaneous
Monogr. = monograph
MP = metabolizable protein
MUFA = monounsaturated fatty acid
MUN = milk urea nitrogen
NAD = nicotinamide adenine dinucleotide
NADP = nicotinamide adenine dinudeotide phosphate
$NADPH_2$ = reduced nicotinamide adenine dinucleotide phosphate
NADH = reduced form of NAD
NAN = nonammonia nitrogen
NDF = neutral detergent fiber
NDM = nonfat dry milk
NDIN = neutral detergent insoluble nitrogen
NE = net energy
NE_g = net energy for gain
NE_l = net energy for lactation
NE_m = net energy for maintenance
NFC = nonfiber carbohydrates
NEFA = nonesterified fatty acid
No. = number
NPN = nonprotein nitrogen
NRC = National Research Council
NSC = nonstructural carbohydrates
o.d. = outside diameter
OM = organic matter
PAGE = polyacrylamide gel electrophoresis
PBS = phosphate-buffered saline
PCR = polymerase chain reaction
PG = prostaglandin
$PGF_{2\alpha}$ = prostaglandin $F_{2\alpha}$
PMSG = pregnant mare's serum gonadotropin
PMNL = polymorphonuclear neutrophilic leukocyte
PPAR = peroxisome proliferator-activated receptor
PRL = prolactin
PSE = pale, soft, and exudative (meat)
PTA = predicted transmitting ability
PUFA = polyunsaturated fatty acid(s)
QTL = quantitative trait locus (loci)
RDP = rumen-degradable protein
REML = restricted maximal likelihood
RFLP = restriction fragment length polymorphism
RIA = radioimmunoassay
RNA = ribonucleic acid
RNase =ribonuclease
rRNA = ribosomal ribonucleic acid
RQ = respiratory quotient
RUP = rumen-undegradable protein
SCC =somatic cell count
SCM = solids-corrected milk
SCS = somatic cell score
SDS = sodium dodecyl sulfate
SFA = saturated fatty acid
SNF = solids-not-fat
SNP = single nucleotide polymorphism
SPC = standard plate count
ssp. = subspecies
ST = somatotropin
spp. = species
SSC = *Sus scrota* chromosome
TCA = trichloroacetic acid
TDN = total digestible nutrients
TDS = total dissolved solids
TLC = thin layer chromatography
TMR = total mixed ration(s)
Tris = tris(hydroxymethyl)aminomethane
TS = total solids
TSAA = total sulfur amino acids
USDA = U.S. Department of Agriculture
UF = ultrafiltration, ultrafiltered
UHT = ultra-high temperature
UV = ultraviolet
VFA = volatile fatty acid(s)
Vol = volume
vol/vol = volume/volume
vs. = versus
wt = weight
wt/vol = weight/volume
wt/wt = weight/weight


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