MCDONALD'S SUSTAINABLE BEEF PILOT

Information Sharing Initiative Report | February 2016

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INTRODUCTION

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The third criteria for the Food Principle of the Global Roundtable for Sustainable Beef (GRSB) is, "Information[1] should be shared both up and down the value chain to provide opportunities for participants to improve their businesses, while respecting confidentiality."

As part of the Pilot, McDonald's supported an initiative to evaluate the potential usefulness of data sharing with stakeholders in the Canadian beef community. To that end, McDonald's partnered with Beefbooster and BIXS to enlist the help of two professionals[2] from Livestock Gentec. Together, they analyzed nearly two million records entered by packing plants into the Beef Information Exchange System (BIXS) during 2012 to 2014 as part of a federally sponsored project.

This initiative was intended to be a catalyst for future information sharing opportunities. It was not intended to be a comprehensive analysis, nor an analysis of potential impacts on individual ranches, feedlots and packers' particular business models and relationships in the market.

The professionals looked at the data two ways:

1. **Macro-analysis** – A high level analysis on all the available records with good quality carcass data and birth dates

2. **Micro-analysis** – A deeper analysis on a subset of those records where genomic technology was used to identify the specific Beefbooster sires of 813 calves.

[1] Specific information related to sustainability principles and criteria should be determined by the local, national and regional roundtables as they establish their indicators.

[2] Michael MacNeil, MS, PhD. and John Basarab, PhD.

KEY TAKEAWAYS

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1. **Data must be transformed to create value**
   Data needs to be transformed into usable information, then into shared knowledge to make informed decisions and create value.

2. **Cattle harvested before 19 months of age had the best profit opportunity under the market conditions and assumptions used in this initiative**
   ~41% of Canadian cattle in the database were harvested before 20 months of age.

3. **Reduced Carbon Footprint**
   Cattle harvested at 18 months instead of 24 months have the potential to reduce GHG intensity of beef production by 1.2 tonnes CO_2e /youthful animal harvested.

4. **Missing birth dates in CCIA records resulted in culling over 93% of the records**
   - BIXS imported the data from CCIA records
   - The only records with birth dates were from operations registered in BIXS

5. **$219 higher carcass value for the average TX (terminal cross) line Beefbooster calf compared to the industry average**

6. **Opportunity to select bulls for carcass value**
   There is an opportunity to improve carcass value by selecting yearling bulls using a multi-trait carcass value index.

RESULTS

RESULTS

Macro-analysis of carcass data in BIXS

1,909,787 records were submitted to BIXS by packers as part of a federally funded project from January, 1, 2012 to April 30, 2014. This dataset did not include birthdates. BIXS was able to cross-reference the information, with their member data and identify birthdates for 126,870 of the records. Livestock Gentec's analysis excluded:

- 87% of the records for lack of date of birth because the producers associated with these records were not BIXS members so associated birth dates were not available.

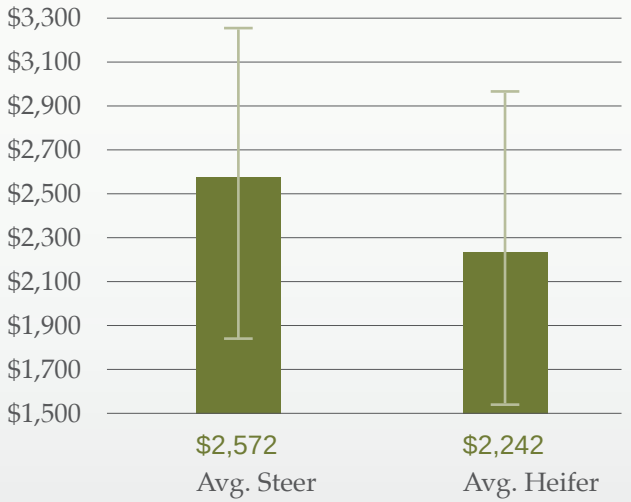
- 6% of the records for unreasonable outliers in the following fields: over-age, ribeye area, subcutaneous back fat, marbling or records were missing: sex, harvest date, hot carcass weight, longissimus muscle area, fat depth, marbling score, quality grade or yield grade.

CL Ranch | Calgary, AB

RESULTS

Macro-Analysis Area 1

Benchmarking Canadian Beef Industry Carcass Value



Methodology

Investigators used the Cargill, High River grid to calculate individual carcass values for each of the animals within the population of (n = 1,834,267) and then analyzed the distribution of the carcass value within the population (Standard deviation $233.50). About 50% of the carcasses had back fat measurement of greater than 0.5 inch.

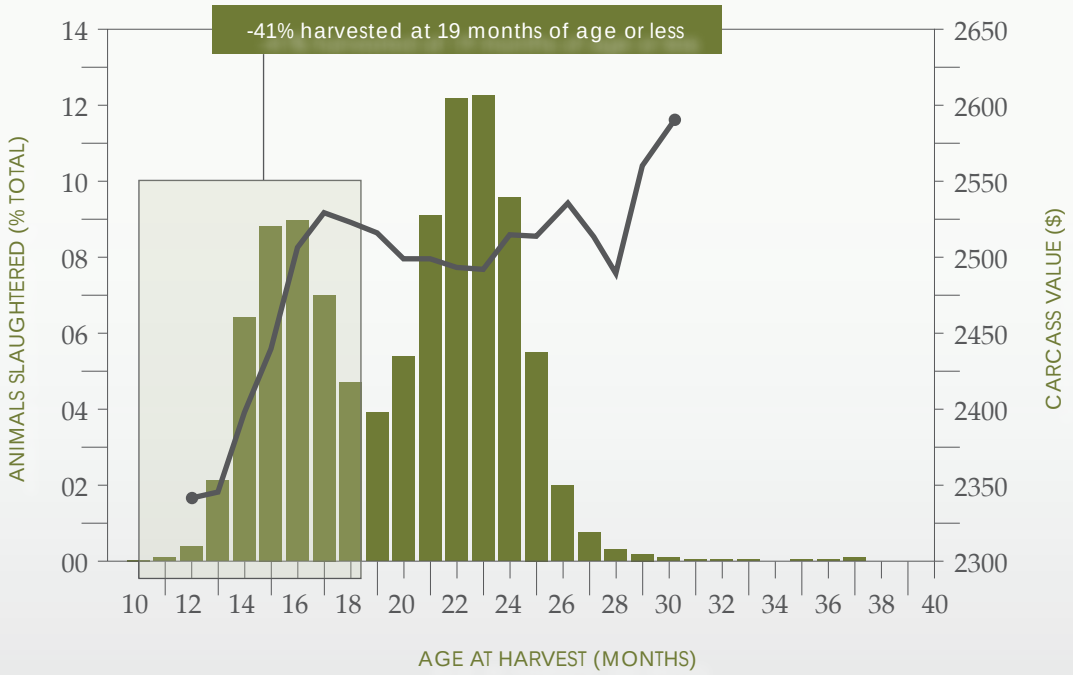
Carcass discount information:

- 40% discounted for quality grade
- 13% discounted for yield grade
- 1.6% discounted for carcass weight

RESULTS

Macro-Analysis Area 2

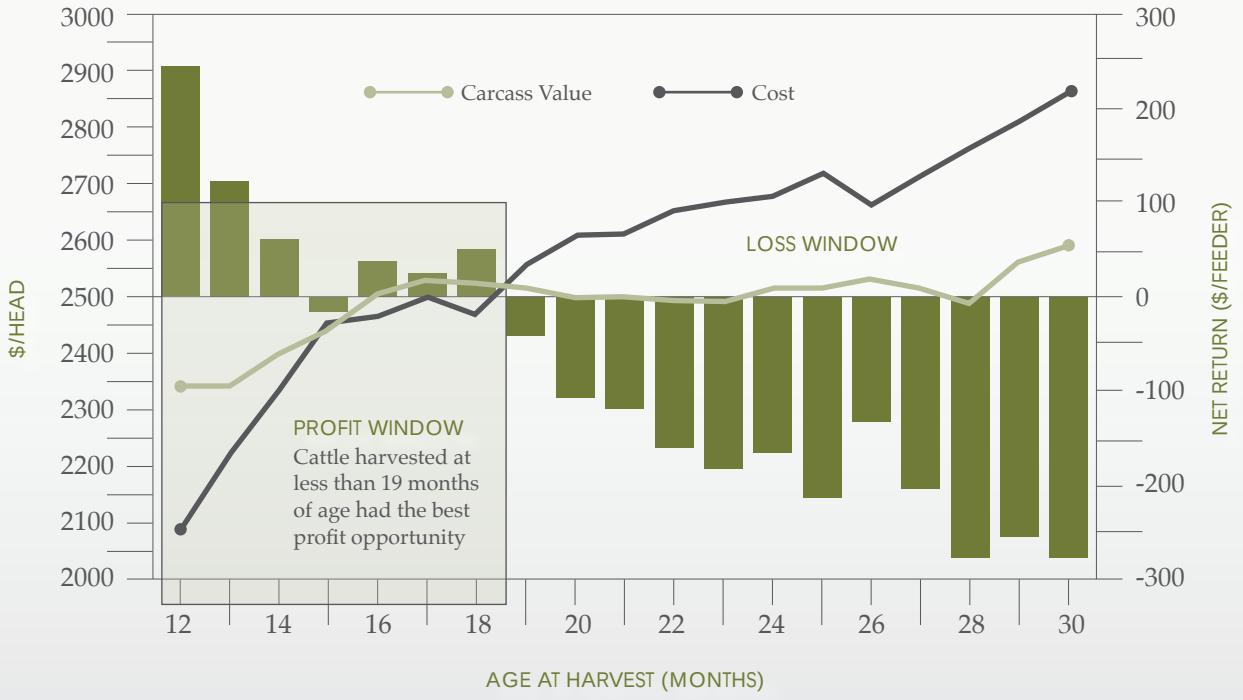
Distribution of age, carcass weight and value at harvest (n=126,870)



RESULTS

Macro-Analysis Area 3

Cost to Produce, Carcass Value and Net Return Estimate

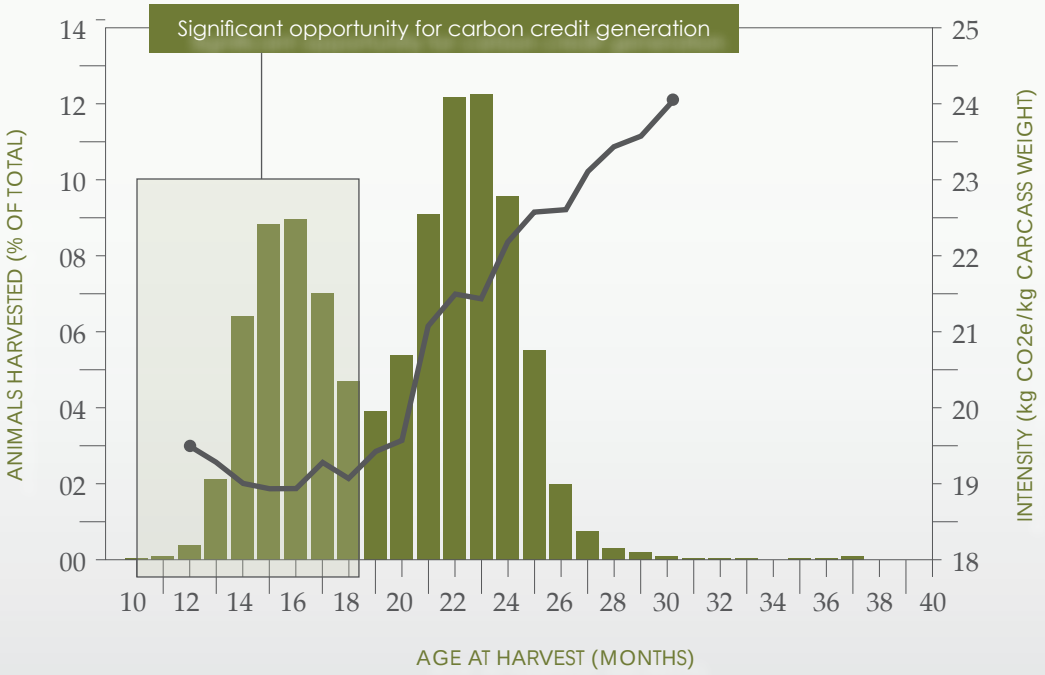


RESULTS

Macro-Analysis Area 4

Greenhouse Gas Emissions Intensity and Age at Harvest

Reducing age at harvest from 24 to 18 months of age reduces GHG intensity by 1.2 tonnes CO2e/head (Assume 850 lb. carcass)



RESULTS

Micro-economic analysis of Beefbooster data set

Livestock Gentec analyzed a subset of Canadian Cattle Identification Agency (CCIA) and BIXS records linked to 813 calves where genomic technology was used to identify their specific Beefbooster sires.

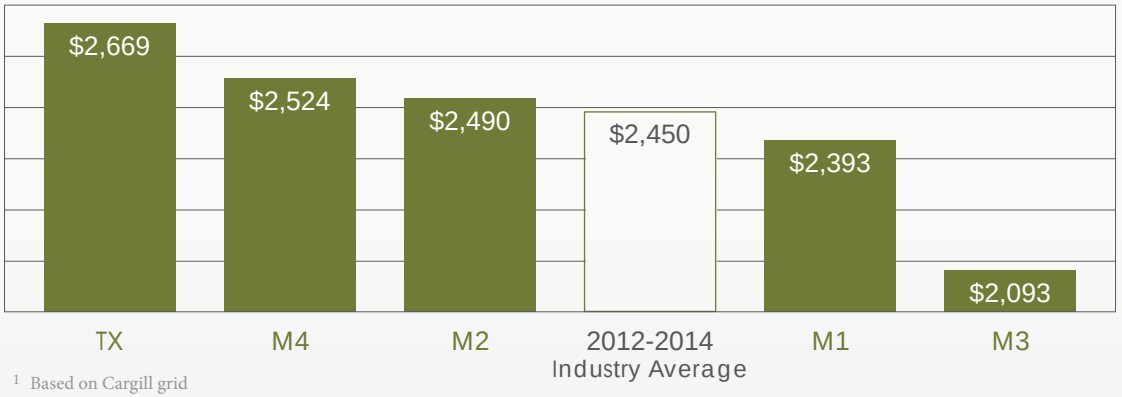
M4 Cow-calfs pairs | Beefbooster

RESULTS

Micro-Analysis Area 1

Beefbooster Line Carcass Value Calculation

Livestock Gentec determined the individual carcass value for each individual animal determined by weight, quality and yield grades through the Cargill, High River, Alberta grid. These results are portrayed in the following two charts:



[1] Based on Cargill grid

[2] 63% steers and 37% heifers - source CanFax Research Services

	TX	M4	M2	2012-2014 Industry Average	M1	M3
Highest Value	$255	$108	$121	0	$(7)	$(322)
Average Value	$219	$74	$40		$(57)	$(357)
Lowest Value	$183	$40	$(41)		$(107)	$(392)

RESULTS

Micro-Analysis Area 2

Carcass Value Expected Progeny Difference (EPD) by Sire Line

Livestock Gentec then performed mixed model analysis considering harvest date, sex, strain, sire within strain to determine Carcass Value EPDs for each sire within each line.

SIRE LINE	M1 (N=28)	M2 (N=5)	M3 (N=29)	M4 (N=48)	TX (N=15)
Highest EPD	+$61	+$33	($19)	+$95	+$169
Lowest EPD	-$87	-$9	-$186	-$22	+$4

Based on these results, there is an opportunity to improve carcass value by selecting yearling bulls using a multi-trait carcass value index.

TX Bull | Beefbooster

CONCLUSION

CONCLUSION

Impacting the triple bottom-line

This initiative demonstrates that collaboration and information sharing has the potential to increase the economic viability, social responsibility and environmental sustainability of the entire Canadian beef community.

Antelope Butte Ranch | Lundbreck, AB

APPENDIX

APPENDIX

Cost Assumptions

1. $Cost_a$ (feeder) = multiply steer live weight (500-600 lb) by buying price ($3.00/lb) plus $11.50/hd for marketing and transportation [$0.15/lb slide when >500 lb]
2. $Cost_i$ (induction) = 3% of feeder cost based on CanFax Trends for 2015) processing, vaccination, medicines and veterinary services
3. $Cost_f$ (feed) = $1.00/day for backgrounding diets, $0.83/day for pasture ($25/animal unit month) and $2.26/day for finishing diets
4. $Cost_y$ (yardage) = multiplying days on feed (DOF) by $0.45/head/day
5. $Cost_{int}$ (interest) = The sum of the feeder value and half the total feed costs multiplied by the proportion of the year in drylot and pasture (DOF/365) and by 0.03 (3% interest
6. $Cost_d$ (death loss) = 1.5% of feeder costs
7. $Cost_m$ (marketing costs) = $5/hd
8. $Cost_g$ (growth promotants) = $1.05 per implant with 200 mg progesterone and 20 mg estradiol benzoate and $4.50 per implant with 120 mg trenbolone acetate and 24 mg estradiol

Greenhouse Gas Reference Sources

1. On-farm emissions of CH4 from enteric fermentation and manure
2. On-farm emissions of N2O from manure,
3. Off-farm emissions of N2O from N leaching, run-off and volatilization
4. On-farm emissions of N2O from cropping due to soils, fertilizer, roots and residue (11.2% in calf-fed systems; 11.4% in yearling-fed systems)
5. CO2 emissions from energy use (9.0% in calf-fed systems; 9.5% in yearling fed systems
   - GHG emissions for cowherd were taken from Basarab et al., animals, 2012
   - Conversion of CH4 to CO2e = x 25
   - Conversion of N20 to CO2e = x 298

RECOGNITION

Lead

Beefbooster

Support

BIXS and McDonald's

Funding

McDonald's and Alberta Livestock Meat Agency

Analysts

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