Bull Selection to Enhance Herd Performance – Investing In Genetics

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NW FL Beef Conference

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UF | IFAS Extension
UNIVERSITY of FLORIDA

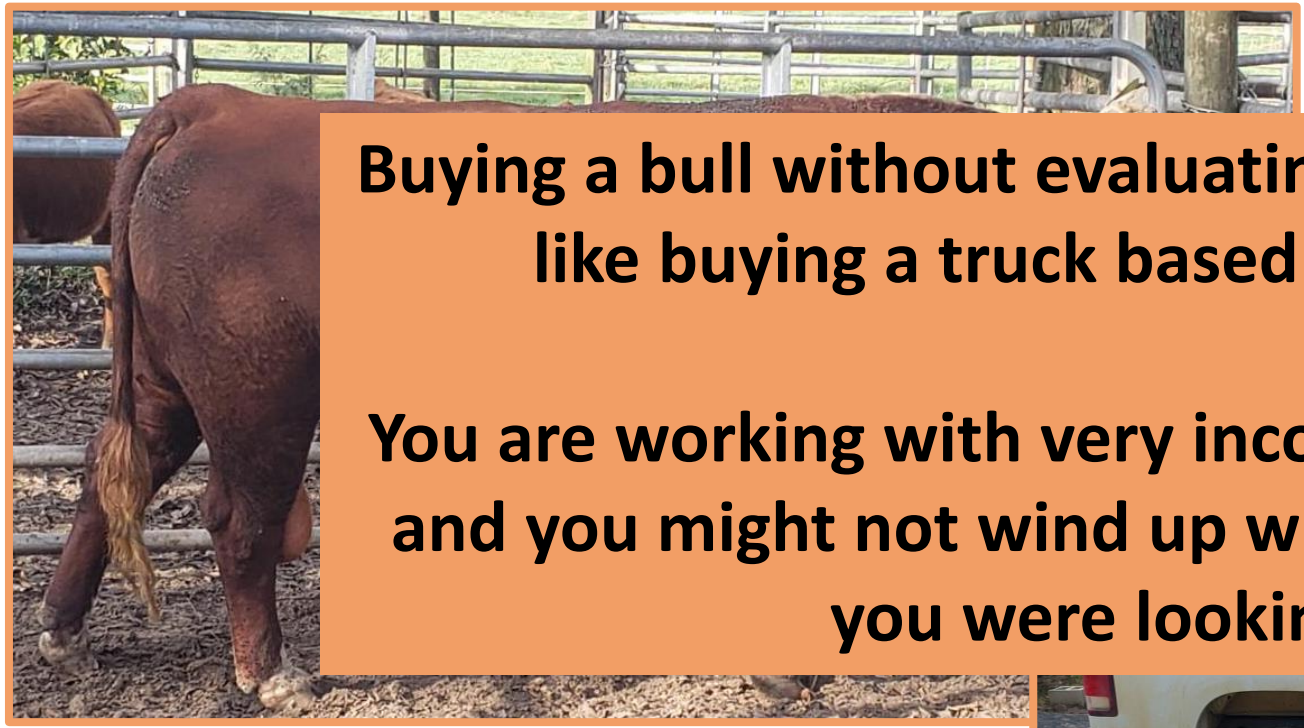
PANHANDLE AG EXTENSION TEAM

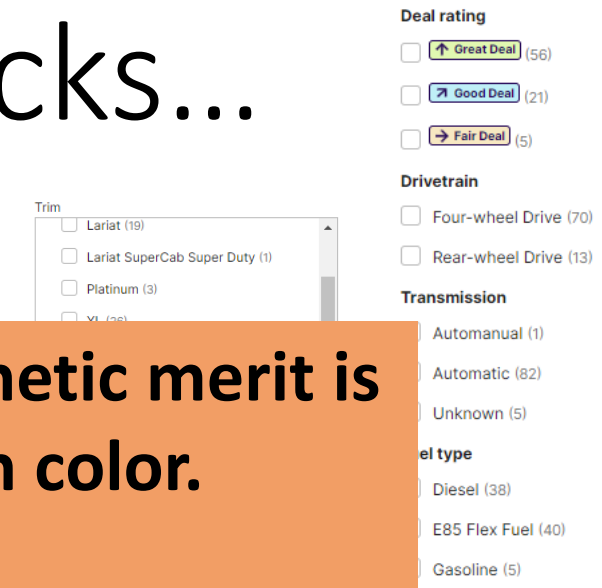
Objective

- Discuss **why** and **how** to base selection decisions on genetic merit.
- Shift thinking from “Buying Bulls” to “Investing in Genetics”

- What I’m <u>not</u> going to do
  - Talk about breeds
  - Talk about phenotypic evaluation
  - Give you any short, simple “rules of thumb”

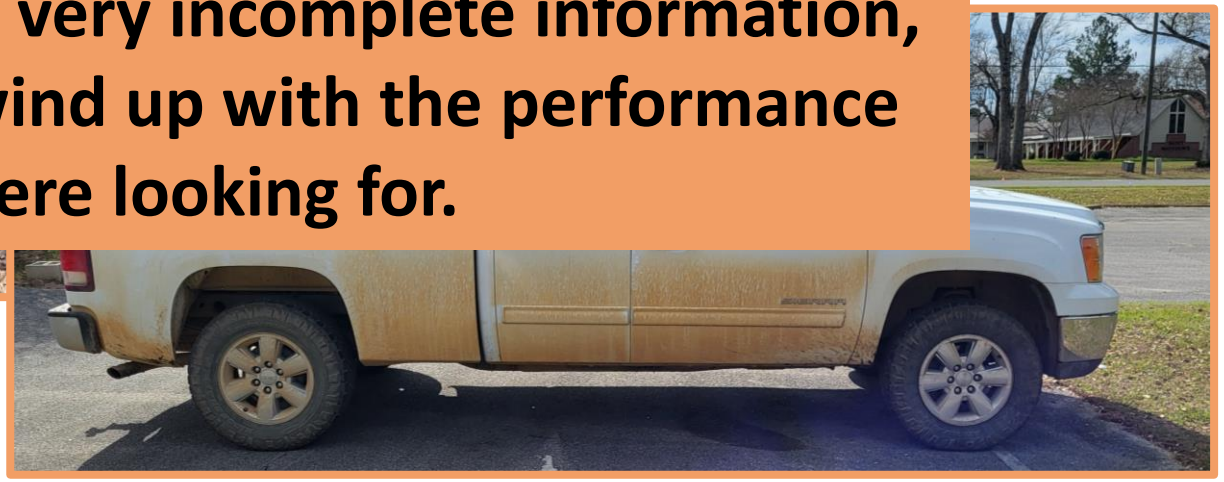
A story about bulls and trucks…





Buying a bull without evaluating his genetic merit is like buying a truck based solely on color.

You are working with very incomplete information, and you might not wind up with the performance you were looking for.



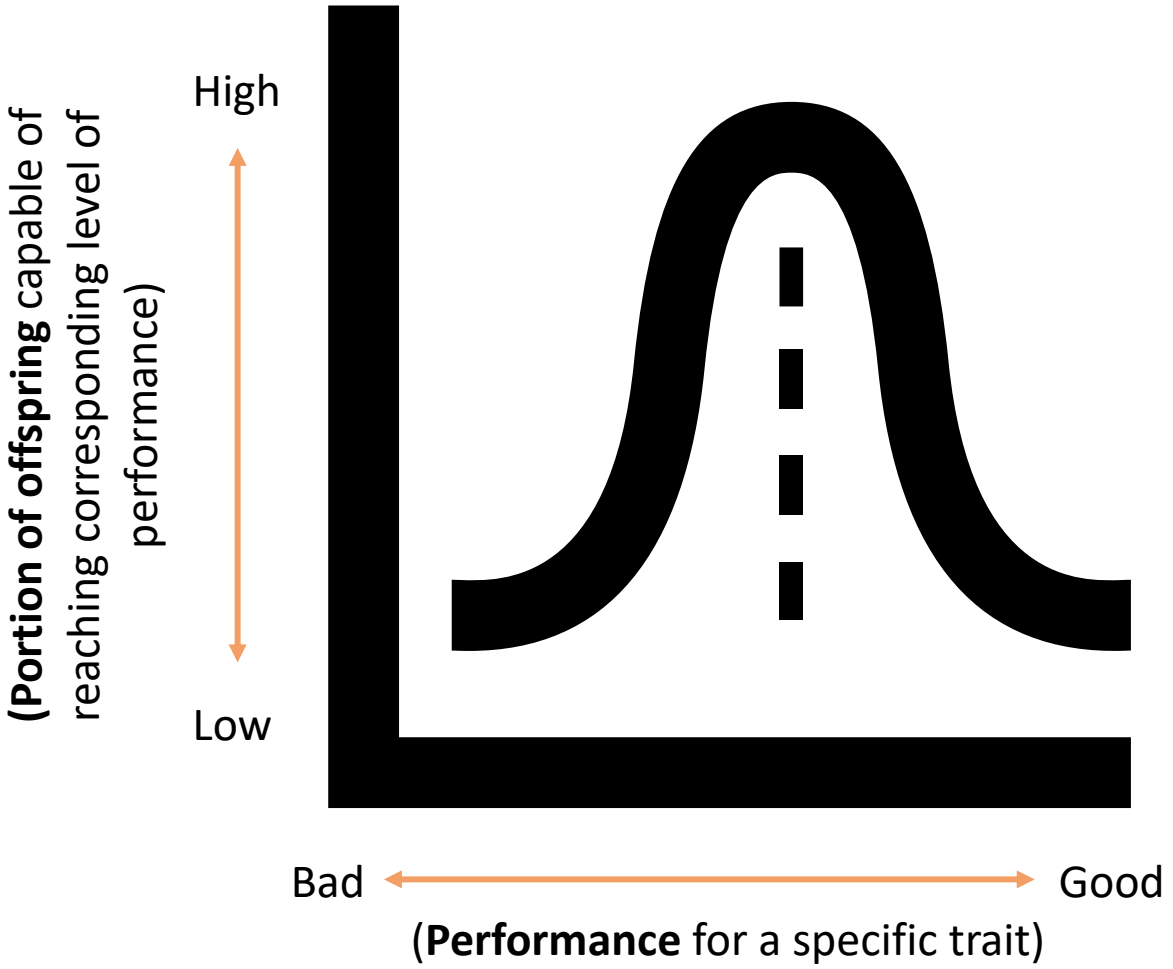
CED	BW	WW	YW	RADG	DMI	YH	SC	DOC	HP	CEM	MILK	Hd/Dts	MW	MH	CW	MARB	REA	FAT	C/U Pg	$EN	$W	$G	$B
+7	+2.0	+73	+128	+.30	+.20	+0.5	+.74	+8	+22.4	+11	+29	0	+40	+0.4	+71	+.93	+1.62	+.004	0	-19.68	+76.85	+52.48	+193.84
.33	.35	.29	.32	.35	.35	.49	.49	.30	.24	.10	.16	0	.34	.17	.22	.32	.30	.31	0				

Why Does it Matter?

- Genetics set the upper limit of calf performance (genetic potential).
  - Good management will never drive performance beyond what genetics allow.
  - Investing in improved genetics allows for substantial improvements in herd performance.

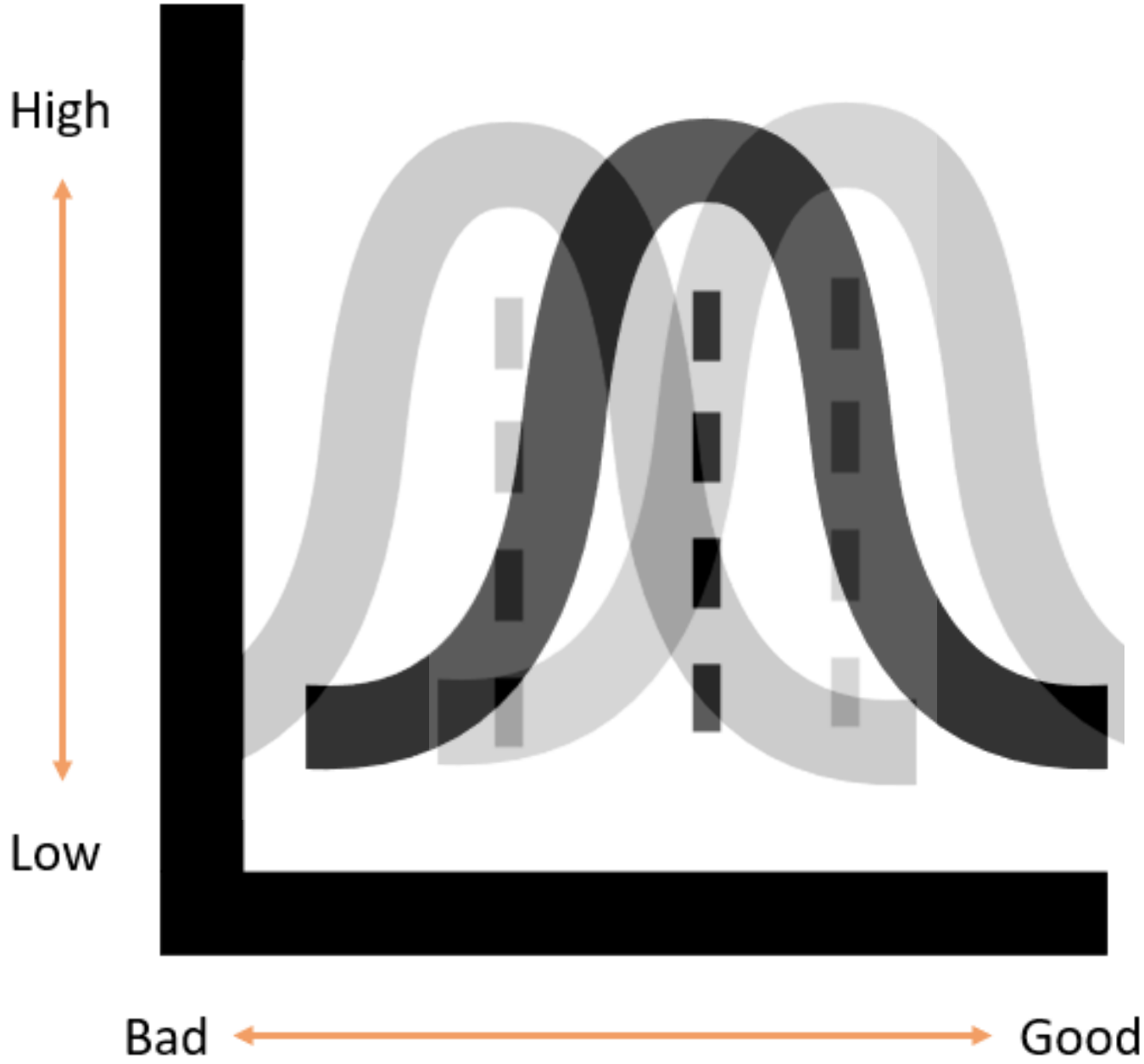
Complicating Factors

- There are factors that can make the effects of a bull's genetic merit less evident.
  - Adverse environmental conditions
  - Poor management
  - The cow…
  - **The bell curve of biology**



Complicating Factors

- Don’t let this cause you to discount the value of selection based on genetic merit.
- **Every bull has a curve for every trait, focus on the center of the bell.**



How Does it Work?

- There is a lot of mind-boggling science related to evaluating the genetic merit of beef cattle. **You don’t need to understand any of it.**
- You just need to know how to use the tools.

The Tools

- EPD (Expected Progeny Differences)
- Economic Selection Indices
- GE EPD (Genomically Enhanced EPD)
  - Genetic Profiles

These are all proven and effective tools.

EPD (Expected Progeny Differences)

- EPD predicts the differences expected in performance of future progeny of two or more sires of the same breed when mated to animals of the same genetic potential.

Economic Selection Indices

- Combination of multiple EPDs weighted based on economic significance and expressed as a single number - $ values.

Genomically Enhanced EPD

- EPD that have incorporated information from the DNA of the animal, typically from a SNP panel.

Using the Tools

2144 Simangus Logan Farms

LGNF JOHNNY CASH J4

4015327 **DOB: 8/20/2021**

Overall Rank 03

KBHR HIGH ROAD E283

MR SR HIGHLIFE G1609

MISS SR D1609

CCR PAYWEIGHT 0327C

LGNF MISS MARCI F7

GFX MABEL 636D

$API	119	**Index**	**121**
$TI/TSI	83	**ADG**	**5.16**
$W	N/A	**WDA**	**3.23**
$F	N/A	**Frame**	**6.89**
$B	N/A	**Final Wt**	**1510**

	CED	BW	Adj WW	Adj YW	Adj Scrotal	Milk	Ultrasound IMF	Ultrasound REA	Ultrasound BF
EPD	14.9	1.8	101	155		19	-0.05	0.94	-0.08
Actual/Acc.	-	73	613	1218	37	0.14	0.35	0.37	0.33

Ultrasound data

	IMF	REA	BF
Actual	1.84	13.0	0.25
Adjusted	1.68	11.8	0.23

Feed Efficiency Rank: 7

Intake, lb/day	56-d ADG, lb/day	F:G	RFI, lb/day
26.6	**5.10**	**5.21**	**-2.46**

Homozygous Black:	**Y**	**Retained semen interest:**	**Y**	**Breed Composition:**	**3/4 SM 1/4 AN**
Homozygous Polled:	**Y**	**Genomically tested:**	**Y**	**Parent verified:**	**Y**

Breeding Objectives

- Select with purpose
  - You can’t afford a bull that excels in every trait
- Carefully evaluate your operation
  - Determine which traits impact your profitability
  - Identify priorities for improvement
- **Formulate selection criteria that focus on <u>the traits that are financially significant to you</u>**

Using the Tools

- For Comparison, not measurement – specific numeric values are less important than how those values compare to other bulls within the same breed.
- Numeric values need context – at least breed average, preferably complete percentile breakdowns

American Hereford Association
EPDs as of December 21, 2020
Pan American Hereford Cattle Evaluation

Average and Percentile Breakdown - 2018 & 2019 Calves

	Production					Fertility			Maternal						Carcasss			$ Indexes		
	CED	BW	WW	YW	DMI	SC	SCF	MM	M&G	CEM	MCW	UDDR	TEAT	CW	FAT	REA	MARB	BMI	BII	CHB
Average	2.5	2.9	52	84	0.2	0.9	16.0	24	50	1.8	88	1.2	1.2	65	0.012	0.37	0.10	341	409	110
Low	-14.5	-8.2	-16	-29	-1.4	-1.3	-3.2	-12	-18	-20.7	-30	0.5	0.3	-4	-0.106	-0.86	-0.43	48	100	-6
High	25.0	13.4	93	164	2	3.1	35.0	52	88	17	188	2.1	2.1	121	0.144	1.41	1.18	620	720	241
Percentile Breakdown																				
Upper 1%	14.7	-3.1	72	116	-0.8	1.8	24.7	39	70	9.1	23	1.5	1.6	88	-0.036	0.79	0.48	479	567	160
2%	12.8	-1.4	69	112	-0.5	1.7	23.5	37	68	8.2	46	1.5	1.5	85	-0.036	0.72	0.41	461	548	152
3%	11.6	-0.8	68	110	-0.4	1.6	22.8	36	66	7.6	50	1.5	1.5	83	-0.026	0.69	0.37	450	536	147
4%	10.7	-0.4	67	108	-0.4	1.5	22.2	35	65	7.2	54	1.4	1.5	82	-0.026	0.66	0.34	441	526	143
5%	10.1	-0.1	66	106	-0.3	1.5	21.8	34	64	6.9	57	1.4	1.5	81	-0.026	0.64	0.32	435	519	141
10%	8.1	0.7	63	101	-0.2	1.4	20.4	32	61	5.8	65	1.4	1.4	77	-0.016	0.58	0.25	412	492	132
15%	6.8	1.1	61	98	-0.1	1.3	19.5	31	60	5.0	71	1.3	1.4	75	-0.006	0.54	0.21	397	475	126
20%	5.9	1.5	59	95	-0.1	1.2	18.8	30	58	4.4	75	1.3	1.3	73	-0.006	0.50	0.18	386	461	122
25%	5.1	1.8	58	93	0.0	1.1	18.2	29	57	3.9	78	1.3	1.3	71	-0.006	0.48	0.16	376	450	119
30%	4.4	2.1	57	91	0.0	1.1	17.7	28	55	3.5	81	1.3	1.3	70	0.004	0.45	0.14	368	440	116
35%	3.8	2.3	56	90	0.1	1.0	17.2	27	54	3.1	83	1.2	1.3	69	0.004	0.43	0.13	360	431	114
40%	3.3	2.5	55	88	0.1	1.0	16.8	26	53	2.7	85	1.2	1.2	68	0.004	0.41	0.11	353	422	112
45%	2.7	2.7	54	86	0.1	1.0	16.4	25	52	2.3	88	1.2	1.2	67	0.004	0.39	0.10	346	414	110
50%	2.2	2.9	53	85	0.2	0.9	15.9	25	51	1.9	90	1.2	1.2	65	0.014	0.37	0.08	339	406	108
55%	1.7	3.2	52	83	0.2	0.9	15.5	24	50	1.5	92	1.2	1.2	64	0.014	0.35	0.07	332	398	106
60%	1.2	3.4	51	82	0.2	0.8	15.1	23	49	1.1	94	1.2	1.2	63	0.014	0.33	0.06	326	390	105
65%	0.7	3.6	50	80	0.3	0.8	14.7	22	48	0.7	96	1.1	1.1	62	0.024	0.31	0.05	319	382	103
70%	0.1	3.8	48	78	0.3	0.7	14.2	22	47	0.3	99	1.1	1.1	61	0.024	0.28	0.04	312	374	101
75%	-0.5	4.0	47	76	0.4	0.7	13.7	21	46	-0.2	101	1.1	1.1	60	0.024	0.26	0.02	305	366	99
80%	-1.1	4.3	46	74	0.4	0.6	13.1	20	44	-0.8	104	1.1	1.1	58	0.034	0.23	0.01	296	357	97
85%	-1.9	4.7	44	71	0.5	0.6	12.5	18	42	-1.4	107	1.1	1.0	56	0.034	0.20	-0.01	287	346	95
90%	-2.9	5.1	42	67	0.5	0.5	11.6	17	39	-2.3	111	1.0	1.0	54	0.044	0.16	-0.03	274	332	92
95%	-4.3	5.8	38	61	0.7	0.4	10.3	13	35	-3.7	117	1.0	1.0	50	0.054	0.09	-0.06	254	312	87
100%	-14.5	13.4	-16	-29	2.0	-1.3	-3.2	-12	-18	-20.7	188	0.5	0.3	-4	0.144	-0.86	-0.43	48	100	-6

313,766 calves born in 2018 and 2019

Purebred Simmental Percentiles Table

%	API	TI	CE	BW	WW	PWG	YW	MCE	MLK	MWW	STY	DOC	CWT	YG	MRB	BF	REA	SF
1	170.34	97.46	17.80	-3.30	99.80	0.36	153.90	10.70	35.10	79.40	22.20	18.10	53.70	-0.58	0.57	-0.13	1.34	-0.49
2	164.62	94.98	16.80	-2.60	96.70	0.34	149.00	10.10	33.70	77.30	21.50	17.10	50.30	-0.56	0.51	-0.12	1.26	-0.47
3	161.36	93.38	16.20	-2.10	94.90	0.33	145.90	9.70	32.70	76.00	21.10	16.60	48.80	-0.55	0.47	-0.12	1.22	-0.46
4	158.81	92.03	15.80	-1.80	93.60	0.32	143.70	9.40	32.00	75.00	20.70	16.20	47.10	-0.54	0.44	-0.12	1.19	-0.45
5	156.82	91.03	15.40	-1.50	92.60	0.32	141.70	9.10	31.50	74.10	20.50	15.90	45.90	-0.53	0.41	-0.12	1.16	-0.44
10	149.50	87.53	14.30	-0.70	88.80	0.30	135.00	8.40	29.60	71.20	19.60	14.80	41.90	-0.51	0.34	-0.11	1.09	-0.42
15	144.68	85.28	13.50	-0.20	86.30	0.28	130.70	7.80	28.40	69.30	19.00	14.00	39.40	-0.49	0.28	-0.11	1.05	-0.40
20	141.30	83.47	12.90	0.20	84.30	0.27	127.20	7.40	27.30	67.70	18.50	13.40	37.30	-0.48	0.24	-0.10	1.01	-0.39
25	138.10	81.92	12.50	0.60	82.60	0.26	124.40	7.00	26.40	66.40	18.10	12.90	35.60	-0.47	0.21	-0.10	0.98	-0.38
30	135.49	80.58	12.10	0.90	81.20	0.26	121.80	6.70	25.60	65.20	17.60	12.50	34.10	-0.46	0.19	-0.10	0.95	-0.37
35	133.05	79.39	11.70	1.10	79.90	0.25	119.50	6.40	24.90	64.10	17.20	12.20	32.70	-0.45	0.16	-0.10	0.93	-0.36
40	130.84	78.31	11.30	1.40	78.50	0.24	117.30	6.20	24.30	63.10	16.80	11.80	31.40	-0.44	0.14	-0.09	0.91	-0.35
45	128.71	77.27	11.00	1.60	77.30	0.24	115.20	5.90	23.70	62.10	16.50	11.50	30.20	-0.43	0.12	-0.09	0.89	-0.34
50	126.69	76.27	10.60	1.80	76.10	0.23	113.20	5.60	23.10	61.20	16.10	11.10	29.00	-0.42	0.11	-0.09	0.87	-0.33
55	124.73	75.26	10.30	2.00	75.00	0.23	111.10	5.40	22.50	60.30	15.70	10.80	27.70	-0.41	0.09	-0.09	0.85	-0.32
60	122.77	74.29	9.90	2.20	73.80	0.22	109.00	5.20	22.00	59.40	15.30	10.40	26.60	-0.40	0.07	-0.08	0.83	-0.32
65	120.93	73.33	9.60	2.50	72.60	0.21	106.90	4.90	21.40	58.50	14.90	10.10	25.40	-0.39	0.06	-0.08	0.81	-0.31
70	118.97	72.31	9.10	2.70	71.40	0.21	104.80	4.60	20.90	57.60	14.40	9.70	24.10	-0.38	0.04	-0.08	0.78	-0.30
75	117.00	71.25	8.70	2.90	70.00	0.20	102.50	4.30	20.30	56.60	14.00	9.30	22.80	-0.37	0.02	-0.08	0.76	-0.29
80	114.91	70.09	8.20	3.20	68.50	0.19	100.00	4.00	19.60	55.50	13.50	8.70	21.40	-0.36	0.00	-0.07	0.73	-0.28
85	112.37	68.86	7.60	3.50	66.90	0.18	97.30	3.60	18.90	54.30	12.90	8.10	19.70	-0.34	-0.02	-0.07	0.70	-0.26
90	109.25	67.22	6.80	4.00	64.80	0.17	93.90	3.20	18.00	52.90	12.10	7.20	17.50	-0.32	-0.05	-0.07	0.67	-0.25
95	104.84	65.06	5.60	4.70	61.60	0.16	88.90	2.40	16.60	50.80	11.00	5.80	14.40	-0.29	-0.09	-0.06	0.61	-0.22
Avg	126.69	76.27	10.60	1.80	76.10	0.23	113.20	5.60	23.10	61.20	16.10	11.10	29.00	-0.42	0.11	-0.09	0.87	-0.33

Using the Tools

- Focus on Percentile (not numeric values)
- Consider the units for each EPD

Be careful with setting specific, numeric standards (Independent Rejection Levels)

"My new bull will have at least a 60 WW, 104 YW, 32 Milk, and a -2 BW."

- You can only make progress in so many directions at one time.
- Very few bulls will meet all criteria
- Cutoffs are generally arbitrary
- Values become outdated

VRDEC

Visual
Representation of
Data for
Evaluation and
Comparison

VRDEC Bull Selection Tool, Florida Bull Test Sale 2023

Simangus

Page 1

CED

Lot #	EPD
Top 10%	16.2
29	15.2
41	**15.1**
3	***14.9***
73	*14.9*
16	**14.7**
Upper 25%	14.2
50	**13.7**
44	***13.6***
53	***13.5***
32	12.6
15	***12.4***
48	**12.4**
22	***12.3***
13	12.2
AVG	12.2
28	**11.7**
36	***11.1***
31	***11***
18	*10.9*
60	**10.6**
Lower 25%	10.3
61	***9.3***
55	***8.5***
68	***8.5***
57	**8.2**
35	***5.5***

BW

Lot #	EPD
Top 10%	-2.4
53	***-1.5***
Upper 25%	-1
29	-0.8
16	***-0.1***
73	*-0.1*
50	**0**
AVG	0.4
13	0.5
28	**0.5**
32	0.6
36	***1.1***
48	**1.2**
68	***1.3***
44	***1.4***
61	***1.4***
15	***1.5***
31	***1.6***
60	**1.7**
Lower 25%	1.7
3	***1.8***
57	**1.8**
22	***2***
41	**2**
55	***2.2***
35	***2.5***
18	*2.6*

WW

Lot #	EPD
41	**114**
3	***101***
16	***95***
22	***95***
15	***94***
28	**94**
55	***92***
18	*90*
Top 10%	89.2
35	***89***
68	***86***
32	85
48	**85**
61	***85***
57	**84**
13	83
44	***83***
Upper 25%	82.6
29	82
53	***82***
60	**81**
31	***80***
50	**80**
AVG	75.6
36	***75***
73	*74*
Lower 25%	69

YW

Lot #	EPD
41	**193**
28	**162**
3	***155***
15	***153***
55	***150***
22	***148***
16	***146***
68	***143***
Top 10%	140.2
18	*140*
48	**140**
57	**140**
32	136
13	135
35	***133***
60	**132**
53	***130***
Upper 25%	128.7
50	**128**
61	***128***
44	***125***
29	124
31	***119***
AVG	116.4
73	*112*
36	**111**
Lower 25%	104.5

Milk

Lot #	EPD
Top 10%	28.5
18	*27*
Upper 25%	25.6
16	***25***
41	**25**
57	**25**
15	***24***
28	**24**
29	24
22	***23***
31	***23***
48	**23**
50	**23**
73	*23*
AVG	22.6
53	***22***
35	***21***
60	**21**
13	20
32	20
44	***20***
55	***20***
61	***20***
Lower 25%	19.9
3	***19***
36	***19***
68	***14***

Economic Indices

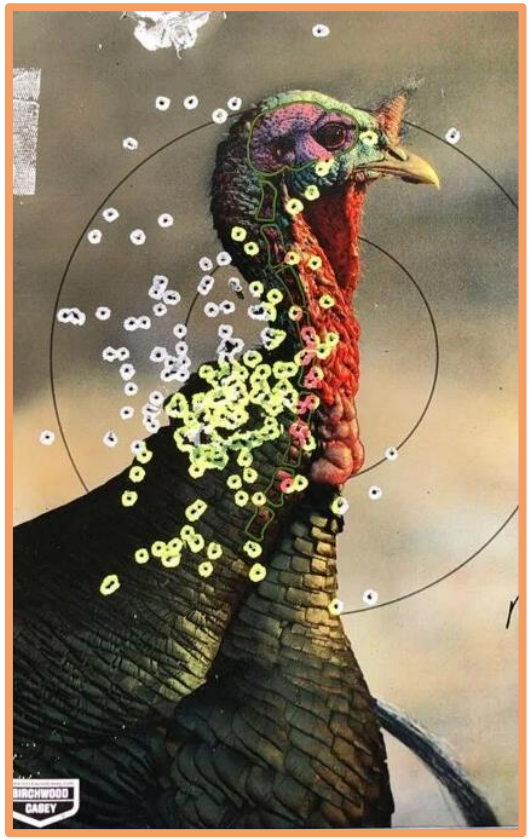
- Powerful tools
- Make complex multi-trait selection feasible
- MANY to choose from, depending on breed

But

- Each index is built around a **specific marketing scenario** – the index is only valuable to you if your scenario matches that of the index.
- Small operations need to be particularly carful – most indices will not apply.

Genomically Enhanced EPD

- Game Changer, especially for commercial cattlemen buying virgin bulls.
- **EPD accuracy is improved considerably**.
- I personally would not buy a bull without GE EPD.
- Parent Verification



EPD Accuracy

Nothing changes the pattern (it’s aways the bell curve), accuracy is about how well we aim (predict the center of the curve).

A practical example

Black Bull

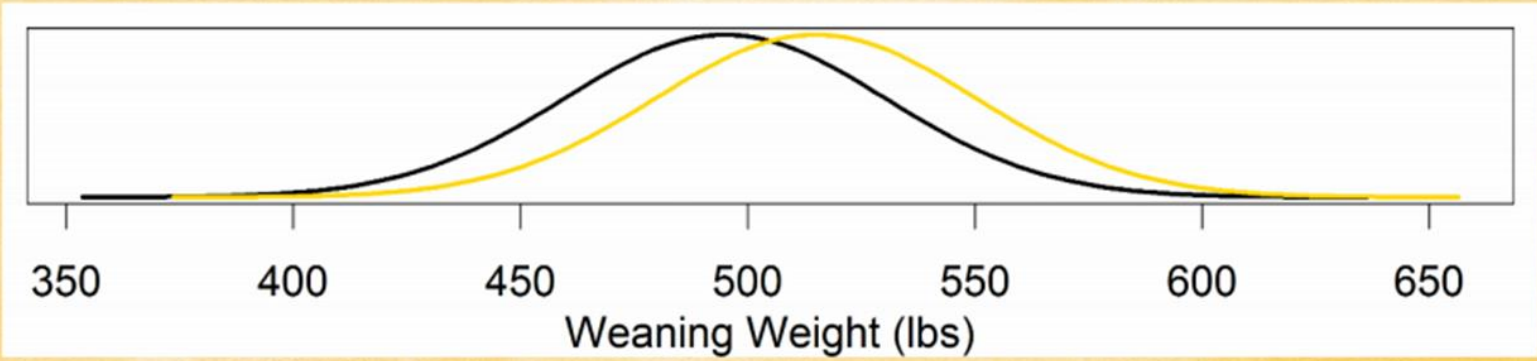
Weaning Weight EPD = 2

Average Weaning Weight of Calf Crop = 495

Gold Bull

Weaning Weight EPD = 22

Average Weaning Weight of Calf Crop = 515



EPDs in Practice

Dr. Jared Decker

University of Missouri

Do the Math

- 30 cows exposed per bull (27 calves sold)
- Use the bull 4 years

- Black Bull – WW avg 495lbs x $1.98/lbs. = $980/calf x 108 = **$105,840**

- Gold Bull – WW avg 515 x $1.94/lbs. = $999/calf x 108 = **$107,892**

- **$2,052 in additional earnings based on the genetic merit of the bull**.

Closing Thoughts on Investing in Genetics

- Buying a bull without complete genetic information is just foolish.
- You're going to have bull power. The "investment" is only any additional cost above what you would have otherwise bought. It may just be the time spent to make a more informed decision.
- Invest in genetics that will pay you back. There are lots of good bulls that may not be good for you.
- Take the time to accumulate the necessary resources make an informed decision.
- Don't hesitate to ask for help and/or information

Invest in Genetics

- Invest your time and effort to become comfortable with the selection tools.
- Invest in genetics that will allow you to maximize pounds produced and resource use efficiency during this time of high calf value & high input prices.

Questions???

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PANHANDLE AG
EXTENSION TEAM