

MINNESOTA CARCASS MERIT PROGRAM: SUMMARY OF DATA FROM 2004-2008

G. I. Crawford^{*1} and A. DiCostanzo[†]

University of Minnesota

^{*}Extension Regional Office, Hutchinson, and [†]Department of Animal Science, Saint Paul

Summary

Data were compiled from four years of the Minnesota Carcass Merit Program at UMore Park in Rosemount, MN. A total of 519 head of cattle were marketed during this time from 24 different producers. Of these, 443 were steers and 76 heifers. Overall DMI measured 20 lb/d, with ADG averaging 3.40 lb and feed:gain averaging 5.71. Cattle averaged 195 days on feed. For carcass characteristics, 1.7% of carcass graded prime, 57% choice, 39% select, and 2.3% standard or no roll. Overall marbling score averaged 543 (500 = small⁰ or low choice). Yield grade averaged 2.25 with 3.5% of carcasses grading yield grade 4 or greater. Longissimus muscle area averaged 12.7 square inches, and 12th rib backfat averaged 0.406 inches. Total cost of gain ranged from \$0.45/lb in 2005-06 to \$0.72/lb in 2007-08 with an average of \$0.57/lb from 2004-2008. Of the 24 producers who have participated in the Minnesota Carcass Merit Program from 2004 to 2008, 14 participated multiple years, and three have participated each of the four years. The current Carcass Merit Program (2008-09) is being conducted at two locations (UMore Park and NWROC in Crookston, MN) and has 367 cattle enrolled from 20 producers. Future directions of the Carcass Merit Program include continued efforts to reduce cost of gain through improvements in efficiencies and utilization of low-cost feedstuffs and improved data delivery to participants through use of the Carcass Merit Program website.

Introduction

In the current beef production system, it is the responsibility of cow/calf producers to raise feeder calves that have the potential to perform well in the feedlot and produce a carcass that will reach choice quality grade without depositing excessive subcutaneous fat. For most cow/calf producers, however, their knowledge of the calf crop's quality extends only to the date of sale as feeder calves, and their subsequent performance in the feedlot and on the rail is unknown. Cow/calf producers can track the performance of their cattle through retained ownership or agreements with buyers of their calves, and can use these data to make genetic decisions to improve the quality of their herd.

The Minnesota Carcass Merit Program (CMP) was initiated in 1993 thanks to the foresight of Dr. Harvey Peterson and a group of highly motivated extension educators in an effort to discover the genetic merit of Minnesota cattle. Cattlemen participating in the program benefit from knowing detailed information on feedlot performance, carcass merit and value of their cattle. Many purebred breeders have used this venue to test the offspring of bulls they produce. Additionally, cattlemen have learned how their cattle would function under a "retained ownership" program.

¹Contact: craw0105@umn.edu or 320.234.0441

Since 2004, the CMP has been conducted at UMore Park in Rosemount, MN. Detailed data have been collected throughout this program and these data have been utilized by participants as well as the University of Minnesota Beef Team to guide genetic and feedlot management decisions.

Materials and Methods

The CMP is open to any cow/calf producer wishing to test the feedlot performance and carcass characteristics of their calves. The program generally begins with delivery of calves to UMore Park in early November. Calves are required to have the following vaccinations at least 21 days prior to arrival:

7 or 8-way clostridial bacterin
Modified live IBR, BVD, PI₃, and BRSV vaccine
Pasteurella multocida and *Mannheimia haemolytica*
Haemophilus somnus

In addition, incoming calves are required to be healed from dehorning and castration and have a negative PI BVD test prior to arrival. Producers are encouraged to enroll calves weighing between 500 and 700 lbs in groups of five or more, although all weights and group sizes are accepted.

Upon arrival, calves are weighed, tagged with an official CMP eartag, visual characteristics are recorded (coat color, unique marking, visual health appraisal, etc.), rectal temperatures are collected, and vaccinations occur with Ultrabac/Somnubac, BoviShield Gold 5, and One Shot, and Dectomax pour-on (Pfizer Animal Health). In 2007-08 calves were also vaccinated with Draxxin (Pfizer Animal Health) upon arrival. Revaccination occurs approximately 21 days later with a booster of Ultrabac/Somnubac and BoviShield Gold 5. Rectal temperatures are again collected at revaccination, and any calf with a temperature greater than 103.5 degrees F is treated with Excede (Pfizer Animal Health).

Implant programs have varied somewhat throughout the program. In general, however, calves are implanted initially approximately 28 days after arrival with either a Synovex C or Synovex Choice (Fort Dodge Animal Health) implant, with a terminal Synovex Choice approximately 100 days prior to market.

From 2004-07, diets consisted of whole corn, haylage and/or corn silage, and dry supplement. In 2007-08, dry-rolled corn became the primary grain source. Heavyweight calves (generally those above 700 lbs) are stepped up to a finishing diet (approximately 63 Mcal/cwt NEg over a course of 28 days). Lighter weight calves remain on a lower energy diet for a longer period of time to allow for frame growth prior to stepping up to the finishing diet. Cattle are fed once daily at approximately 8:00 a.m.

Feedlot pens at UMore Park are partially covered pens with 2,250 square ft/pen and 30 ft of bunk space/pen. The covered portion of each pen is 900 square ft, approximately 300 square ft of

which is a concrete apron behind the feed bunk and 600 square ft is dirt-floored. The outside portion of the pens is concrete-floored and measures 1,350 square ft/pen. Each pen has approximately 48 linear inches of water space. These pens house approximately 30 head, allowing for approximately 70 square ft/head, one ft of bunk space/head, and 1.5 inches of linear water space/head.

The dirt-floored portion of the pens is bedded with corn stalk residue bales when necessary. The concrete apron behind the feed bunk and the outdoor concrete floor is scraped at least twice weekly. Cattle are monitored daily for any signs of sickness and treated if necessary.

Cattle determined to be ready for market upon visual appraisal of weight and backfat. Cattle are generally marketed in 50,000 lb loads, which results in approximately 36-40 head marketed in each group. Cattle have been slaughtered at either PM Beef in Windom, MN or Swift and Company in Grand Island, NE. Measurements of hot carcass weight (HCW), longissimus muscle area, 12th rib backfat, marbling score, USDA quality and yield grade are collected at the packing plant.

Producers retain ownership of cattle throughout the program and are charged for all feed, bedding, and veterinary medical costs. For the most recent year (2007-08), yardage costs were \$0.20/head daily and the feed delivery fee was \$12/ton. A \$30 entry fee/head is collected at the beginning of the CMP, all other costs are deducted from the final selling price of cattle.

Results and Discussion

A total of 519 cattle have been marketed from the CMP since 2004-05. Of these, 443 were steers and 76 heifers. By year, the total cattle marketed from the program are 161, 125, 108, and 125 cattle marketed in 2008, 2007, 2006, and 2005, respectively (Table 1). There have been 33, 4, 16, and 23 heifers marketed in 2008, 2007, 2006, and 2005, respectively. Cattle arrived to the CMP on November 8, 2007, November 9, 2006, November 10, 2005, and November 19, 2004. Initial BW averaged 552 ± 117 lb (Table 1), ranging from 264 to 806 lb initial BW. Rectal temperatures have been collected at feedlot arrival in 2006 and 2007, and averaged 102.3° F.

A total of 24 producers have participated in the program with 14 producers participating multiple years and three producers participating all four years. The average group size per year has been 13.4, 12.5, 9.8, and 10.4 and median group size has been 11, 7, 6, and 10 in 2007-08, 2006-07, 2005-06, and 2004-05, respectively. The largest group size from one owner was 38 head, which occurred in 2005-06. The smallest group was 2 head, which occurred in 2007-08.

Live Animal Performance

Overall and yearly live animal performance results are shown in Table 1. Cattle averaged 195 days on feed (DoF). The first group of cattle went to market after 181, 165, 154, and 145 DoF in 2008, 2007, 2006, and 2005, respectively. The final group of cattle went to market after 230, 215, 210, and 214 DoF in 2008, 2007, 2006, and 2005, respectively.

Final live BW averaged $1,210 \pm 143$ lb overall, 1,072 lb for heifers and 1,234 lb for steers. Due to the inefficiencies associated with feeding cattle in the CMP when less than one truckload of cattle remain, the lightest weight cattle are often marketed with the last market-ready cattle, and therefore are not fully finished. This can explain the relatively low overall final BW and particularly low final BW for heifers. For example, the average final BW for the first market group from 2004-08 was 1,304 lb, while the average final BW for the final market group in these years was 1,182 lb.

Dry matter intake averaged 20.0 lb/head, or 1.7% of BW. It is important to remember that these DMI data include the step-up period in which cattle were eating less than ad-libitum. Average daily gains were 3.40 lb overall, 3.49 lb for steers and 2.86 lb for heifers. Feed conversion averaged 5.71 overall. For steers, feed conversion has been better than 6.0 every year except for 2006-07, when it was 6.02. For heifers, feed conversions were 6.25 in 2007-08, otherwise feed conversions have been better than 6.0 each year.

Carcass Characteristics

Overall and yearly carcass characteristics are shown in Table 2. Hot carcass weights (HCW) averaged 740 lb and dressing percentage averaged 61.1%. Quality grade has fluctuated over the four years of the CMP at UMore Park. Overall, the percentage of carcasses grading Prime, Choice, Select, and Standard/No Roll were 1.7, 56.6, 39.4, and 2.3%, respectively. The percentage of carcasses grading Choice or better has fluctuated from a high of 65.2% in 2007-08 to a low of 47.2% in 2006-07. Marbling scores averaged 543 on a scale in which 500 is equal to small⁰ marbling or a low Choice quality grade. Marbling scores have been nearly identical between steers (543.1) and heifers (542.5). In the Northern plains, feedlots generally target 70% or more carcasses grading Choice or better. When looking at quality grades and the final BW to which the cattle were fed, it is logical to assume that if the lightest end of the cattle were fed to heavier weights there may have been higher marbling scores and more carcasses grading Choice or better. There have been 26 carcasses, or 5.0%, that have had HCW of less than 600 lb, which generally will receive lightweight discounts at the packing plant. This relatively high percentage of lightweight carcasses has a negative effect on quality grade. Of the 26 lightweight carcasses, only 10 (39%) graded Choice.

Longissimus muscle (rib eye) area averaged 12.8 square inches overall, 12.9 square inches for steers and 12.4 square inches for heifers. Backfat at the 12th rib averaged 0.416 inches overall, 0.415 inches for steers and 0.418 inches for heifers. Only 3.5% of carcasses had a yield grade of 4 or higher. Most packing plants discount carcasses grading yield grade 4 or higher, however, feedlots will generally target having up to 5% yield grade 4 carcasses to ensure they are feeding cattle near their targeted endpoint. Again, the lightest cattle in each year's CMP are likely not fed to an ideal endpoint and therefore may reduce the overall average 12th rib fat thickness. Not surprisingly, the two years (2007-08 and 2005-06) in which the highest percentage of yield grade 4 carcasses were observed (4.35 and 4.63%, respectively) were also the two highest years in terms of carcasses grading choice or better (65.2 and 64.9%, respectively).

Feeding Costs

The increase in corn prices has been reflected in an increase in cost-of-gain in the CMP. Average costs of gain between 2004 and 2008 were \$0.57/lb. In 2007-08 total cost of gain was \$0.72/lb, whereas total cost of gain ranged from \$0.45 to \$0.56/lb in the previous three years. It is often assumed that feed costs account for approximately 2/3 of total cost of gain. The CMP costs-of-gain reflect this, as 65.9% of total cost of gain is from feed costs. The balance is accounted for by veterinary medical costs, yardage, and bedding.

Current Program and Future Direction

The 2008-09 CMP has been expanded to include a second location, the Northwest Research and Outreach Center (NWROC) in Crookston, MN. The addition of the NWROC provides capacity for an additional 220 head of cattle, and provides producers in Northern Minnesota a more convenient location for participation in the CMP.

For 2008-09, 367 calves from 20 producers are enrolled in the program. This includes 228 head at UMore Park and 139 head (initial BW = 553 ± 93 lbs.) at the NWROC. There are 189 steers (initial BW = 610 ± 96 lbs) and 39 heifers (initial BW = 521 ± 99 lbs) at UMore Park, while all 139 head at the NWROC are heifers as a part of an experiment to determine the value of spayed heifers. All heifers at UMore Park and 70 heifers at NWROC have been spayed.

The feeding program at UMore Park has also changed for 2008-09. Modified distillers grains with solubles (MDGS; Western Wisconsin Energy) are being utilized in all rations along with dry-rolled corn, corn silage, and a liquid supplement (Quality Liquid Feeds). At the NWROC, the ration consists of dry-rolled corn, corn silage, haylage, wet beet pulp, and a dry supplement.

In an effort to better convey interim data to participants, a website (www.mncmp.bravehost.com) has been established. Through this website, producers can access the most recently available performance data for their cattle and can also gather updates and information about the CMP.

Future plans include continued use of both CMP locations and continued effort to lower costs of gain through improved efficiencies and utilization of low cost feedstuffs. Expanded use of the CMP website is also planned to improve accessibility of data by producers. Further data analyses to identify performance and carcass trends are also planned.

Conclusion

In the four years since the Minnesota Carcass Merit Program has been conducted at UMore Park in Rosemount, MN, 24 producers have marketed 519 head of cattle through the program. Through this program, producers have been able to track the feedlot performance and carcass characteristics of the calves they produce and use those data to improve the quality of their herds. Performance results from the CMP show average daily gains around 3.4 lb and feed conversion

of less than 6:1. Approximately 60% of the cattle in the CMP have graded Choice or better, and more cattle may have graded Choice or better had the lightest-weight cattle been fed to a more appropriate final BW. Total cost of gain is heavily impacted by feed costs, and has increased greatly in 2007-08 due to higher corn prices. The 2008-09 CMP has a record number of cattle and has expanded to a second location. Future plans include further development of data delivery through the CMP website and continued efforts to improve costs of gain through improved feed efficiency and utilization of low-cost feedstuffs.

Acknowledgements

Appreciation is extended to producers who have participated in the Carcass Merit Program. Appreciation is also extended to our industry partners, particularly Fort Dodge Animal Health, Pfizer Animal Health, Form A Feed, Land o' Lakes-Purina Feed, Quality Liquid Feeds, and Western Wisconsin Energy, for their contribution of goods and services. Also, thanks to the staffs at UMore Park and the NWROC for their work on the Carcass Merit Program.

Table 1. Live performance of cattle enrolled in the Carcass Merit Program from 2004-2008.

Year	n	In BW, lb	Final BW, lb	DoF ¹	DMI, lb/d	ADG, lb	F:G ²
Overall	519	552	1,210	195	20.0	3.40	5.71
Heifers	76	475	1,072	209	17.2	2.86	5.95
Steers	443	566	1,234	192	20.4	3.49	5.67
2007-08							
Overall	161	528	1,252	209	20.0	3.50	5.71
Heifers	33	447	1,094	226	18.0	2.88	6.25
Steers	128	549	1,292	204	20.5	3.66	5.58
2006-07							
Overall	125	575	1,185	183	20.2	3.37	6.01
Heifers	4	466	983	194	15.2	2.67	5.74
Steers	121	578	1,191	182	20.4	3.39	6.02
2005-06							
Overall	108	543	1,204	197	19.7	3.41	5.79
Heifers	16	450	1,027	210	16.2	2.75	5.91
Steers	92	559	1,235	194	20.4	3.52	5.77
2004-05							
Overall	125	570	1,188	188	17.6	3.29	5.35
Heifers	23	534	1,085	187	16.5	2.96	5.58
Steers	102	578	1,212	188	17.8	3.36	5.29

¹Days on feed²Feed:Gain (Feed Conversion)

Table 2. Carcass characteristics from cattle enrolled in Carcass Merit Program from 2004-2008.

Year	HCW ¹ , lb	LMA ² , sq in	BF ³ , in	Marbling ⁴	Ch + ⁵ , %	YG ⁶	YG 4+ ⁷ , n (%)
Overall	740	12.8	0.416	543	58.3	2.25	18 (3.5)
Heifers	653	12.4	0.418	543	56.6	2.11	1 (1.3)
Steers	755	12.9	0.415	543	58.6	2.27	17 (3.8)
2007-08							
Overall	776	13.5	0.424	576	65.2	2.37	7 (4.3)
Heifers	677	13.0	0.383	530	45.4	2.27	1 (3.0)
Steers	801	13.6	0.434	588	70.3	2.39	6 (4.7)
2006-07							
Overall	729	12.4	0.396	504	47.2	2.34	4 (3.2)
Heifers	605	10.4	0.432	510	50.0	2.75	0 (0.0)
Steers	733	12.5	0.394	504	47.1	2.34	4 (3.3)
2005-06							
Overall	721	12.0	0.449	549	64.8	2.19	5 (4.6)
Heifers	610	11.3	0.428	570	62.5	1.80	0 (0.0)
Steers	740	12.1	0.453	546	65.2	2.25	5 (5.4)
2004-05							
Overall	721	13.0	0.396	532	54.8	2.05	2 (1.6)
Heifers	658	12.5	0.461	548	69.6	1.96	0 (0.0)
Steers	736	13.1	0.382	528	51.5	2.07	2 (2.0)

¹Hot carcass weight

²Longissimus muscle area (rib eye area)

³Backfat at the 12th rib

⁴Marbling score where 500 = small⁰ or low Choice quality grade

⁵Percentage of carcasses grading USDA Choice or better

⁶USDA yield grade

⁷Number of carcasses grading USDA yield grade 4 or higher