Oct 2024 - Canadian Charolais Breed Average, Percentiles and Trends

Canada USA Joint Evaluation

The September 2024 evaluation continues a historic step for both the AICA and CCA genetic evaluations. The genetic evaluation was conducted by Angus Genetics Incorporated (AGI) and uses updated heritability values, improved models and combines the pedigree, performance and genomic datasets from the American International Charolais Association and the Canadian Charolais Association into a single joint evaluation. This means that the EPD and Accuracies produced are directly comparable between the AICA and CCA populations. It is important to note that the breed averages, percentiles and trends are calculated on a country specific basis and can not be directly compared between populations. The tables presented in this document can be used to determine where cattle from the US or Canada fit into the relevant population.

New to this evaluation is a Terminal Sire Index. This joint project between CCA and AICA reflects an update to the AICA Terminal Sire Index and provides insight into the relative profitability of sires' calves when mated into an Angus based cowherd on a retained ownership, terminal mating program. This tool is designed for commercial cattle producers using Charolais bulls in this scenario. Component traits are weighted according to their relative economic importance to the system and computed into a single value, the TSI.

Single Step Genetic Evaluation

The genetic evaluation uses single step genomic technology. The single step evaluation means that the EPD contain information from pedigree, performance and DNA information directly in the calculation of the EPD. The use of DNA in the EPD calculation allows us to increase the accuracy of the EPD for tested animals and better predict outcomes, particularly on young cattle.

For example, in the evaluation a DNA test is roughly equivalent to the reporting of the following numbers of progeny records

Table 1. Progeny records roughly equivalent to the information provided from a genotype test in the SSE. Milk equivalents are expressed as grandprogeny from daughters. Carcass traits are expressed as ultrasound record equivalents.

	Progeny Equivalents
CE	10
BW	25
WW	15
YW	8
Milk	10
REA	6
Fat	6
Marb	6

Including the DNA information allows us to greatly enhance our selection process, particularly on young animals.

Specific animals may have differences in their EPD between the August 2023 evaluation and the new evaluation, due to additional data and DNA test results and improvements to data editing, however overall, members should notice very few changes to the overall averages or trends and even most animals. The EPD traits and their use are the same as in previous evaluations, and they can be used for selection in the same manner as before.

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Breed Average EPD

	CE	BW	WW	YW	MILK	MCE	TM	SC	CW	REA	Fat	Marb	TSI
Current	4.7	0.4	59.4	109.4	22.3	5.7	52.0	1.1	23.3	0.73	0.005	0.06	256.2
Sires	4.6	0.3	59.2	108.7	22.2	5.5	51.8	1.0	22.7	0.73	0.003	0.06	256.0
Dams	3.1	0.9	55.7	102.0	21.2	4.9	49.0	0.9	20.5	0.70	0.002	0.05	250.3

Current – all calves born in Canada in the last 2 years (2023 - 2024)

Sires – all sires with a calf reported in Canada in the last 2 years

Dams – all dams with a calf reported in Canada in the last 2 years

Percentile

	CE	BW	WW	YW	MILK	MCE	TM	SC	CWT	REA	FAT	MARB	TSI
Avg	4.7	0.4	59.4	109.4	22.3	5.7	52.0	1.1	23.3	0.73	0.005	0.06	256.2
Min	-27.6	-12.3	9.9	19.5	-5.5	-14.9	12.4	-0.6	-12.2	0.13	-0.053	-0.24	196.9
Max	23.0	12.5	99.7	185.3	47.1	18.8	88.0	2.7	60.9	1.51	0.077	0.49	336.4
SD	5.61	2.45	9.48	16.29	5.62	4.01	7.87	0.35	7.89	0.14	0.015	0.07	13.41
1	16.9	-6.1	82.6	149.5	35.8	13.9	70.4	1.8	42.2	1.10	-0.029	0.26	289.5
2	15.5	-5.2	79.5	144.1	33.9	13.1	68.1	1.7	39.8	1.04	-0.024	0.23	284.6
3	14.7	-4.6	77.7	141.2	32.9	12.6	66.6	1.7	38.3	1.02	-0.021	0.21	281.9
4	14.1	-4.2	76.3	138.8	32.1	12.1	65.6	1.6	37.3	0.99	-0.020	0.20	280.0
5	13.6	-3.9	75.2	136.9	31.4	11.8	64.7	1.6	36.3	0.98	-0.018	0.19	278.3
10	11.7	-2.8	71.4	130.2	29.3	10.6	61.9	1.5	33.3	0.92	-0.013	0.15	273.0
15	10.3	-2.1	68.9	126.1	27.9	9.7	60.1	1.4	31.3	0.87	-0.010	0.13	269.7
20	9.3	-1.5	67.1	122.8	26.8	9.1	58.5	1.3	29.7	0.84	-0.007	0.12	267.1
25	8.5	-1.1	65.5	120.0	26.0	8.5	57.3	1.3	28.4	0.82	-0.005	0.10	264.9
30	7.7	-0.7	64.1	117.6	25.1	8.0	56.1	1.2	27.2	0.80	-0.003	0.09	263.0
35	6.9	-0.4	62.8	115.3	24.4	7.5	55.1	1.2	26.2	0.78	-0.001	0.08	261.1
40	6.2	0.0	61.5	113.1	23.7	7.0	54.0	1.2	25.2	0.76	0.001	0.07	259.4
45	5.5	0.3	60.3	111.1	23.0	6.5	53.0	1.1	24.3	0.74	0.003	0.06	257.7
50	4.8	0.5	59.2	109.2	22.4	6.0	52.1	1.1	23.3	0.72	0.005	0.06	256.1
55	4.1	0.8	58.0	107.2	21.7	5.5	51.1	1.0	22.4	0.71	0.006	0.05	254.5
60	3.5	1.1	56.9	105.1	21.0	5.0	50.1	1.0	21.4	0.69	0.008	0.04	252.9
65	2.7	1.4	55.7	103.0	20.3	4.4	49.1	0.9	20.5	0.67	0.010	0.03	251.1
70	2.0	1.7	54.5	100.8	19.5	3.9	48.0	0.9	19.4	0.65	0.012	0.02	249.3
75	1.1	2.0	53.1	98.5	18.7	3.2	46.9	0.9	18.3	0.63	0.015	0.01	247.4
80	0.2	2.4	51.6	95.8	17.8	2.5	45.6	0.8	17.0	0.61	0.017	0.00	245.1
85	-1.0	2.8	49.8	92.9	16.7	1.6	44.1	0.7	15.5	0.59	0.020	-0.01	242.6
90	-2.5	3.3	47.5	89.0	15.3	0.4	42.0	0.6	13.5	0.56	0.024	-0.03	239.3
95	-4.8	4.1	44.2	83.4	13.0	-1.4	39.0	0.5	10.5	0.51	0.031	-0.05	234.3
100	-27.6	12.5	9.9	19.5	-5.5	-14.9	12.4	-0.6	-12.2	0.13	0.077	-0.24	196.9
Num	38114	38822	38822	38822	38822	38114	38822	38822	21503	21503	21503	21503	38801

Percentiles are based on Current Canadian Born Calves – all calves born in the last 2 years (2023 – 2024)

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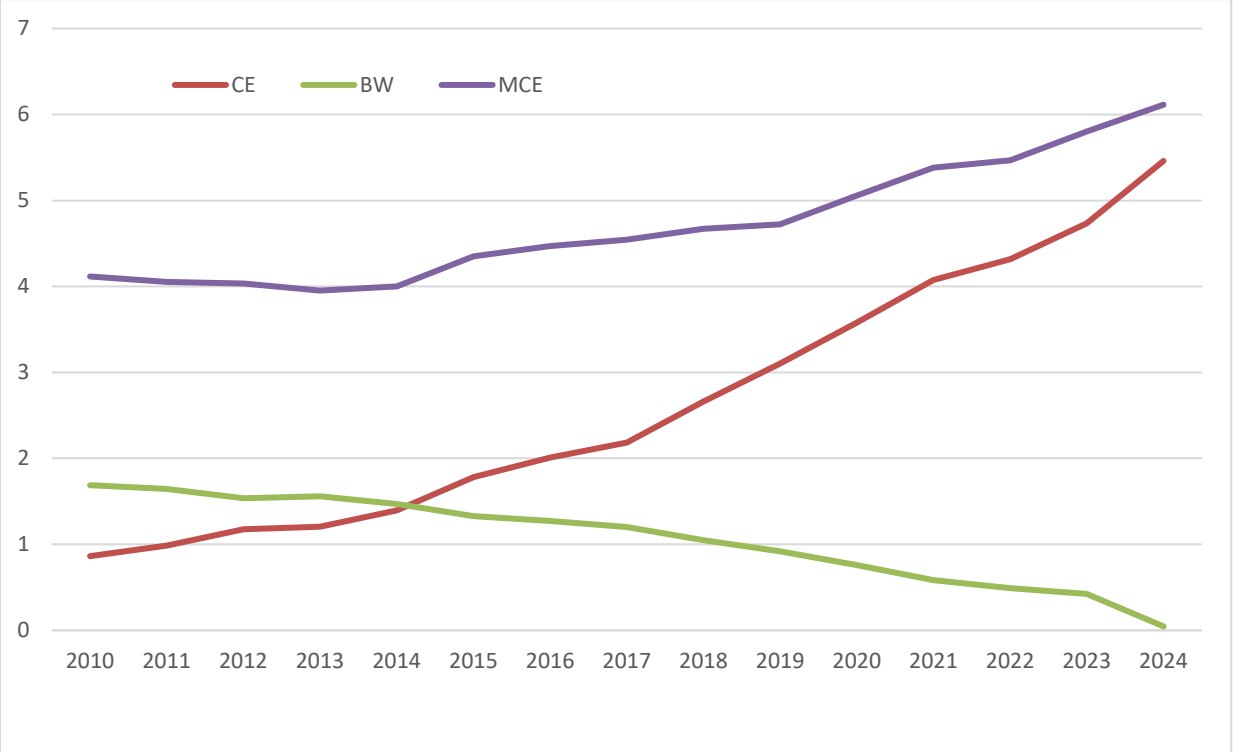
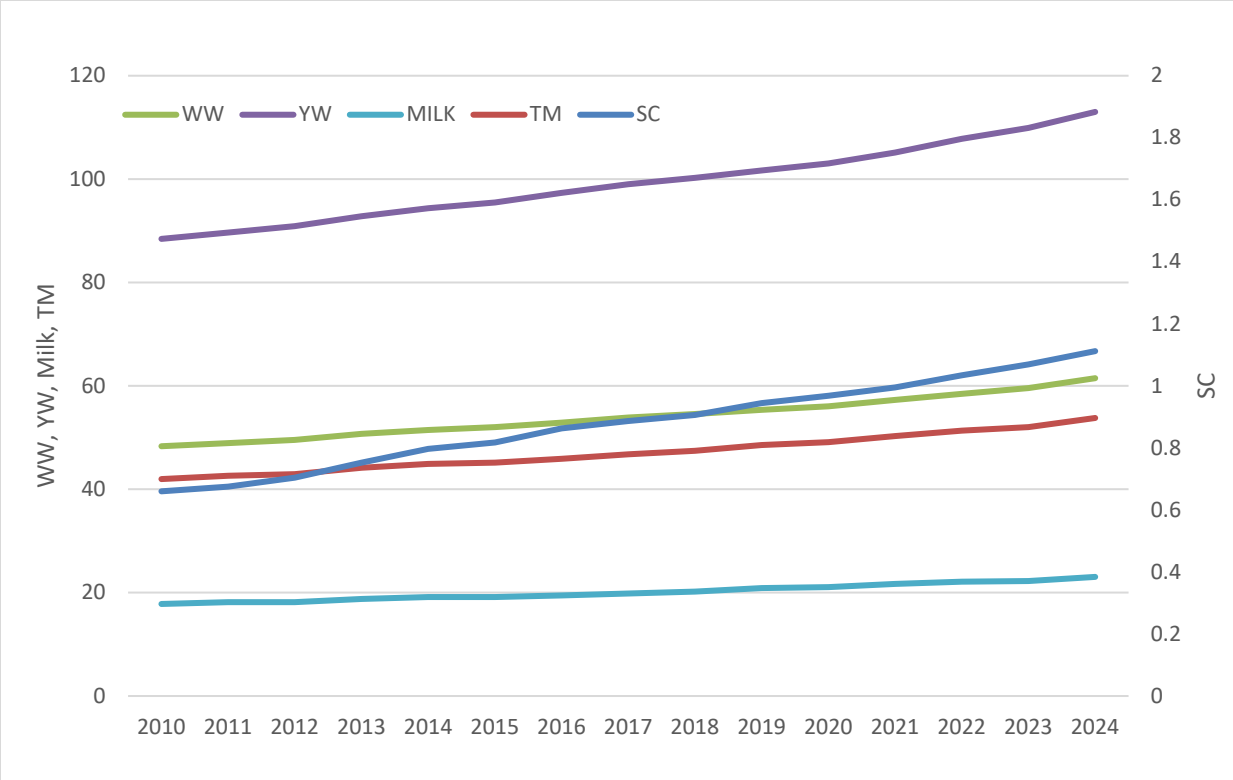
Genetic Trends for Calving Ease, Birth Weight and Maternal Calving Ease



Genetic Trends for Weaning/Yearling Weight, Milk, Total Maternal and Scrotal



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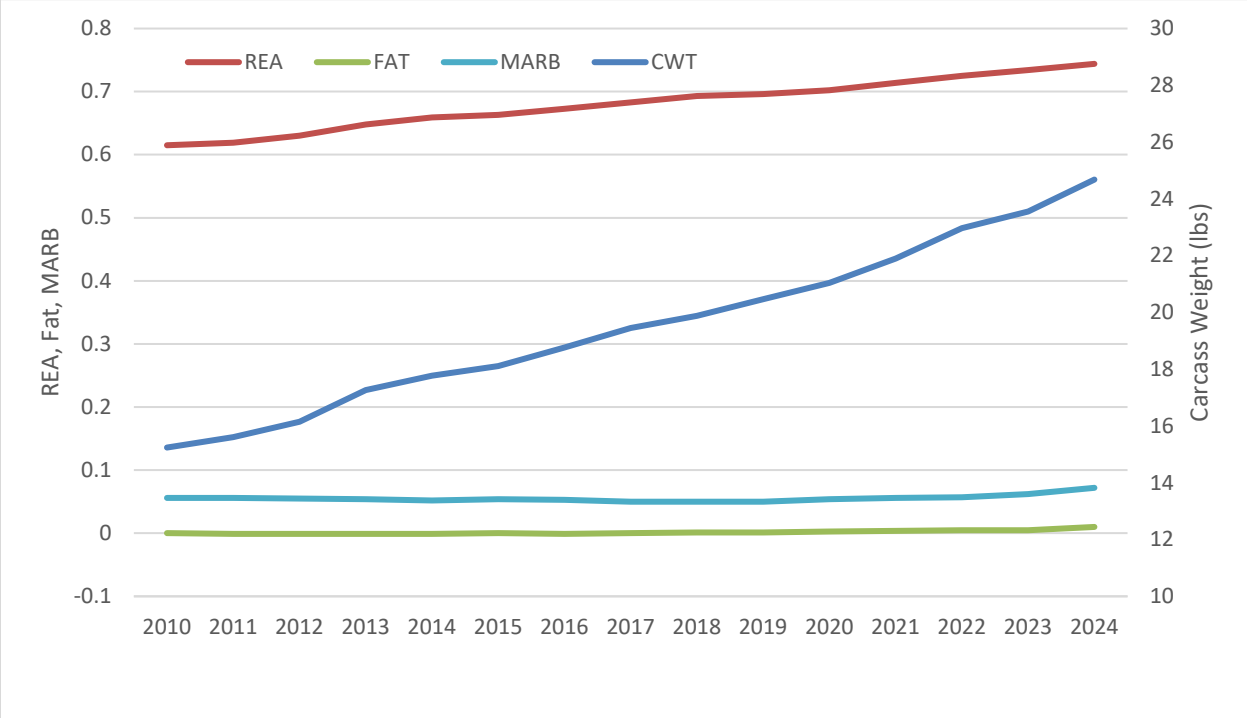
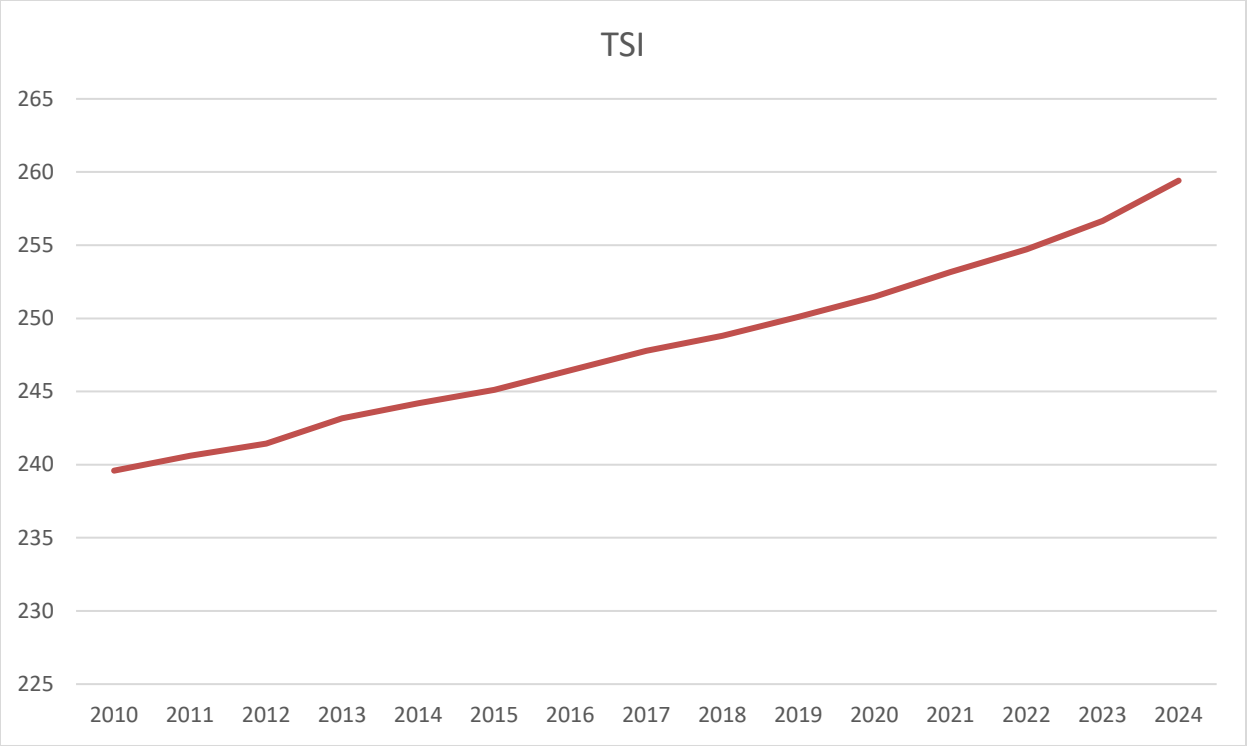
Genetic Trends for REA, Fat, Marbling and Carcass Weight



Genetic Trends for Terminal Sire Index



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EPD Abbreviations

Trait	Trait	Description	Units
CE	Calving Ease	Genetic difference for unassisted calving of progeny. A larger number indicates easier calving (less assistance).	Unassisted
BW	Birth weight	Describes genetic differences for progeny birth weight. A larger number indicates heavier calves at birth.	Lbs
WW	Weaning Weight	Genetic difference for progeny weaning weight. A larger number indicates heavier calves at weaning.	Lbs
YW	Yearling Weight	Genetic difference for progeny yearling weight. A larger number indicates heavier calves at one year of age.	Lbs
MILK	Milk	Genetic difference for daughters' progeny weaning weight due to their milk production (grandprogeny). A larger number indicates heavier calves from daughters at weaning.	Lbs
MCE	Maternal Calving Ease	Genetic Difference for daughters' calving unassisted as first calf heifers. A larger number indicates easier calving (less assistance).	Unassisted
TM	Total Maternal	Genetic difference for daughters' progeny weaning weight due to their genes for milk and growth (grandprogeny). A larger number indicates heavier calves at weaning.	Lbs
SC	Scrotal Circumference	Genetic differences for male progeny scrotal size at 1 year of age. A larger number indicates larger scrotal circumference at a year old.	Cm
CWT	Carcass Weight	Genetic difference for progeny carcass weight in pounds. A larger number indicates heavier carcasses.	Lbs
REA	Rib-Eye Area	Genetic difference for progeny Rib-Eye area in square inches. A larger number indicates bigger rib-eye muscle.	Sq. In.
FAT	Fat Thickness	Genetic difference for progeny backfat thickness at 12/13 rib. A larger value indicates fatter carcasses.	in
MARB	Marbling	Genetic difference for progeny marbling score (quality grade) in marbling score units. A larger number indicates more marbling.	MSU
TSI	Terminal Sire Index	Relative difference in progeny values between sires when mated to an Angus cowherd with all calves retained through slaughter and marketed on a Grid Based Marketing system with additional premiums for upper 2/3 Choice.	$

Heritability and Correlations used in the Joint North American Evaluation (H^2 on the Diagonal)

											Ultrasound (Correlated Traits)				
	BW	**WW**	**PWG**	**Milk**	**SC**	**REA**	**CW**	**Fat**	**Marb**	**CE**	**MCE**	**IMF**	**REA**	**Wt**	**Rib**	**Rump**
BW	**0.49**	0.20	0.10							-0.76	0.16					
WW		**0.26**	0.16		0.28	0.35	0.45	-0.10	-0.07							
PWG			**0.31**		0.35											
Milk				**0.14**												
SC					**0.31**											
REA						**0.34**							0.70			
CW							**0.21**							0.75		
Fat								**0.26**	0.15						0.70	0.48
Marb									**0.36**			0.69				
CE										**0.24**	-0.06					
MCE											**0.16**					
IMF												**0.23**				
UREA													**0.39**			
U Wt														**0.27**		
U Fat															**0.35**	
U Rump																**0.38**

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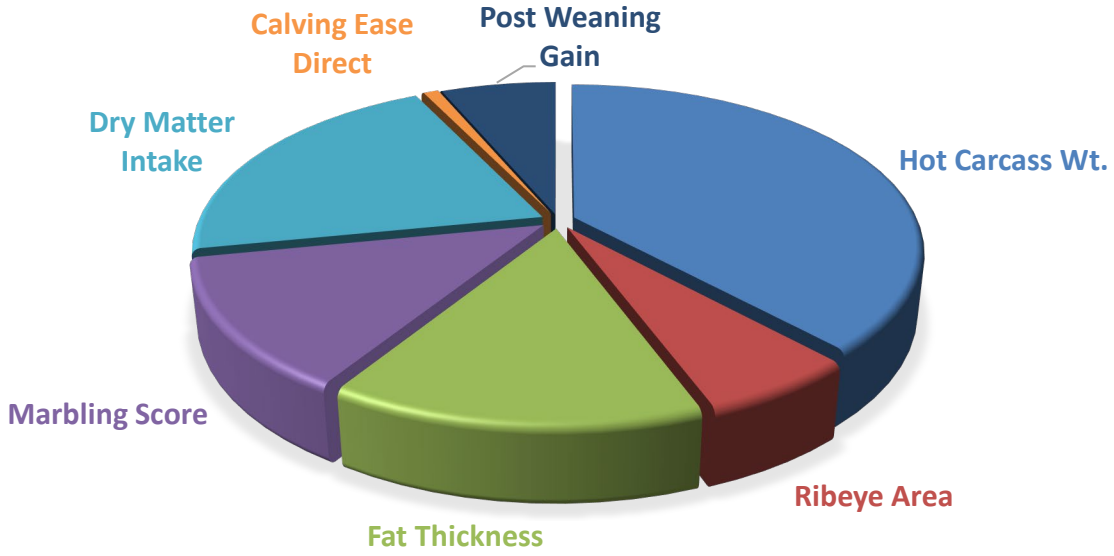
The Terminal Sire Index (TSI) represents an update for AICA members and a new addition to the evaluation for CCA membership. TSI has been updated a number of times in nearly two decades of use in the US. Recently, TSI underwent a major overhaul that featured development utilizing new state-of-the-art selection index construction software and updating of the phenotypic and economic data used to compute the index. The new TSI was developed to model a production scenario and breeding system where Charolais bulls are mated to Angus based cows, 2-years of age and older, and all progeny fed out with harvested carcasses marketed on a value-based grid which includes a premium structure for cattle that are in the upper 2/3 Choice quality grade.

In the case of TSI, the selection criteria are the EPDs for hot carcass weight, marbling, ribeye area, fat thickness, post weaning gain and calving ease direct. Animals must have published EPD for CW, REA, Marbling, Fat, WW, YW and CED to receive a TSI value. Dry matter intake (DMI) is included in the economic weightings with a genetic value predicted through the association between DMI and yearling weight (YW) EPD. There's a strong genetic relationship between growth and DMI so animals with high levels of growth are expected to have higher daily DMI.

FIGURE 1. AICA/CCA TERMINAL SIRE INDEX SELECTION CRITERIA RELATIVE EMPHASIS



Using TSI

Implementation of TSI into a terminal sire selection decision is simple and straight forward. TSI is reported in dollars and represents the differences of sires' progeny values when harvested on a value-based pricing grid after feeding. The TSI values reported are on a per conceived calve basis. It is expected that users of the TSI index generally conform to this production circumstance. In the example below, we would expect Sire A to produce progeny that average $50 per head more net return than those of sire B.

Sire A:	TSI $300
Sire B:	TSI $250
Difference:	$50 per head

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TSI is **not** a suitable selection criterion for evaluation of sires where replacement females will be retained. The terminal model used doesn't contemplate replacement female retention and therefore, doesn't include any maternal trait weightings. In fact, misuse of the index may induce a set of genetic antagonisms. The extra emphasis placed on growth and carcass weight would be expected to have a correlated genetic effect of making larger sized mature females with increased maintenance requirements which may be counterproductive in a replacement scenario.

IMPORTANT NOTE:

While every attempt was made to ensure that animals used in both the AICA and CCA herdbook were correctly matched, it is possible that animals may have been missed. If you identify animals with EPD that differ between the AICA and CCA datasets, please contact your association with the animal information so that they can be corrected and updated prior to the next evaluation.

For those importing/exporting animals, please ensure that the animal is properly registered in the country of origin and that the information is provided to the country of import. This ensures that animals are properly matched for future evaluations.