



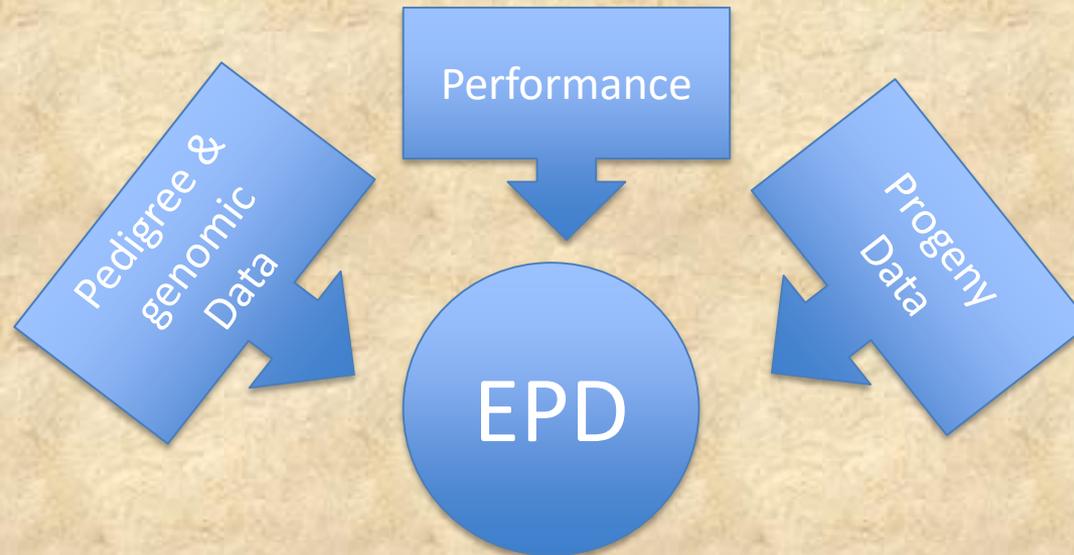
**Report on Genomics  
World Charolais Technical  
Congress 2019**

# Background

- CCA started on the road to Genomics in 2014 in order to improve the accuracy of EPDs and allow for much improved genetic evaluation of young animals
- Agreed to provide DNA, pedigree and performance data to the University of Georgia to aid research of Single Step Evaluation (SSE)
- Single step method adopted by:
  - American Angus Association July 2017
  - Canadian Angus Association September 2017
  - American International Charolais January 2018
  - Canadian Charolais Association June 2018

# SSE incorporates all sources of information

- ✓ Accounts for relationship between genotyped animals and genomic prediction information
- ✓ Eliminates periodic calibration
- ✓ Reduces bias
- ✓ Identifies differences that the pedigree alone cannot detect



# Current status

- First official EPD run that included Genomic information in July 2018
- As of July 2019, CCA has included **4,432** Genomic tested animals in our database
- Data is primarily 50K results from bulls used in AI and walking bulls – especially those used in purebred Charolais herds + about 1,000 older, breed-significant sires from the Canadian Genome Project
- Have started testing females primarily with the 50K chip

# Impact of Genomic test

GEPD = genomics added / EPD = same data without genomics

Trait	Number Animals	Accuracy GEPD	Accuracy EPD	Diff
CE	1081	0.36	0.22	+ .14
BW	1365	0.65	0.40	+ .25
WW	1365	0.42	0.25	+ .17
YW	1365	0.33	0.18	+ .15
MILK	1365	0.25	0.14	+ .11
CWT	1365	0.16	0.10	+ .06
REA	1365	0.17	0.08	+ .09
Fat	1365	0.16	0.10	+ .06
Marble	1365	0.15	0.07	+ .08

**Improvement in all traits and significant improvement in accuracy for birth & growth traits between Spring 2018 EPDs and GEPD evaluation**

# Sample accuracy improvement

## Sample of similar pedigrees

### Bulls – Genomic tested accuracy

<i>Registration #</i>	<i>Birth W</i>	<i>Weaning W</i>	<i>Yearling W</i>	<i>Sire</i>
SMC745629	.59	.38	.31	Monument
PMC751031	.62	.41	.32	Hallelujah
PMC751034	.61	.40	.30	Hallelujah
Average	.61	.40	.31	

### Females – Not genomic tested

<i>Registration #</i>	<i>Birth W</i>	<i>Weaning W</i>	<i>Yearling W</i>	<i>Sire</i>
PFC751023	.38	.26	.16	Hallelujah
PFC751030	.37	.26	.15	Hallelujah
PFC751043	.38	.27	.18	Monument
Average	.38	.26	.16	

***Difference***      ***+.23***      ***+.14***      ***+.15***

# Accuracy

- Accuracy improvement is most significant when there are no or few progeny
- Accuracy improvement decreases when more progeny are added and eventually converge

## Example: BW Accuracy

# of Progeny	EPD	GEPD	Diff
0	.31	.61	+.30
20	.56	.73	+.17
30	.61	.74	+.13
430	.88	.89	+.01

## Example: WW Accuracy

# of Progeny	EPD	GEPD	Diff
0	.19	.38	+.19
20	.43	.53	+.10
30	.47	.55	+.08
277	.78	.78	0

# Impact – Progeny Equivalents

Approximate # of progeny required to have the same degree of information as adding Genomics to EPDs

	Progeny Equivalents
CE	10
BW	25
WW	15
YS	8
Milk	10
REA	6
Fat	6
Marble	6

# Summary

- Research has proven that the Single Step method of applying Genomics to EPDs is a valuable tool to accelerate and improve genetic evaluation
- Genomic information is updated in real time each time there is an EPD run and accuracies continue to improve as more Genomics tested animals are added
- Genomics will provide Charolais breeders and their customers the most accurate genetic evaluation possible early on

# Looking ahead

- Currently working on a joint project with AICA to investigate a North American evaluation. This would bring more data into the equation... ***more data = more accuracy***
- First steps underway:
  - matching the pedigree and data files from both CCA and AICA to ensure animals used across countries are properly accounted for.
  - joint data will be reviewed and the genetic models determined.
- Next step:
  - a trial evaluation will be conducted and the results will be compared with EPDs already produced by each association.
  - then we'll determine the effects of adding additional data and making Model Improvements on accuracy and other impacts on EPDs.