

Beef Cattle Research Report – 2005

Department of Animal Sciences
University of Wisconsin-Madison



Jeffrey W. Lehmkuhler
Editor



Introduction

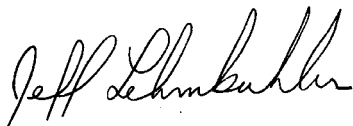
The faculty and staff of the Animal Sciences department are pleased to present this edition of the University of Wisconsin Beef Cattle Research Report. The report summarizes activities occurring within the department over the last year and provides an update of progress made during 2005.

The Animal Science research program is a multi-disciplinary approach that combines the expertise of several departments on campus, county-based extension personnel, and individuals within the industry. Areas of research conducted address issues producers are facing now and in the future.

This report attempts to bring together research and activities related to the beef industry conducted through our department and relay it to the industry in an easy to read format. We attempted to keep the project updates brief and in the process all data may not be represented. You are encouraged to contact the researchers for additional information. Additionally, several projects are in their infancy and data reported here may change as the data are finalized. Use of product names in this report is not an endorsement of the product and is for the readers' convenience.

It is important to the department to relay to the industry and supporters of the department the work faculty and staff are currently engaged in. We will continue to improve upon this effort and welcome feedback. We hope you enjoy this overview and the Animal Sciences department looks forward to serving the livestock industry in the upcoming year.

Sincerely,

A handwritten signature in black ink that reads "Jeff Lehmkuhler". The signature is written in a cursive style with a large, prominent initial "J".

Jeff Lehmkuhler, Ph.D.
Extension Beef Cattle Specialist and Assistant Professor

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Investigating *Silphium perfoliatum* (cup plant) silage as an ingredient in diets for growing cattle

Jeff Lehmkuhler, Marcelo Ramos, Steve Arp, and Ken Albrecht

Introduction

Silphium perfoliatum L., commonly called cup plant, is a perennial plant native to the tallgrass prairie and has a range that extends from Minnesota down to Texas. It has intriguing potential as a forage crop because of its extreme persistence in frigid or wet environments where other perennial plants perish. Previous research with this plant suggested that the rate and extent of digestion in vitro was similar to that of alfalfa (40-50% NDF range). However, gains were noted to be reduced in developing heifers when the cup plant silage replaced alfalfa silage at a level of 60% (2.06 vs. 1.30 lb/d). These trials further investigate the utilization of cup plant silage as a forage source for growing cattle.

Project Description

Experiment 1

Thirty-six weaned steers were assigned to nine pens. Two levels (30% and 60% DM basis) of cup plant silage were investigated as a replacement for corn silage. Treatments were randomly assigned to pen. Due to refusal of coarsely chopped cup plant stems, daily feed delivered allowed for approximately 10 lb of feed refusal daily on the cup plant diets. Feed was delivered once daily. Test diets were fed for a total of 110 days from early December 2003 to late March of 2004. Cattle were weighed on two consecutive days at the beginning and end of the trial. Single day weights were obtained at approximately monthly intervals to monitor performance.

Experiment 2

Twenty-four yearling steers and twelve yearling heifers were blocked by sex and assigned to nine pens. Treatments were randomly assigned to pens for each sex. The same diet treatments in Experiment 1 were offered. Cattle were managed similarly as in Experiment 1. Due to the heavier cattle and limited cup plant silage available the treatment diets were only fed for 62 days in this experiment. The trial occurred from late August through late October of 2005.

In these experiments, pens were considered the experimental unit. Data were analyzed for the main effect of dietary treatment and block effect due to sex or source has not been taken into account within the model.

Results

The average diet dry matter was near 43% for the diets in Experiment 1. Cup plant silage samples analyzed for crude protein indicated that the cup plant silage in Experiment 1 contained approximately 10% CP and the corn silage was approximately 8% protein. Dietary crude protein for the diets ranged between 10-12% over the course of the trial. In Experiment 1, initial weights were similar for all treatments by design. By the end of the second period, live weight was significantly heavier for the corn silage diet compared to the 60% cup plant treatment with 30% being intermediate. Cattle receiving corn silage were heavier than those fed the 60% cup plant silage diet. Average daily gain was significantly greater for the corn silage diet compared to

60% cup plant diet for all periods and the entire trial. Feeding 30% cup plant silage allowed for intermediate gains that were near 2.7 lb lb/d over the course of the study. Including cup plant silage at the 30% level did not alter DM intake. However, cattle receiving the 60% cup plant diet had intakes significantly lower than the other two treatments. When expressed as a percent of the average on trial body weight, intakes ranged from 1.85% for the high cup plant inclusion rate to 2.04% for the lower level of cup plant silage. Feed to gain was impacted by diet with the corn silage > 30% > 60% cup plant silage treatment.

Experiment 2 resulted in similar trends in performance levels as Experiment 1 where numerical ADG rankings were CS > 30% > 60%. Differences between the performance for the 30% and 60% were not significantly different for this shorter duration. This may be a compensatory gain response that occurred in the first period as the 60% cup plant cattle were gaining at similar rates as those on the 30%. Additionally, unlike Experiment 1, DM intakes were similar for all treatment diets. When DM intake was expressed as a percentage of body weight, the cattle consuming the 60% cup plant were greater than the other two treatments just opposite of that observed in Experiment 1. This may partially be explained by variation in cup plant silage quality from year to year as well as the type of cattle utilized in the trials (calf-fed versus yearling). The pounds of feed (DM basis) required per pound of live weight gain was highest for the 60% cup plant silage ration and greater than the corn silage treatment. As commonly observed with yearling cattle, more feed per unit of gain was required when comparing results to the calf-fed data. DM intakes as a percent of body weight were relatively similar between the calf-fed and yearling cattle and within the commonly observed range.

Discussion

A feed sample was taken from the cup plant silage at the time of filling the silo in Experiment 1. The crude protein values from the two cup plant growing sites (7.8% and 8.6%) was found to be similar to that of corn silage while the energy content was estimated to be approximately half that of corn silage. Therefore, it was predicted that a linear decrease in average daily gain would be observed as cup plant silage was increased. When the gain data from Experiment 1 were plotted, it was noted that the 60% cup plant treatment gains were less than one expect based on diet energy density differences. This is explained by the lower DM intakes observed for this inclusion rate. Inclusion of cup plant silage at the 30% level resulted only in the “dilution” effect of the dietary energy density as DM intake was similar to the corn silage diet. When intakes were similar to the other treatments, the response of lower energy content for the corn silage was more readily observed as was the case in Experiment 2. These similar intakes resulted in the expected linear decrease in performance when gain data were plotted by treatment. In both trials, large pieces of stem were noted as being refused by the cattle. This may be reduced through altering the timing of harvest to obtain less mature forage but may reduce overall yields. These trials indicate that the use of cup plant silage in growing cattle diets allow for moderate performance and may be a viable alternative forage crop for growing/backgrounding cattle diets.

Table 1. Diets fed in Experiments 1 and 2 investigating the use of cup plant silage in growing cattle.

Ingredient	% of Diet DM		
	Corn silage	30% cup	60% cup
Corn silage	89	59	30
Cup plant silage	--	30	59
Supplement	11	11	11

Table 2. Performance responses observed in Experiment 1.

	Corn Silage	30% Cup	60% Cup	SEM
On wt, lb	539	539	537	22.0
Pd 1 wt, lb	640	629	599	22.4
Pd 2 wt, lb	756 ^a	724 ^{a,b}	653 ^b	22.9
Off wt, lb	872 ^a	832 ^a	728 ^b	27.4
Pd 1 ADG, lb/d	3.04 ^a	2.63 ^b	1.73 ^c	0.09
Pd 2 ADG, lb/d	2.70 ^a	2.22 ^a	1.26 ^b	0.15
Pd 3 ADG, lb/d	3.50 ^a	3.27 ^a	2.26 ^b	0.18
Trial ADG, lb/d	3.04 ^a	2.66 ^b	1.71 ^c	0.10
Trial DMI, lb/d	14.1 ^a	14.0 ^a	11.7 ^b	0.4
DMI, % of BW	2.00 ^a	2.04 ^a	1.85 ^b	0.02
Trial F/G, lb/lb	4.6 ^c	5.3 ^b	6.9 ^a	0.2

^{a,b,c} Values differ within row (P<0.05)

Table 3. Performance responses observed in Experiment 2.

	Corn Silage	30% Cup	60% Cup	SEM
On wt, lb	785	784	788	7.7
Mid-point wt, lb	891	861	862	9.7
Off wt, lb	978 ^a	939 ^{a,b}	923 ^b	13.5
Pd 1 ADG, lb/d	3.19 ^a	2.36 ^{a,b}	2.22 ^b	0.28
Pd 2 ADG, lb/d	3.00	2.69	2.10	0.32
Trial ADG, lb/d	3.10 ^a	2.51 ^{a,b}	2.16 ^b	0.25
Trial DMI, lb/d	18.1	17.5	18.6	0.3
DMI, % of BW	2.05 ^b	2.04 ^b	2.17 ^a	0.03
Trial F/G, lb/lb	5.9 ^b	7.0 ^{a,b}	9.0 ^a	0.8

^{a,b,c} Values differ within row (P<0.10)

Feeding Optaflexx ® to Yearling Holstein Steers

Jeff Lehmkuhler, Marcelo Ramos and Arin Crooks

Introduction

Ractopamine hydrochloride is the active ingredient in Optaflexx, a new feed additive for finishing cattle. The pre-release research trials investigating responses for this feed additive in Holstein steers involved calf-fed steers. Reported responses were increased daily gains, increased ribeye area, and no alterations for intramuscular fat or marbling. The response in yearling Holstein steers was not investigated. The following report discusses responses observed for a group of yearling Holstein steers offered Optaflexx.

Project Description

Following the grazing season, fifty-seven Holstein steers were placed on feed at the Lancaster Agricultural Research Station. Steers were separated into heavy (868 lb) and light (781 lb) weight blocks and assigned to eight pens. Beginning average pen weights were similar within block. The heavy block was on feed for 151 days while the light block was fed for 172 days. Steers were implanted with Snyovex Choice 41 days after being placed on feed. Steers were weighed on two consecutive days prior to the initiation of feeding ractopamine as well as prior to harvest. Average daily gain was calculated for the period during which Optaflexx was offered. A commercially available premix containing Optaflexx was fed at a rate that allowed for an intake of 200 mg/d of ractopamine for 34 days prior to slaughter. Steers were sent to a commercial packing plant and hot carcass weight (HCWT) as well as trimmed carcass weight data were recorded. Following a 48-h chill, ribeye area, backfat thickness, marling scores and USDA yield were obtained. Data were analyzed with pen as the experimental unit for the variables of interest.

Results

No differences were observed due to weight block (light versus heavy) and only the main effects of treatment are reported below. The variation observed for pens reduced the ability to detect statistical differences with the limited number of observations. The design of the weights of cattle at the initiation of Optaflexx feeding were similar for control and treatment cattle. Optaflexx feeding did not statistically impact any of the observed variables. Average daily gain was numerically increased for steers receiving Optaflexx. Carcass traits did not differ for control or Optaflexx cattle. Steers produced carcasses that averaged just less than 800 lb with an average ribeye area of 11.7 square inches. Quality grades averaged in the upper range of low Choice (500 marbling score = low Choice). Seventy-seven percent of the cattle graded Choice or greater.

Discussion

No detrimental impacts were observed when Optaflexx was fed. The positive responses for carcass traits observed for beef cattle and calf-fed Holstein steers in the pre-release trials were not observed in this group of steers. A numerical improvement in ADG was observed. To further investigate the response of ractopamine fed to yearling Holstein steers, two additional trials are planned for the winter of 2005. When deciding to utilize this new technology, one should consider the economics as well.

Table 1. Response of yearling Holstein steers offered Optaflexx.

Variable	Optaflexx	Control	SEM
Start weight, lb	1240	1241	15.2
Harvest weight, lb	1361	1345	13.9
ADG, lb/d	3.52	3.02	0.22
HCWT, lb	792	787	9.2
Dress %	58.2	58.5	0.4
Trimmed Carcass, lb	750	745	7.8
Trim, %	5.2	5.3	0.2
Ribeye area, sq. in.	11.7	11.7	0.2
Backfat, in.	0.19	0.23	0.02
Marbling score	582	569	26.4
USDA Yield Grade	1.8	2.0	0.1
REA/cwt of HCWT	1.48	1.49	0.03

Pasture Finishing: Effect of Normande Influence and Supplementation

Jeff Lehmkuhler, Dan Undersander and Arin Crooks

Introduction

Pasture finishing systems involve allowing animals access to pasture areas during the finishing period. Grain may or may not be offered in these systems. Pasture finishing systems allow for a reduced cost of production for smaller operations by reducing the overhead costs associated with buildings, bedding, and manure handling. These systems offer an alternative for cow-calf producers wanting to retain ownership of cattle post-weaning. As ethanol and bio-diesel production increases, grain co-products will become increasingly available. This report discusses the use of Normande genetics and supplementation strategies for pasture finishing steers.

Project Description

Twenty-five steers ranging from 50%-90% Normande were obtained. These steers were overwintered on a diet that contained corn silage, hay, and some grain. A group of steers, predominately black hair coat color, were purchased at a local market to represent “conventional” genetics. Ears were palpated and any pre-existing implants were excised. Twenty-four steers each of Normande and Conventional genetic influence were utilized. Steers were placed on a small amount of grain and haylage after arriving at the Lancaster Agricultural Research Station (LARS). Grain was used to train steers to using bunks fitted with Broadbent Calan gates. Each gate utilizes a key to control access to feed in the bunk. The keys are worn around the neck of steers while on pasture to allow multiple supplement treatments to be provided on a single pasture. Steers were dewormed with an avermectin product, treated for pinkeye as necessary and were not administered an implant.

Four supplement treatments were investigated. These included no supplement (GRASS), alfalfa pellets (ALF), 67:33 soybean hulls and dried distillers grains combination (DS), and 67:33 soybean hulls and dried distillers grain plus Rumensin® (RDS). Supplements were offered at levels up to 9 lbs/d. Feed refusals were weighed daily to monitor supplement intake. Steers were turned out to pasture on May 19 and grazed until October 12. Thirty-six of the steers, 18 of each genetic source, were selected for harvest. Cattle were processed at a commercial plant and hot carcass weight (HCWT) was obtained to allow for calculation of dressing percentage. Following a 48-hr chill the carcasses were assessed for ribeye area, backfat thickness, and marbling score. Subcutaneous fat color was assessed subjectively using a Japanese standard (0-9 scale were 0=white and 9=yellowish orange). USDA yield and quality grades were also obtained from carcasses.

Results

Genetic source did not impact live weight at harvest, hot carcass weight, marbling score, or fat color (Table 1). Normande-influenced steers were found to have higher dressing percentage, ribeye area, and ribeye/unit of weight (live or carcass) when compared to Conventional steers. Backfat thickness was greater for Conventional crossbred cattle than Normande steers. The average marbling scores were observed to be similar even though backfat thickness was less for Normande steers.

Consumption of the DS and RDS was high and on most days cattle consumed the daily offering of 9.0 lb. The intake of ALF was more variable (standard deviation of 2.28 versus 0.09 for ALF and average of DS/RDS) and averaged approximately 50% less over the grazing season than the other supplements (data not shown). Supplementation increased weight at harvest and HCWT regardless of type when compared to those that were not supplemented (Table 2). Cattle that consumed grain co-product supplements had greater dressing percentage and more backfat than those receiving alfalfa pellets and no supplement. Ribeye area was greatest for cattle receiving DS and larger than ALF and Grass. Cattle consuming RDS had ribeye areas similar to those that received ALF while being larger than GRASS. Ribeye per unit of weight was not affected by supplement. Steers consuming grain co-products had carcasses with a higher fat color score (more yellow) than those not receiving supplement. The average fat color scores for all treatments however were low. Three of the 36 (8.3%) steers produced carcasses that were identified as yellow by the plant (received grain co-products) and were identified by the researchers as having mid-range fat color scores. Three carcasses were graded as dark cutters with one each from the supplement treatments. The percentage of carcasses that were graded as Select or greater (excluding those that were dark cutters or yellow carcasses) was 12.5%, 12.5%, 40%, and 50% for GRASS, ALF, DS, and RDS, respectively.

A simple correlation table was calculated using EXCEL for the carcass traits to examine relationships (Table 3). Marbling was found to be moderately correlated with backfat and dressing percentage. This illustrates that pasture finishing is similar to other systems in which intramuscular fat (marbling) is deposited as animals approach physiological maturity (fat accretion rates increase). A negative relationship existed for frame score (hip height) and backfat. This suggests that the smaller framed cattle were closer to physiological maturity and would have been expected to have graded Select or higher in the pasture finishing system where time was restricted by the length of the grazing season. However, the relationship between frame score and marbling score was low in this group of animals. For Normande genetics, a negative relationship was observed for the percentage of Normande-influence and frame score.

As the percentage increased from 50% to 90% the cattle tended to be smaller framed. This relationship combined with the inherent ability to deposit intramuscular fat and less subcutaneous fat makes Normande genetics a plausible breed for pasture finishing systems. Ribeye area was found to be highly correlated to weight (live and carcass) and a moderate relationship was observed for dressing percentage.

Discussion

This preliminary data offer some insight to alternative production systems for cattle producers. The high variability and lower intake of alfalfa pellets warrants further investigation for an alternative forage supplement that may be utilized to increase dry matter intake during the spring flush or when pasture availability is limited due to reduced forage production. The lack of response from the inclusion of an ionophore is unexpected and can not be explained at this time.

The data will be utilized to investigate potential economic impacts for a commodity-based market as well. Consideration will be given to cost of supplements and revenue from weight response as well as quality-based pricing system. Supplementation and genetics can impact carcass traits in pasture finishing systems. It is useful to have a pre-determined carcass endpoint. This allows one to match genetics and management to produce the meat quality consumers desire and consistency they expect. This study will be repeated in 2006 to collect more data.

Table 1. Effect of breed on carcass characteristics of pasture finished steers.

	Normande	Conventional Xbred	SEM
N=	18	18	
Livewt, lb	1074	1074	16.2
HCW, lb	612	594	9.5
DP, %	56.9 ^a	55.2 ^b	0.31
Marbling	417	422	16.6
Fat color	2.3	2.0	0.22
REA, sq in	11.2 ^a	10.3 ^b	0.26
BF, in.	0.08 ^b	0.19 ^a	0.01
REA/HCW	1.84 ^a	1.74 ^b	0.03
REA/LW	1.05 ^a	0.96 ^b	0.02

^{a,b} Means with varying superscripts are different (P<0.05).

Marbling = Marbling score in which 300 = traces, 400 = slight, 500 = small

Fat color = Japanese fat color standard 0 = white and 9 = yellowish orange

Table 2. Carcass responses to supplementation treatment for pasture finished steers.

	Grass	Alf	DS	RDS	SEM
N=	8	8	10	10	
Livewt, lb	1025 ^b	1054 ^{a,b}	1105 ^a	1113 ^a	24.8
HCW, lb	554 ^b	573 ^b	636 ^a	650 ^a	14.1
DP, %	54.0 ^b	54.3 ^b	57.5 ^a	58.5 ^a	0.5
Marbling	399	393	444	445	25
Fat color	1.4 ^b	1.9 ^{a,b}	2.7 ^a	2.7 ^a	0.3
REA, sq in	9.8 ^c	10.5 ^b	11.6 ^a	11.2 ^{a,b}	0.4
BF, in.	0.08 ^b	0.10 ^b	0.17 ^a	0.20 ^a	0.02
REA/HCW	1.77	1.84	1.82	1.73	0.05
REA/LW	0.96	1.00	1.05	1.01	0.03

^{a,b} Means with varying superscripts are different (P<0.05).

Marbling = Marbling score in which 300 = traces, 400 = slight, 500 = small

Fat color = Japanese fat color standard 0 = white and 9 = yellowish orange

Table 3. Simple correlation table for carcass traits of pasture finished steers.

	Correlation Table							
	Livewt	HCW	DP	Marb	FatCol	REA	BF	Frame
Livewt	1.00	0.90	0.37	0.22	0.15	0.67	0.32	0.39
HCW	0.90	1.00	0.73	0.39	0.34	0.73	0.38	0.36
DP	0.37	0.73	1.00	0.49	0.50	0.51	0.33	0.15
Marb	0.22	0.39	0.49	1.00	0.25	0.16	0.46	-0.07
FatCol	0.15	0.34	0.50	0.25	1.00	0.32	0.25	-0.02
REA	0.67	0.73	0.51	0.16	0.32	1.00	0.07	0.29
BF	0.32	0.38	0.33	0.46	0.25	0.07	1.00	-0.34
Frame	0.39	0.36	0.15	-0.07	-0.02	0.29	-0.34	1.00
Normande	-0.28	-0.18	0.11	-0.21	0.46	0.02	-0.26	-0.44

Table 4. Means for carcass traits of pasture finished steers by breed and supplementation type.

	Normande				Conventional Xbred			
	Grass	Alf	DS	RDS	Grass	Alf	DS	RDS
N=	4	4	5	5	4	4	5	5
Livewt, lb	1024	1035	1123	1115	1026	1074	1088	1110
HCW, lb	559	574	653	661	548	571	618	640
DP, %	54.6	55.5	58.2	59.3	53.4	53.1	56.8	57.6
Marbling	390	387	442	450	408	398	446	440
Fat color	1.8	1.5	3.2	2.8	1.0	2.3	2.2	2.6
REA, sq in	10.1	11.1	12.1	11.6	9.5	10.0	11.0	10.8
BF, in.	0.05	0.05	0.11	0.13	0.10	0.16	0.22	0.27
REA/HCW	1.80	1.93	1.86	1.76	1.74	1.75	1.78	1.69
REA/LW	0.98	1.08	1.08	1.05	0.93	0.93	1.01	0.97

Marbling = Marbling score in which 300 = traces, 400 = slight, 500 = small

Fat color = Japanese fat color standard 0 = white and 9 = yellowish orange

Comparison of Jersey, Holstein and Twinner Steers Offered a High Energy Diet Continuously or Managed Using a Phase Feeding Strategy

Jeff Lehmkuhler, Marcelo Ramos, Steve Arp, Jim Claus and Dan Schaefer

Introduction

There is limited published data for the performance and carcass characteristics of Jersey and Twinner beef steers using current management strategies. In a previous pilot study (see 2003 Beef Report), it was noted that Jersey steers gained significantly slower than Holstein steers when fed for the same number of days. It was also observed that the slower rate of growth for the Jersey steers resulted in several light carcasses which were severely penalized in a commodity based marketing system. Also, the current trend in the dairy beef industry is to offer a high energy (10% roughage or less DM basis) diet from 400-500 lb until harvest. This can impact farm cropping systems where rotations involve alfalfa or for operations that rely on corn silage as the forage component such as farmer feeders. Therefore, a larger trial was conducted to investigate the impact of diet for Jersey, Holstein and Twinner beef steers.

Project Description

Due to the slower growth rate of Jerseys, an attempt was made to stagger the starting point in this trial to allow for a constant end point in time. To accomplish this, two local dairies were contacted and agreed to raise Jersey bull calves from birth to four months of age. Jersey bull calves were born within a 35 day period. Upon arrival at the Arlington Beef Nutrition facilities on June 28, 2004, free choice hay and a calf starter was offered the first week after arrival. Corn silage was introduced and the steers were transitioned to the experimental diets. Jersey bull calves were castrated and dehorned. A total of 40 Jersey steers were utilized in the project and started on trial after a 43 day transition period. This transition period was utilized to reduce the impact of castration and previous nutritional plane on subsequent performance. Holstein steers were obtained from a large privately owned calf raising facilities. Low birth weight Holstein bull calves born within a two week window were purchased at four months of age and arrived at the research facilities on August 6, 2004. After a transition period of 41 days, Holstein steers (n=48) were started on trial. Beef steers from the University Twinning herd were obtained following weaning and arrived at the station on October 12, 2004. Following a 43 day transition period, twenty crossbred steers were started on trial. Steers were assigned to either a high energy (10% roughage) or a phase feeding strategy that included 30%, 20% and 10% roughage diets (PHASE). The roughage source used was corn silage and it was assumed that corn silage was 50% grain and 50% roughage. Period 1 was 84 and 76 days in length for Jersey and Holsteins, respectively while Period 2 was 84 days. Dairy steers were implanted with a Ralgro implant initially. At the end of Period (PD) 1 and 2, dairy steers were administered a Synovex Choice implant. Twinner steers were implanted with Synovex Choice at the initiation of the trial. One Holstein steer was removed from test due to a retained testicle and a second due to liver abscesses (determined post-slaughter). Target slaughter points were set to minimize carcass weight

discounts. From the previous trial it was noted that the target end point for the Jersey steers would need to be greater than 1,000 lb (550 lb carcass weight with a 55% dressing percentage). Steers were slaughtered on two different dates at Packerland Packing, Greenbay, WI. The majority of the Holstein steers were harvested on the first date (40 of 46 hd) along with a mixture of Twinner and Jersey steers. Cattle were sorted prior to being fed and loaded for transportation to the packing plant. Steers were not shrunk prior to loading. Carcasses traits were measured following a 48-hr chill and strip loins were obtained from five carcasses within each breed and dietary treatment (total of 25 strips). Following a seven day aging period, strips were frozen until shear force analyses. Data were analyzed for dietary treatment effects for dairy steers using a mixed model with slaughter date as a random variable. The influence of genetic source was analyzed using a separate mixed model with no random variables included.

Results

Diet and Holstein vs Jersey

Initial weights were similar for the dietary treatments but differed by genetic source due to the nature of the study (Table 1). During the first period when PHASE cattle were receiving the 60% corn silage diets, ADG was higher for HEN vs. PHASE for both dairy breeds with Jersey HEN and Holstein PHASE having similar rates of gain. This difference in gain during the first period was observed in the live weight at the end of PD 1 with Holstein HEN steers being the heaviest and Jersey PHASE being the lightest. During PD 2 in which PHASE diets contained 40% corn silage, diet influenced gains for Holstein steers with HEN being nearly 0.4 lbs/d higher than PHASE. However, diet did not impact Jersey steer performance during PD 2 with Jerseys gaining close to 1.0 lb/d less than the Holstein steers. Increasing energy density of the diet for the PHASE Holstein steers resulted in greater gains during PD 3. Final weights obtained prior to harvest were impacted by diet for Holsteins only with HEN steers being heavier than Phase Holsteins and Jerseys. Final weight did not differ by treatment for Jersey steers averaging 1075 lb.

When gain efficiency was investigated, it was noted that HEN steers were more efficient than PHASE during PD 1 for both dairy breeds. Diet affected efficiency of Jersey steers only during PD 2 and no differences for diet treatments in gain efficiency were observed during PD 3. Jerseys were more efficient than Holsteins during PD 1 and 2, but were similar during PD 3. Gain efficiency values declined with days on feed with the range during PD 1, 2, and 3 being 0.20-0.27, 0.17-0.21, and 0.15-0.16, respectively.

The same tendencies in live weight at slaughter were observed for hot carcass weight (HCWT). Holsteins had heavier HCWT than Jerseys and HEN Holstein carcasses were heavier than PHASE Holsteins (Table 2). The dressing percentage was highest for HEN Holstein with PHASE Holstein and Jersey PHASE being similar. Jersey HEN had the lowest dressing percentage. Percentage trim loss (trim loss lb/HCWT lb * 100) was observed to be much higher for the Jersey steers and did not differ by dietary treatment. Holsteins receiving HEN had greater percentage trim loss than did PHASE Holsteins. Longissimus muscle area (ribeye area) was found to be similar for HEN Holsteins, PHASE Holsteins, and PHASE Jerseys. Jersey HEN ribeye areas were smaller than HEN Holsteins carcasses by nearly one square inch and similar to the other treatment groups.

Diet impacted marbling score for Holstein carcasses with HEN being greater than PHASE. Diet did not influence the depth of subcutaneous fat over the longissimus muscle between the 12th and 13th rib.

Twiner Comparisons

Twiner steers weighed approximately 580 lb when they started the trial in November (Table 3). Again, Jersey steer performance was nearly one pound per day less than Holsteins during the trial with ADG for Twinner steers being similar to Holsteins. The harvest weights of the Holstein steers on the High Energy (HEN) treatment were heavier than all other groups. The days on feed from the start of the trial until slaughter date were not affected by diet treatment. Jersey steers were fed approximately 60 more days than were Holstein steers with Twinner steers being on trial just over 200 days on average.

Twiner steers had similar HCWT as HEN Holstein steers which were heavier than PHASE Holsteins and both groups of Jerseys (Table 4). Dressing percentage was similar for Twinner and HEN Holstein steers being higher than the other treatments. Percent trim loss was lowest and similar for Twinner and PHASE Holsteins. Ribeye area was observed to be greatest for the Twinner genetics and one square inch larger than the Holstein HEN carcasses. Dairy genetics produced carcasses with greater marbling scores and less backfat than Twinners. The average USDA yield grade was near 2.0 and similar for Holstein and Twinner carcasses. Warner-Bratzler shear force values which are indicative of tenderness were found to be higher for samples from Twinner carcasses than Holstein PHASE steers (Table 5). The remaining groups were similar to both the Twinner and Jersey PHASE with respect to shear force values. All samples were acceptable with respect to shear values as Miller (1998) suggested that values less than 3.0 kg would result in 100% consumer satisfaction. Dikeman and co-workers suggested that shear force values of greater than 8.6 lb (3.9 kg) would not be acceptable for the restaurant segment and all samples were well below this target.

Discussion

As in the previous smaller trial, Jersey steers were found to gain slower than Holsteins and yet equal to or better with to efficiency of gain. The low dressing percentage of Jersey steers should be considered when targeting end weights with respect to avoiding light carcass discounts. Additionally, Jerseys appear to deposit fat in the various depot sites differently than Holsteins. This is inferred by high trim loss (largely accounts for kidneys and KPH fat), similar intramuscular fat (Marbling Scores) and lower backfat levels. Garcia-Peniche and co-workers (2005) suggested that Jersey cows may be more heat-stress resistance compared to Holsteins based upon calving interval data. Knowing that subcutaneous fat is one layer of protection to ambient temperatures, this tendency to deposit fat internally may allow for more rapid body heat exchange. This conversely would be a negative during cold stress and increase the net energy for maintenance reducing available energy for performance. Jersey steers appear to have a limit to their genetic capability with respect to rate of gain and it is less than that of Holstein and beef cattle.

The similar performance for the Holstein and Twinner steers may partially be due to genetic composition of the Twinner cattle. The early MARC Twinner bulls contained Holstein, Swedish Fresian, Simmental, Pinzgauer, and Norwegian Red dairy genetics (Echternkamp and Gregory, 2002). The UW Twinner steers produced carcasses with larger ribeye area, slightly more backfat and lower marbling scores at a similar carcass weight than that reported by MARC. This may be due to a difference in selection and breeding decisions for the two populations. Performance was reported to be 3.0 lb/d for the MARC Twinner steers. The UW Twinning steers gained slightly greater than 3.5 lb/d and differences are expected to be related to management (both housing and dietary).

The interaction between dairy breed and dietary treatment should be considered when formulating diets to achieve targeted performance levels. In this trial, Jersey steers did not respond similarly to Holstein steers with increasing diet energy density. Holstein steers exhibited a “compensatory” gain response under the phase feeding strategy which was not observed in the Jerseys. Phase feeding results in slightly lower cumulative ADG for Holstein steers and is an option that producers with a large amount of corn silage or other high quality forage may find viable for finishing dairy steers. Phase feeding cattle is expected to increase the days on feed slightly with respect to feeding a high energy diet continuously from 400 lb to slaughter with minimal impacts on carcass traits when harvested at similar live weights. Marbling scores were lower for cattle on the phase feeding strategy, however, the percentage of carcasses grading low Choice or better were 100%, 80%, 77%, 74%, and 45% for Jersey HEN, Jersey PHASE, Holstein HEN, Holstein PHASE, and Twinner respectively. The diets used in phase feeding strategy in this trial produced desirable carcasses and rates of gain that were acceptable.

Table 1. Performance comparison of dairy breeds offered a High Energy diet continuously or managed with a phase feeding strategy.

	Holstein		Jersey		SEM
	High Energy	Phase	High Energy	Phase	
Initial wt., lb	396 ^a	384 ^a	261 ^b	259 ^b	5.8
End of Pd 1 wt., lb	673 ^a	596 ^b	496 ^c	452 ^d	10.0
Pd 1 ADG, lb/d	3.65 ^a	2.79 ^b	2.79 ^b	2.31 ^c	0.10
End of Pd 2 wt., lb	977 ^a	870 ^b	693 ^c	658 ^d	10.1
Pd 2 ADG, lb/d	3.62 ^a	3.25 ^b	2.35 ^c	2.45 ^c	0.08
Final wt., lb	1358 ^a	1312 ^b	1076 ^c	1074 ^c	11.5
Pd 3 ADG, lb/d	3.83 ^b	4.12 ^a	2.60 ^c	2.55 ^c	0.07
Overall ADG, lb/d	3.71 ^a	3.46 ^b	2.58 ^c	2.50 ^c	0.03
Days on Trial	260 ^a	269 ^a	317 ^b	327 ^b	3.7

Table 2. Carcass characteristics for dairy breeds offered a High Energy diet continuously or managed with a phase feeding strategy.

	Holstein		Jersey		SEM
	High Energy	Phase	High Energy	Phase	
HCWT, lb	799 ^a	752 ^b	603 ^c	610 ^c	8.5
Dressing %	58.9 ^a	57.4 ^b	56.1 ^b	56.8 ^{b,c}	0.5
Trim Carcass, lb	756 ^a	716 ^b	560 ^c	564 ^c	7.5
Trim, inches	44.3 ^a	36.9 ^b	43.7 ^a	45.0 ^a	2.8
Trim, %	5.6 ^b	4.9 ^c	7.2 ^a	7.4 ^a	0.4
Longissimus muscle area, inches ²	12.4 ^a	12.0 ^{a,b}	11.5 ^b	11.8 ^{a,b}	0.3
Marbling Score	651 ^a	572 ^b	619 ^{a,b}	566 ^b	30
Backfat thickness, inch	0.27 ^a	0.23 ^a	0.16 ^b	0.12 ^b	0.02
USDA Yield Grade	2.1 ^a	1.9 ^a	1.3 ^b	1.2 ^b	0.2

Table 3. Performance comparison of Holstein, Jersey, and Twinner beef steers.

	Holstein		Jersey		Beef	SEM
	High Energy	Phase	High Energy	Phase	High Energy	
Initial wt., lb	396 ^b	384 ^b	261 ^c	259 ^c	581 ^a	6.6
Final wt., lb	1356 ^a	1312 ^b	1076 ^c	1074 ^c	1309 ^b	11.4
Days on Trial	260 ^b	269 ^b	317 ^a	327 ^a	205 ^c	4.3
ADG, lb/d	3.71 ^a	3.46 ^a	2.58 ^b	2.50 ^b	3.59 ^a	0.05

Table 4. Carcass characteristic comparison for Holstein, Jersey and Twinner steers.

	Holstein		Jersey		Beef	SEM
	High Energy	Phase	High Energy	Phase	High Energy	
HCWT, lb	799 ^a	752 ^b	603 ^c	610 ^c	780 ^a	8.3
Dressing %	58.9 ^a	57.4 ^b	56.1 ^c	56.8 ^{b,c}	59.6 ^a	0.4
Trim Carcass, lb	756 ^a	716 ^b	560 ^c	564 ^c	743 ^a	7.4
Trim, lb	44.4 ^a	37.0 ^b	43.7 ^a	45.0 ^a	37.2 ^b	2.7
Trim, %	5.6 ^b	4.9 ^c	7.2 ^a	7.4 ^a	4.8 ^c	0.4
Longissimus muscle area, in ²	12.4 ^b	12.0 ^{b,c}	11.5 ^c	11.8 ^{b,c}	13.5 ^a	0.3
Marbling Score	643 ^a	568 ^b	618 ^a	570 ^b	439 ^c	24.5
Backfat thickness, in.	0.27 ^b	0.23 ^b	0.16 ^c	0.12 ^c	0.35 ^a	0.02
USDA Yield Grade	2.1 ^b	1.9 ^b	1.3 ^a	1.2 ^a	2.0 ^b	0.2

Table 5. Shear force values for Holstein, Jersey, and Twinner beef steers.

	Holstein		Jersey		Beef	
	High Energy	Phase	High Energy	Phase	High Energy	SEM
Shear force, kg	2.69 ^{a,b}	2.40 ^b	2.48 ^{a,b}	2.65 ^{a,b}	2.78 ^a	0.11

Lancaster Crossbreeding Demonstration Project

Jeff Lehmkuhler and Arin Crooks

Introduction

The Lancaster Agricultural Research Station herd, as many throughout the United States, has a large percentage of Angus influence due to the repeated use of Angus clean-up bulls. A breeding plan was developed to demonstrate a three-breed crossbreeding system utilizing Angus and Hereford breeds as a base. The third breed is to be one less commonly utilized in Wisconsin as a result of input from the public during the recent Lancaster ARS review. Herd production information will be utilized to illustrate what production data should be considered and how it can be utilized. Information related to the crossbreeding system will also be collected to share with producers at the annual field day and other reports.

Project Description

The LARS commercial cow herd has a varying degree of Continental and British background. Since the herd was reestablished in 1999, Angus bulls have been used. In the spring of 2004, two yearling Hereford bulls were purchased to begin the crossbreeding demonstration. The EPD's for these bulls as well as the other sires are shown in Table 1. Artificial insemination was utilized for the purebred cows as well as to add additional sires and genetic diversity. The Hereford bulls were allowed to breed the replacement heifers exclusively for a period of 14 days prior to being introduced to the cows. The cows were divided into two groups. A two-year old Angus bull was placed with half the cows and the two yearling Hereford bulls were introduced to the remaining cows. At approximately 21 day intervals, the bulls were rotated to the opposite cow group.

Birth weights and calving ease scores were recorded for calves. Weaning weights of the calves were obtained on 10/18/05. Birth and weaning weights were adjusted for age-of-dam as described by the Beef Improvement Federation (BIF) guidelines. Data for a set of Angus-sired twins was not included in the birth weight data, but were included for weaning information. All but two bull calves (one Angus- and one Hereford-sired) were castrated at approximately three months of age. Calves were not creep-fed or implanted. Influence of calf sex and sire breed were tested for variables of interest. It is important to keep in mind that this is a small dataset and larger numbers are required to increase the confidence of inferences made from such information.

Results

There were 28 heifer and 34 steer/bull calves in the data sets. The breed data contained 28 Angus- and 34 Hereford-sired calves. Calving ease score, 1-5 with 1 corresponding to unassisted, was not altered by sex or breed of sire in the 2005 calf crop (Tables 1 & 2). Seventy-eight percent of the calves were born unassisted. There were four calves (7.8%) born backwards (CES = 4.0) with birth weights of 110, 93, 77, and 77 pounds and were sired by Hereford bulls. If these calves are removed from the data set, the CES for Hereford-sired calves would average 1.13 and the Angus-sired would remain at 1.39. Two other calves (1 Angus- and 1 Hereford-sired) had to be assisted due to a front leg not being presented correctly for delivery. Calving difficulty during the 2005 season was due largely to calf presentation.

Bull calves were eight pounds heavier at birth (90.2 lb) than heifers (82.2 lb) and the same difference existed for age-of-dam adjusted birth weight data. Calves sired by Hereford bulls were heavier than those sired by Angus (89.3 lb vs. 83.1 lb for Hereford- and Angus-sired, respectively). Even though Hereford calves were heavier at birth, this again did not correspond to increased calving difficulty.

The calves were weaned with an average age at weaning of 204 and 201 for the heifers and steers. Sex affected actual weaning weight with steers weighing approximately 9% heavier than heifers (Table 4). Steers also had greater weight per day of age (WDA) than did heifers at 2.73 lb/d versus 2.47 lb/d. The 205-day adjusted weaning weights were also greater for steers than heifers by nearly 45 lbs. Sire breed did not influence the weaning weight, WDA, or 205-d adjusted weaning weight data. Hereford-sired calves had WDA of 2.63 lb/d while Angus-sired calves were 2.57 lb/d. The 205-day adjusted weaning weights for the Hereford- and Angus-sired calves were 559.7 lb and 556.1 lb, respectively.

Discussion

With respect to the sires utilized, the majority of the calves were sired by the clean-up bulls. The data should not be viewed to note sire differences as the number of observations are small. The Hereford bull KCF Bennett 774 H119 sired 10 calves. The H119 sired steers and heifers had average adjusted birth weights of 101 and 98 lbs. The calving ease scores for H119 sired calves were not different than the other sires. The calves were born unassisted with the exception of two calves that were presented backwards at birth (CES = 4). This is interesting as this bull has a breed average BW EPD while ranking in the top 3% for calving ease. The take-home message is that birth weight EPD is an indicator trait of calving ease and not a direct measurement. When BW EPD's are utilized in combination with Calving Ease EPD's there is an increased confidence in reducing calving difficulties for proven sires.

Often producers are concerned about coat color when making bull selections as regional markets may discount calves with non-black coat colors. If a homozygous black bull is mated to cows that do not carry a diluter gene, the offspring will be black. This is because the genes for black hair coat are dominant. Using simple Mendelian genetics where BB is homozygous for black coat color and bb is red coat color, it can be seen that all the offspring would have black hair coats in the example below.

Example 1. Homozygous black bull mated to cows with red hair coats and resulting offspring coat colors ().

	Cow (Red)	
Sire	b	b
B	Bb (Black)	Bb (Black)
B	Bb (Black)	Bb (Black)

A black bull may be used on a herd that often is black and not red. Again, all the calves will be black if the bull is homozygous for black coat color (BB). It may be more difficult to predict the number of offspring with red hair coats in these herds as the frequency of the red coat color allele occurring in the cows is typically unknown. For example, see the table below in which a black bull is bred to a heterozygous black cow. Here there is a 50% probability that the offspring may be homozygous for black coat color and 50% may be heterozygous.

Example 2. Homozygous black bull mated to a heterozygous black cow and resulting coat color of offspring ().

	Cow (Black)	
Sire	B	b
B	BB (Black)	Bb (Black)
B	BB (Black)	Bb (Black)

The percentage of calves that would have red hair coats if a red bull is used to breed cows is a perceived risk producers are often not willing to take due to current market signals/demands. The percentage of offspring with red coats again will be dependent upon the genetics of the cow herd. After generations of using black bulls a mixture of heterozygous and homozygous cows for black coat color will exist in the herd. Again we'll utilize a simple example to further discuss this. Let's assume a red bull is mated to cows that are heterozygous for black hair coat. In this example, there would be a 50% chance of producing a red coat color. The percentage of cows that are heterozygous for black coat color will vary in a herd. This makes it difficult to predict the actual percentage of red calves. The Lancaster ARS herd is a mixture of the heterozygous and homozygous black cows, a few red and grey cows (black hair coat with the diluter gene), which results in a predominantly black herd. In the 2005 calf-crop, 28 of 29 black cows mated to Hereford bulls had calves with black hair coats. Random chance of which allele is passed to the offspring will vary from year to year. With the continual use of black bulls previously in the LARS herd, it is expected that the cow herd has a high percentage of homozygous black cows and this partially explains the low number of red calves sired by a red bull. As more red bulls are utilized and replacement females retained, it is anticipated in the future an increased percentage of red calves will occur when a red bull is used as a greater number of the cows may be carrying the red allele.

Example 3. Red bull mated to a heterozygous black cow and the resulting possibilities in the offspring ().

	Cow (Black)	
Sire	B	b
b	Bb (Black)	bb (Red)
b	Bb (Black)	bb (Red)

Conclusion

The data from this year's calf crop illustrates that Hereford-sired calves were heavier at birth while dystocia was not increased. Breed of sire did not influence the pre-weaning gain for calves. The data also support previous differences for sex of calf on birth weight and performance pre-weaning.

Table 1. Expected Progeny Differences for the bulls utilized to breed the Lancaster Agricultural Research station beef herd (*bulls are pedigree values).

	CE	BW	WW	YW	Milk	MG	MCE	SC	REA	IMF
Huth N082*	6.5	1.2	40	69	19	39	1.1	0.4	0.11	0.10
Huth N006*	6.6	-0.2	39	65	22	41	2.7	1.2	-0.07	0.09
KCF H119	4.9	3.1	51	81	16	41	2.3	0.8	0.12	0.23
Gallant	5.6	2.3	28	41	15	29	3.7	0.4	0.04	0.01
FHF Starbuck	-5.4	4.2	43	64	26	48	0.1	0.8	0.19	0.03
2005 Hereford	-0.3	3.7	36	61	14	32	0.5	0.6	0.07	0.00
2022*	4.5	2.5	49	91	24	NA	10	NA	0.13	0.08
PN011*	2.0	5.3	55	101	19	NA	7	0.18	0.18	-0.06
Bush944	8.0	-0.3	42	91	22	31	6	0.79	0.24	0.46
ND878	9.0	1.5	43	84	33	17	8	0.46	0.14	0.35
2006 Angus	4.0	2.3	38	70	19	32	6	0.33	0.13	0.14

Table 2. Influence of sex on calving traits.

	Heifer	Steer	P-value
N =	28	34	
Calving Ease Score	1.36	1.49	NS
Birthweight, lb	82.2	90.2	P<0.05
Adj. BW, lb	85.6	93.2	P<0.05

Table 3. Influence of breed on calving traits.

	Angus	Hereford	P-value
N =	28	34	
Calving Ease Score	1.39	1.46	NS
Birthweight, lb	83.1	89.3	P<0.05
Adj. BW, lb	86.5	92.3	P<0.05

Table 4. Influence of sex and breed on calving traits.

	Heifer		Steer	
	Angus	Hereford	Angus	Hereford
N =	13	15	15	19
Calving Ease Score	1.38	1.33	1.40	1.58
Birthweight, lb	80.9	83.5	85.2	95.2
Adj. BW, lb	84.4	86.7	88.6	97.9

Table 5. Influence of sex on weaning weight data.

	Heifer	Steer	P-value
N =	28	34	
Wean wt, lb	503.8	546.7	P<0.05
Wean age, d	204	201	NS
WDA, lb/d	2.47	2.73	P<0.05
205-d adj wt	534.5	581.3	P<0.05
Steer advantage WDA, %	--	10.5	--
Steer advantage 205-d adj wt, %	--	8.8	--

Table 6. Influence of sire breed on weaning weight data.

	Angus	Hereford	P-value
N =	28	34	
Wean wt, lb	521.3	529.2	NS
Wean age, d	203	202	NS
WDA, lb/d	2.57	2.63	NS
205-d adj wt	556.1	559.7	NS
Angus advantage WDA, %	-2.3	--	--
Angus advantage 205-d adj wt, %	-0.06	--	--

Table 7. Influence of sex and breed on weaning weight data.

	Heifer		Steer	
	Angus	Hereford	Angus	Hereford
N =	14	14	14	20
Wean wt, lb	495.2	512.4	547.4	546.0
Wean age, d	201	206	204	198
WDA, lb/d	2.45	2.49	2.68	2.77
205-d adj wt	532.5	536.6	579.6	582.9

Table 8. Actual means of calving traits by sire for bull calves.

Sire	N	CES	BW	Adj BW
2022 Angus Clean-up	13	1.31	85.3	88.2
Bushwacker 944 Angus	0			
Gallant Hereford	1	1.0	90	90
H119 Hereford	6	1.5	99.7	101.2
Hereford Clean-up	12	1.67	93.4	96.9
New Design 878 Angus	1	1.0	81	86
PN011 Angus Clean-up	1	3.0	88.0	96
Starbuck Hereford	0			

Table 9. Actual means of calving traits by sire for heifer calves.

Sire	N	CES	BW	Adj BW
2022 Angus Clean-up	8	1.25	83.4	86.1
Bushwacker 944 Angus	1	1.0	66.0	71.0
Gallant Hereford	1	1.0	84.0	86.0
H119 Hereford	4	1.75	95.5	97.8
Hereford Clean-up	9	1.11	77.6	81.2
New Design 878 Angus	2	1.0	81.0	82.0
PN011 Angus Clean-up	2	2.5	78.5	86.5
Starbuck Hereford	1	2.0	88.0	88.0

Table 10. Actual means of weaning traits by sire for steer calves. The 205-d adjusted weaning weights are by breed of sire and sex contemporary groups.

Sire	N	WWT	WDA	205 WWT	205 Ratio
2022 Angus Clean-up	12	548.6	2.70	580.2	99.8
Bushwacker 944 Angus	0				
Gallant Hereford	1	598.0	2.53	542.0	101.4
H119 Hereford	6	600.0	2.80	591.7	101.8
Hereford Clean-up	13	517.0	2.76	580.0	99.7
New Design 878 Angus	1	598.0	2.38	510.5	95.5
PN011 Angus Clean-up	1	482.0	2.39	548.0	94.2
Starbuck Hereford	0				

Table 11. Actual means of weaning traits by sire for heifer calves. The 205-d adjusted weaning weights are by breed of sire and sex contemporary groups.

Sire	N	WWT	WDA	205 WWT	205 Ratio
2022 Angus Clean-up	7	541.9	2.68	566.6	106.0
Bushwacker 944 Angus	1	454.0	2.10	488.0	91.3
Gallant Hereford	1	552.0	2.53	542.0	101.4
H119 Hereford	4	580.8	2.66	573.3	107.2
Hereford Clean-up	8	471.6	2.40	521.6	97.6
New Design 878 Angus	2	522.0	2.38	510.5	99.5
PN011 Angus Clean-up	4	410.5	2.18	495.0	92.6
Starbuck Hereford	1	526.0	2.44	504.0	94.2

Extension Livestock Team Assists Wisconsin Cattlemen's Association Beef Identification Pilot Project

Jeff Lehmkuhler, Terry Quam, Ardel Quam, Zen Miller, Dave Wachter, Rhonda Gildersleeve, Randy Thompson, Adam Hady¹

Funds provided to Wisconsin Livestock Identification Consortium were awarded to the Wisconsin Cattlemen's Association (WCA) for a project to investigate the use of radio frequency identification device (RFID) technology for exhibition steers. The UWEX Livestock team assisted WCA in writing the grant proposal as well as implementing the project. The project involved WCA, Global Animal Management (software service provider), Global Vet Link (on-line certificate of veterinarian inspection provider), Wisconsin State Fair Park, Cooperative Extension, and local county fair boards. The project involved placing RFID ear tags in all steers arriving at all state fair check-in sites in addition to all steers exhibited at the Grant, Iowa, Outagamie, Richland, and Rock county fairs. In total 1,142 steers were identified with RFID tags provided by WLIC for this project.

Exhibitors were required to register their premises through the state's registration program that became mandatory in the fall of 2005 (January 2006 extension). State Fair Park made it mandatory for all exhibitors to obtain a premise registration in order to exhibit at the 2005 fair. A DVD was developed and displayed as part of an informational tool at the 2004 WI state fair and WCA registered premises of exhibitors at the 2004 state fair as well as check-ins. Additionally, those counties involved in the projects required their exhibitors to register their premise (though this was not strictly enforced). UWEX also assisted exhibitors register their premises. A follow-up survey was conducted by each county extension agricultural agent that participated in the project.

Post-participation surveys were sent to exhibitors. A total of 112 (17 Outagamie, 34 Iowa, 21 Grant, 10 Richland and 30 Rock) surveys were returned which was approximately a 50% return rate. The survey questions were either yes/no or scalar from 1 to 5 where 1 corresponded to "Strongly Disagree" and 5 represented "Strongly Agree". A total of ten questions were asked in the brief one page survey.

It was noted that the project tended to increase their knowledge of the electronic animal identification system (3.7-4.2). Responses regarding the premise registration form as being simple to understand and for the question as to the ease of registering their premise were the same for both questions and were between "Undecided" and "Agree" with averages ranging from 3.5-4.1. The process did not appear to slow the check-in process with survey responses ranging from 1.6-3.1. The majority of the participants felt the tags did not negatively impact the appearance of their show animal (1.8-2.4). Based upon the survey responses only, a total of 14 steers had lost the RFID device. The total number lost is unknown as not all steers that were identified at the check-ins were exhibited. This illustrates 1) Retention of RFID tags is not 100% in show cattle and 2) Retention rate is relatively high. Additionally, nine steers were reported by the survey respondents to have developed an infection around the site of administration. It is uncertain as to the cause and warrants further investigation. This project reports responses from neutral to acceptable regarding the device as an acceptable form of animal identification by the respondents (3.2-4.0). The project was reported to be

important for the livestock show industry as a National Animal Identification System is developed (3.5-4.6).

The UWEX Livestock Team assisted the beef industry in evaluating a proposed animal identification technology. The use of RFID technology appears to be a plausible method for identifying cattle going to exhibitions but is not faultless. As the industry continues to make advances to the development of a national animal identification system, Extension will provide education to producers regarding the system.

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Common Abbreviations

ADG	Average Daily Gain
G/F	Unit of gain per unit of feed = Inverse of F/G
F/G	Unit of feed per unit of gain = Inverse of G/F
DMI	Dry Matter Intake
DM	Dry Matter
BW	Body Weight
CP	Crude Protein
TDN	Total Digestible Nutrients
IVDMD	In Vitro Dry Matter Digestibility
NDF	Neutral Detergent Fiber
ADF	Acid Detergent Fiber
IVP	In Vitro Produced
AI	Artificial Insemination
ET	Embryo Transfer
SEM	Standard Error of the Mean
kg	kilogram(s)
lb	pound(s)
d	day
wt	weight
wk	week
DOF	Days On Feed
REA	Rib-eye Area
YG	Yield Grade
QG	Quality Grade
HCWT	Hot Carcass Weight

Conversion

Kg to lb = multiply by 2.21

Lb to kg = multiply by 0.454