



Genetic Selection Tools for *indicus* Influenced Cattle

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Neogen has a stake in genetic prediction for *indicus*-influenced breeds.



Why aren't indicus cattle used more across the USA?

1. Carcass Quality
2. Fertility
3. Limited access to genetics/bull producers
4. Docility
5. Tradition
6. Other

Why use *indicus*-influenced cattle?

Breeding Beef Cattle for Unfavorable Environments

A SYMPOSIUM PRESENTED AT THE
KING RANCH CENTENNIAL CONFERENCE



EDITED BY
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**Why use *indicus*-
influenced cattle?**



Can breeders of *indicus*-influenced cattle...

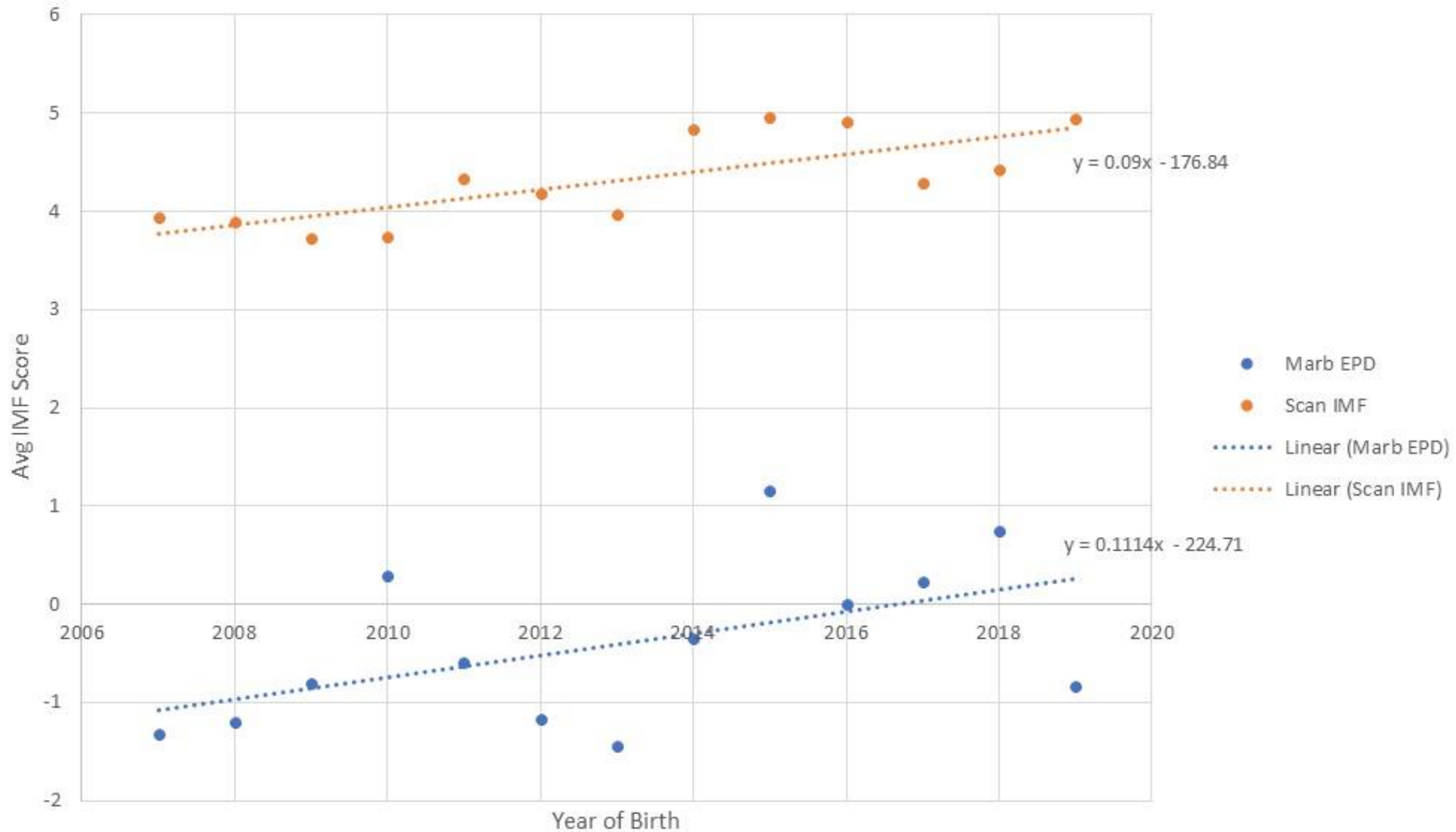
... overcome the negatives (whether real or perceived)

... while maintaining the positives?

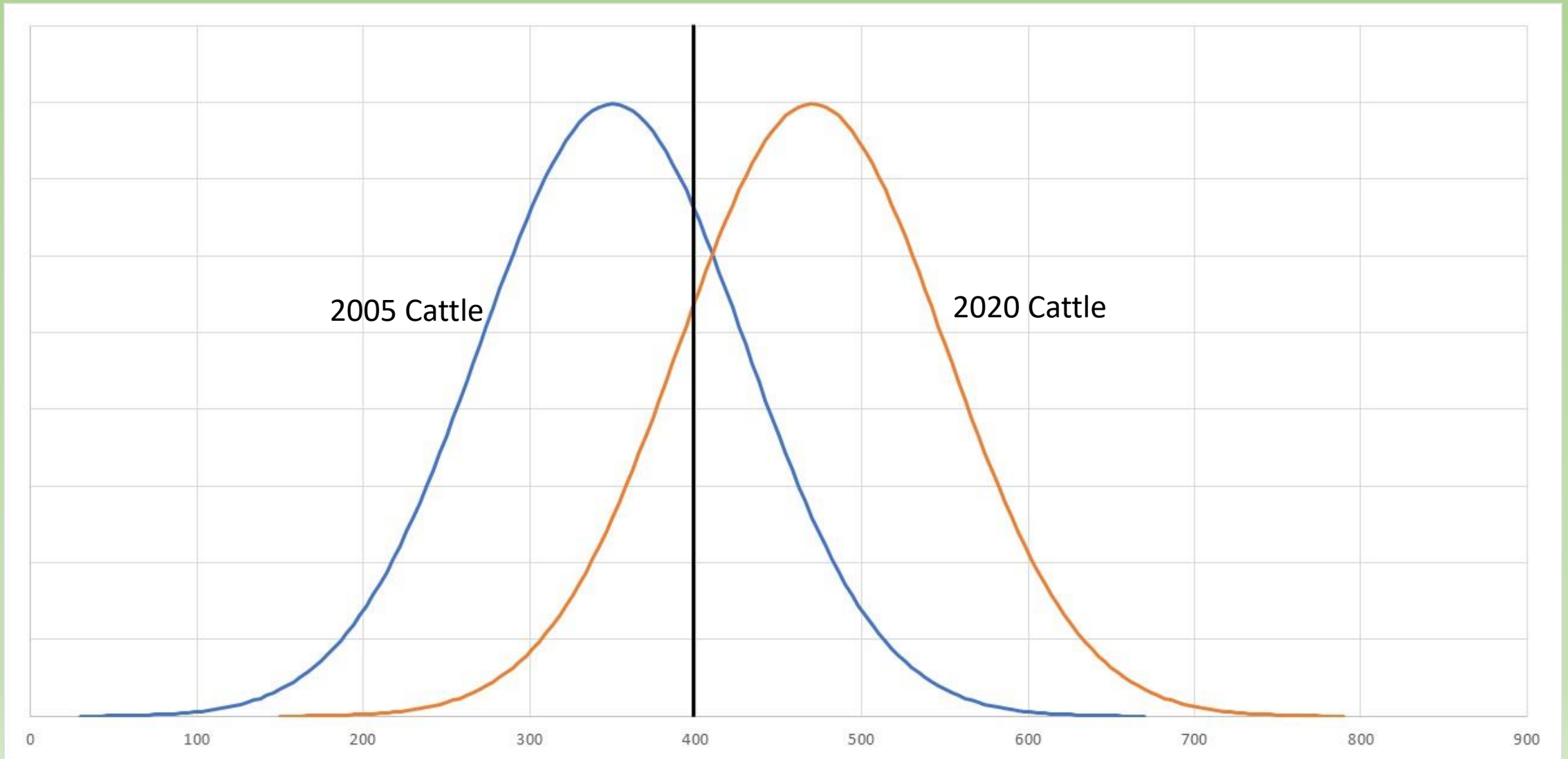
King Ranch Selection Strategy



King Ranch - Genetic Trend in Marbling



Change in marbling score and percent choice



How did they do this?

- Gathered data and kept pedigrees straight.
- Invested in genomics - single step models since 2012.
- Used index selection – **No Single Trait Selection!!**
- *Consistency from year to year*

King Ranch – Maternal Traits

correlation between epds	<i>ww epd</i>	<i>milk epd</i>	<i>adg epd</i>	<i>heifer preg epd</i>	<i>stay2 epd</i>	<i>stay5 epd</i>	<i>cow wt epd</i>	<i>maternal index</i>
ww epd	1.00							
milk epd	-0.11	1.00						
adg epd	0.18	-0.14	1.00					
heifer preg epd	0.03	-0.07	0.06	1.00				
stay2 epd	-0.02	-0.03	0.02	0.07	1.00			
stay5 epd	-0.04	-0.01	-0.01	0.15	0.38	1.00		
cow wt epd	0.29	-0.01	0.19	0.03	-0.05	-0.08	1.00	
maternal index	-0.02	-0.05	0.02	0.53	0.80	0.70	-0.08	1.00

I N T E R N A T I O N A L
BRANGUS
B R E E D E R S A S S O C I A T I O N



Brangus Maternal Selection Strategy

Brangus - Age at First Calf EPD

- A prediction of the days in age a cow will be when her first calf is born - lower number is better.
- Heifer development group as contemporary group.
- Heritability = 0.22 ± 0.07
- Genetic Correlations:
 - Mature Cow Weight = 0.35
 - Body Condition Score = 0
 - Scrotal Circumference = -0.27
 - Back Fat = 0.32
 - Milk = 0.55

Brangus – Other Maternal EPDs

- Stayability
 - Probability cow will be in herd at 5 years old.
 - Heritability = 0.16
- Heifer Pregnancy
 - Probability cow will have calf as heifer given she was exposed.
 - Heritability = 0.19
- Mature Cow Weight
 - Expected weight of cow at 5 years old, at constant body condition score.
 - Heritability = 0.25

Brangus - Maternal Index

	Coefficient	Correlation
Age at First Calf	-4.5	-0.08
Cow Weight	-12.5	0.04
Stay	60	0.72
Heifer Pregnancy	95	0.86

Expressed in standard deviations – i.e. index value of 1 is 1 standard deviation above average for the index.

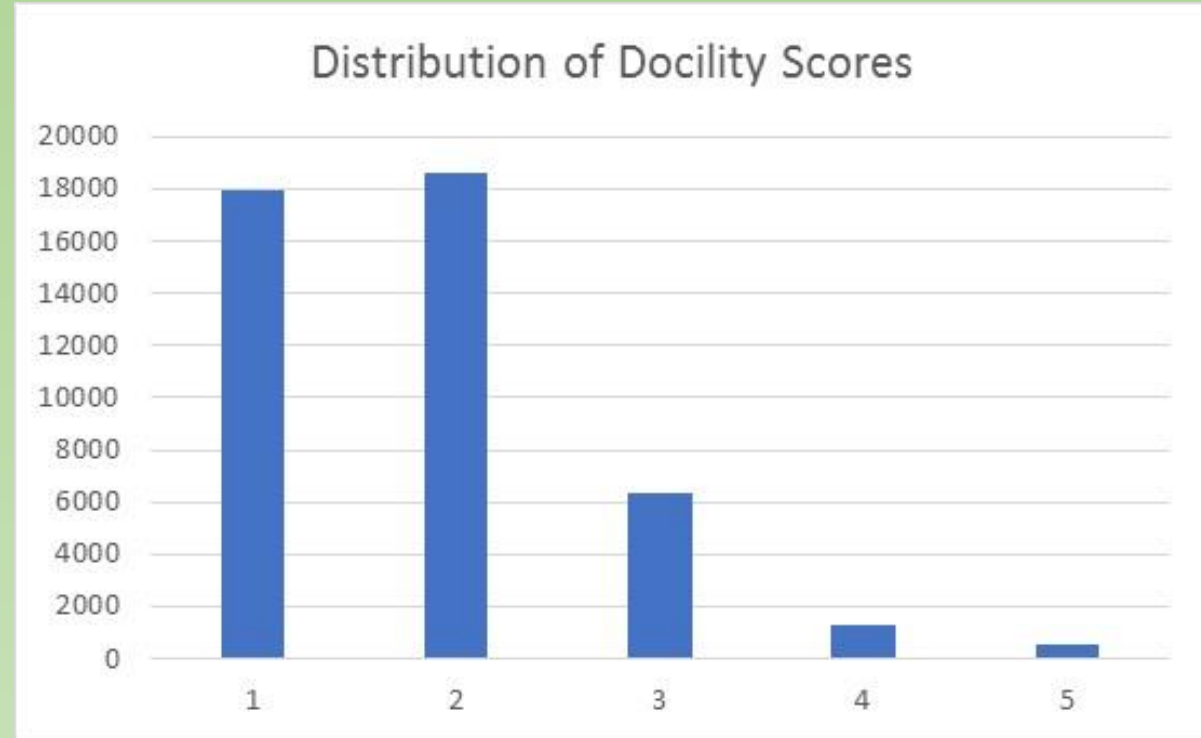
Brahman Selection Strategy



Docility

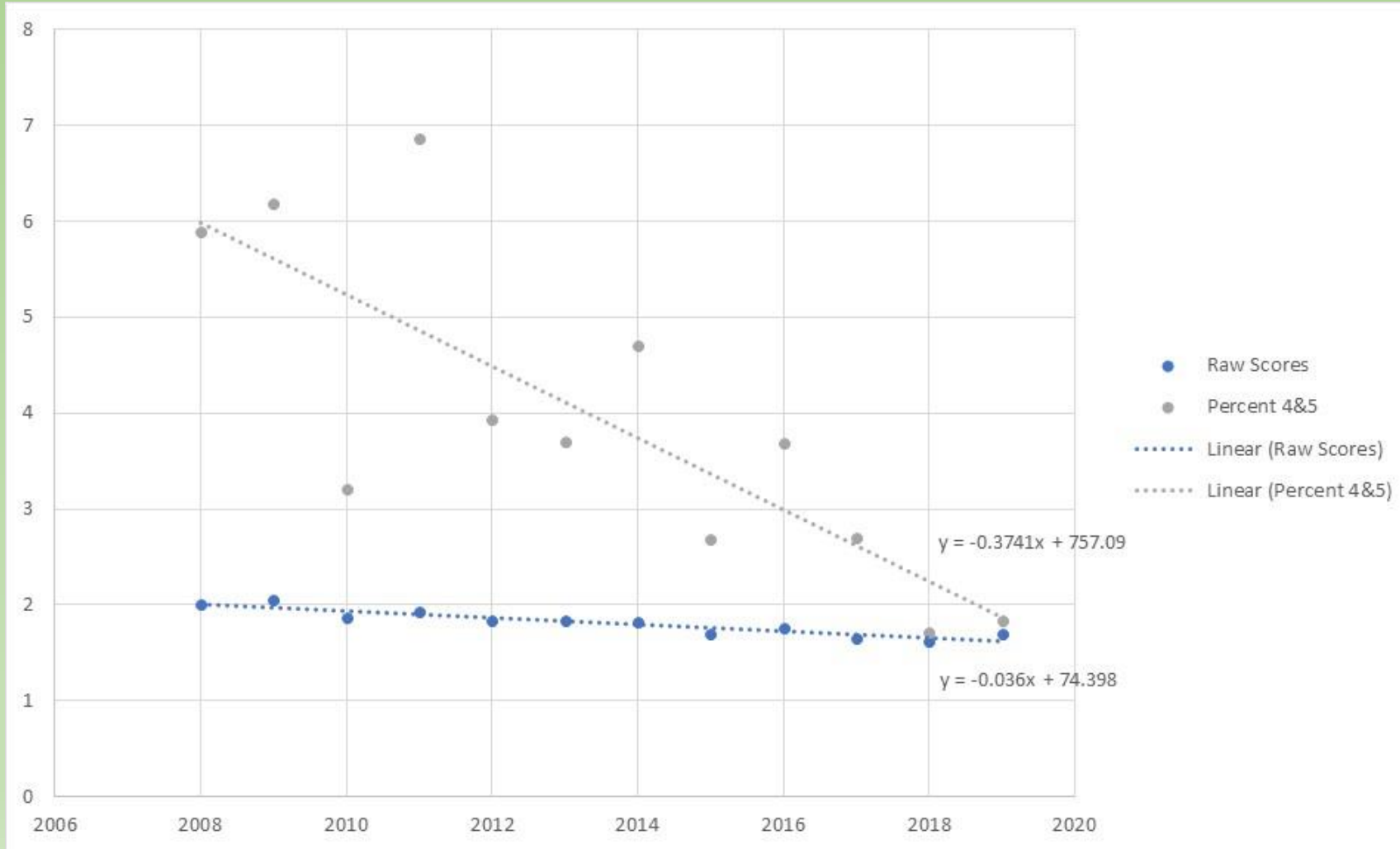


- Score ranging from 1-5 with 1 being calmest
- Scores collected at weaning
- Heritability = 0.29 ± 0.02

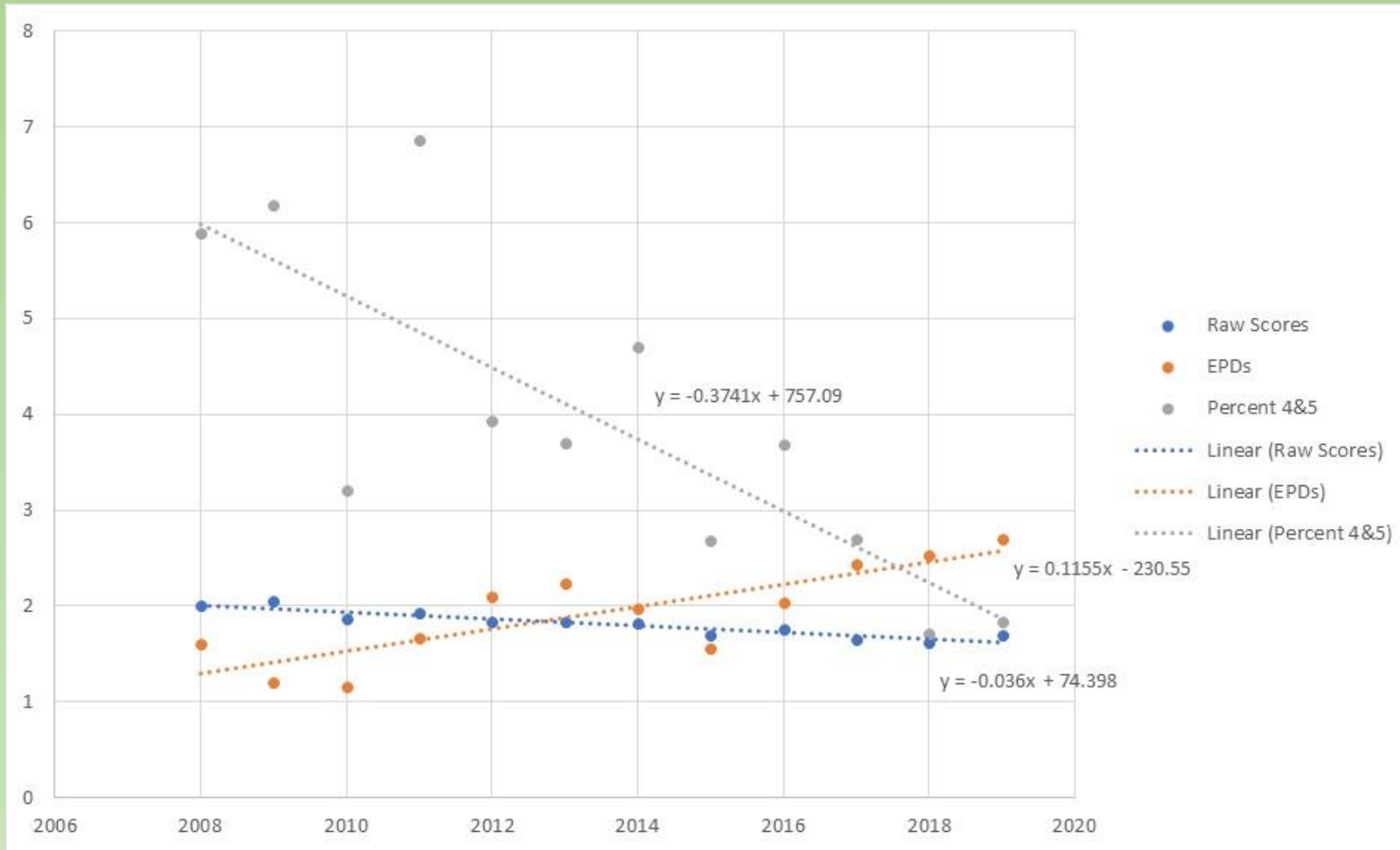


- EPD expressed as probability of being docile – ie higher is better

Genetic Progress in Docility



Genetic Progress in Docility



Docility Genetic Correlation to Tenderness



In ABBA data, correlation between Tenderness and Docility is 0.25

More docile animals have more tender carcasses.

BEEFMASTER
BREEDERS UNITED



Beefmaster Selection Strategy

What are the foundation breeds and percentages of Beefmaster cattle?

1. 1/4 Hereford, 1/4 Shorthorn, 1/2 Brahman
2. 3/8 Brahman, 5/8 Hereford/Shorthorn
3. 1/4 Hereford, 1/4 Shorthorn, 1/2 *bos indicus*
4. Nobody knows

Calving Interval EPD

Given a cow calved within the first 2 ½ years of life, how many days until her second calf is born.

RFI EPD

Several breeders have invested in feed efficiency equipment.

Stayability EPD

Probability that a cow will stay in the herd until 5 years of age.

Correlation between new EPDs

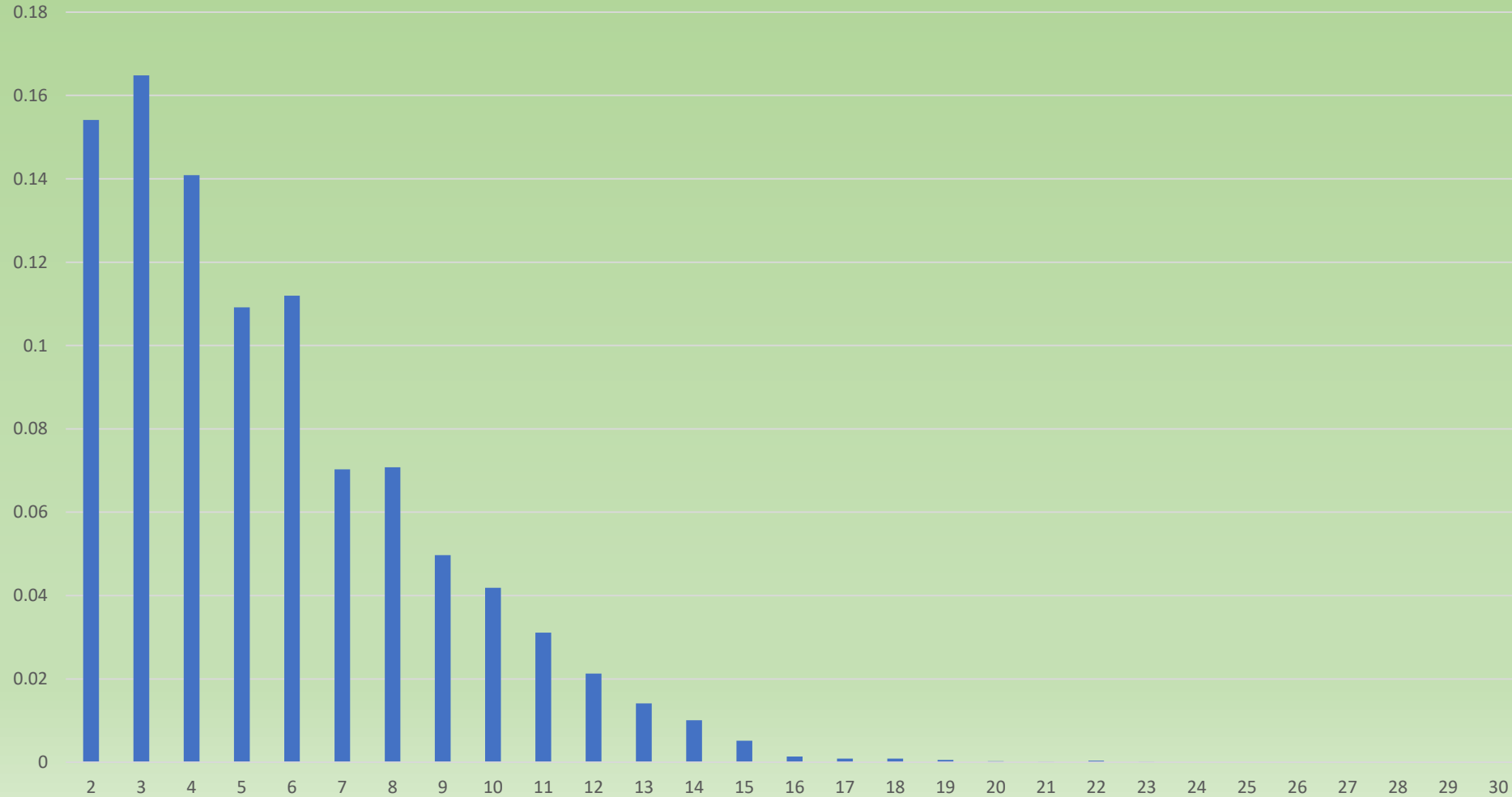


correlation in EPDs	<i>yw epd</i>	<i>sc epd</i>	<i>age first calf epd</i>	<i>stay epd</i>	<i>calving int epd</i>	<i>rfi epd</i>
yw epd	1.00					
sc epd	0.64	1.00				
age first calf epd	0.06	0.09	1.00			
stay epd	0.04	0.03	-0.02	1.00		
calving interval epd	-0.14	-0.16	-0.43	0.15	1.00	
rfi epd	-0.05	-0.06	0.05	-0.05	-0.06	1.00

Animals in Whole Herd Reporting



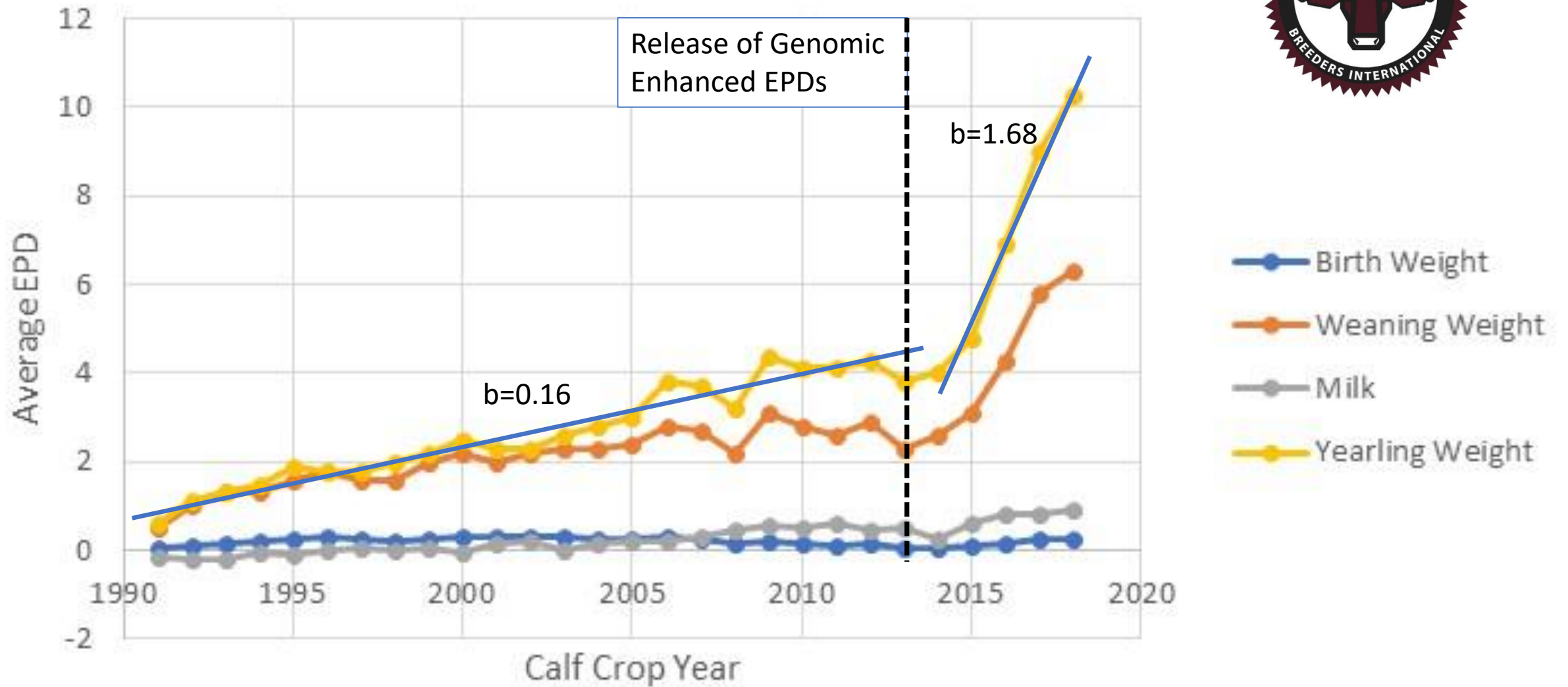
Cow Age Distribution



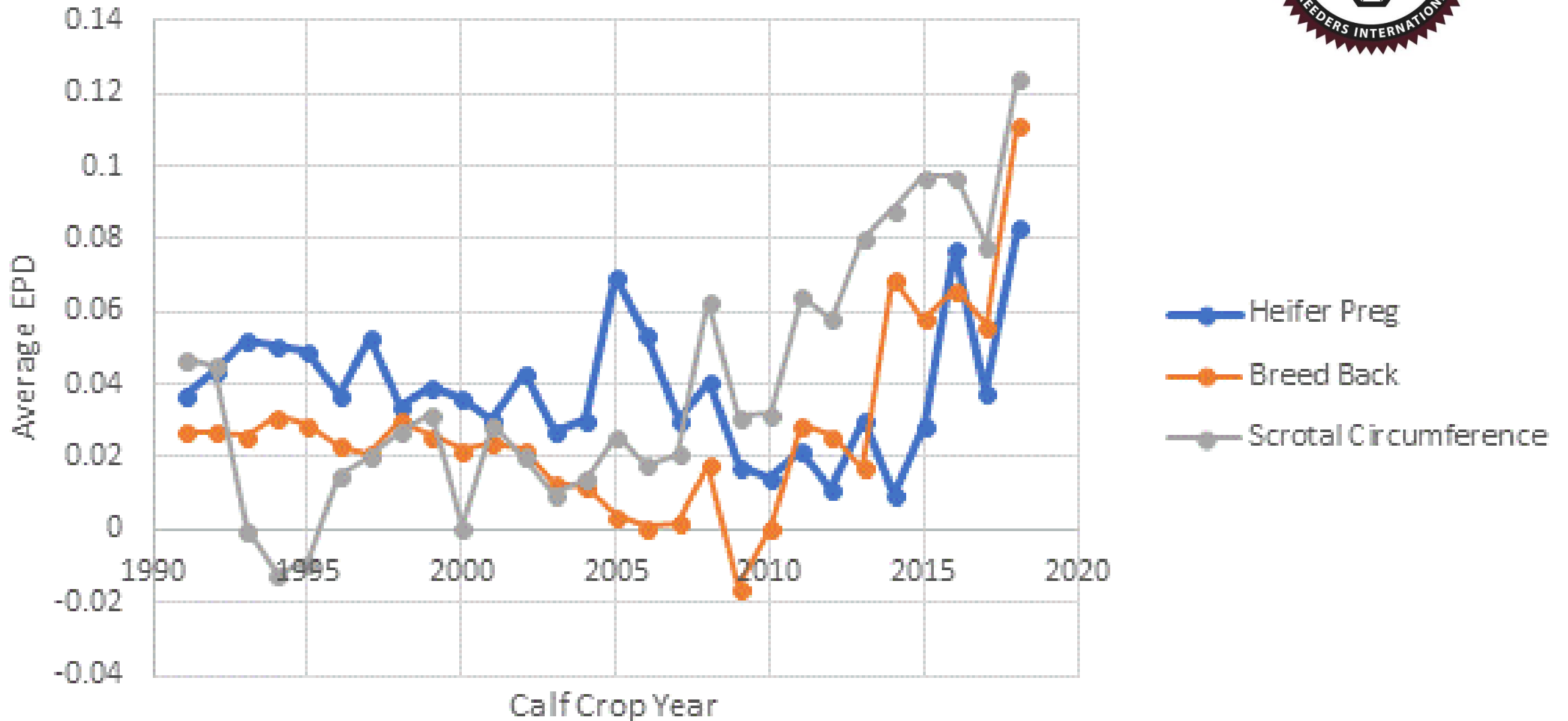
Santa Gertrudis Selection Strategy



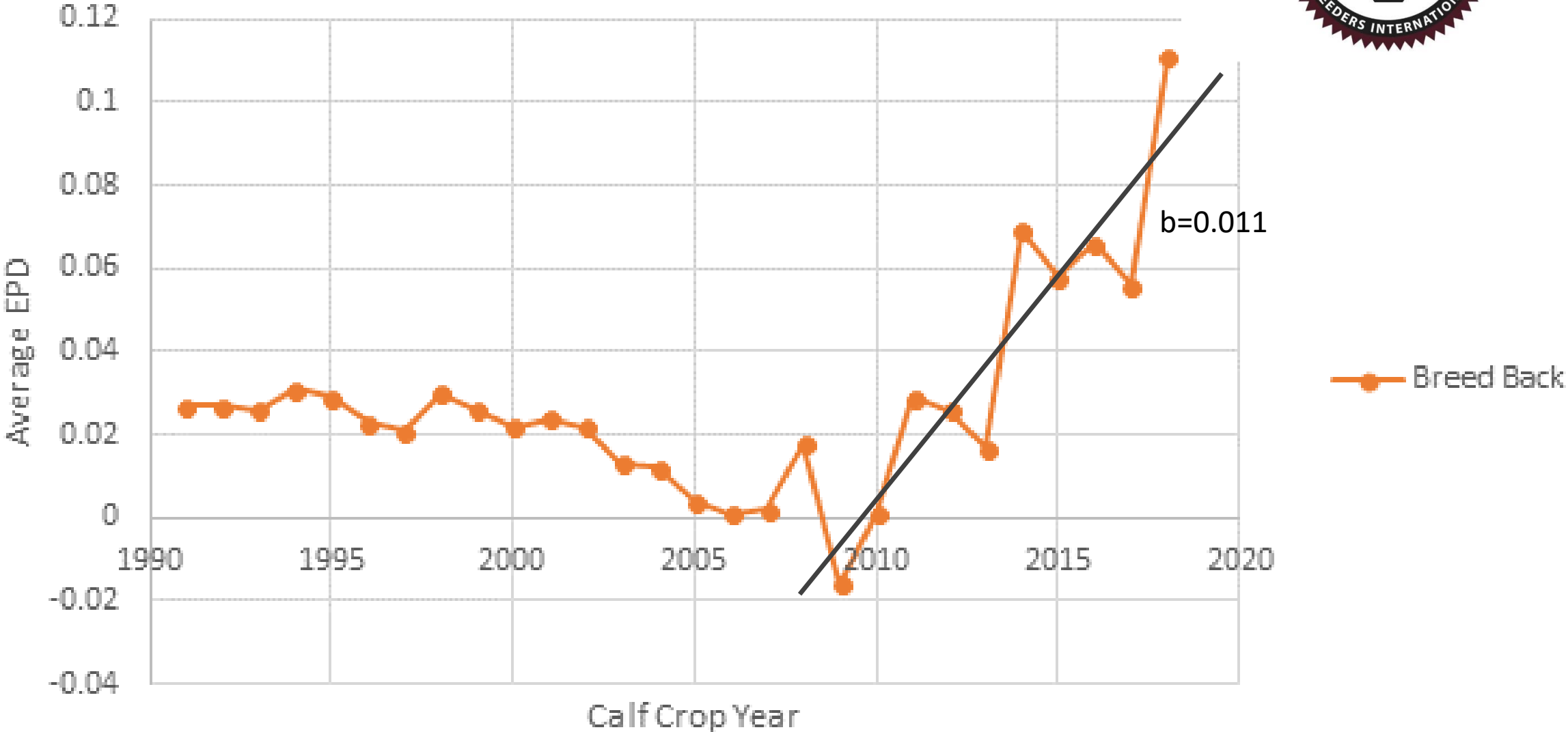
Genetic Trend of Growth Traits



Genetic Trend for Fertility For Breeders Submitting Records

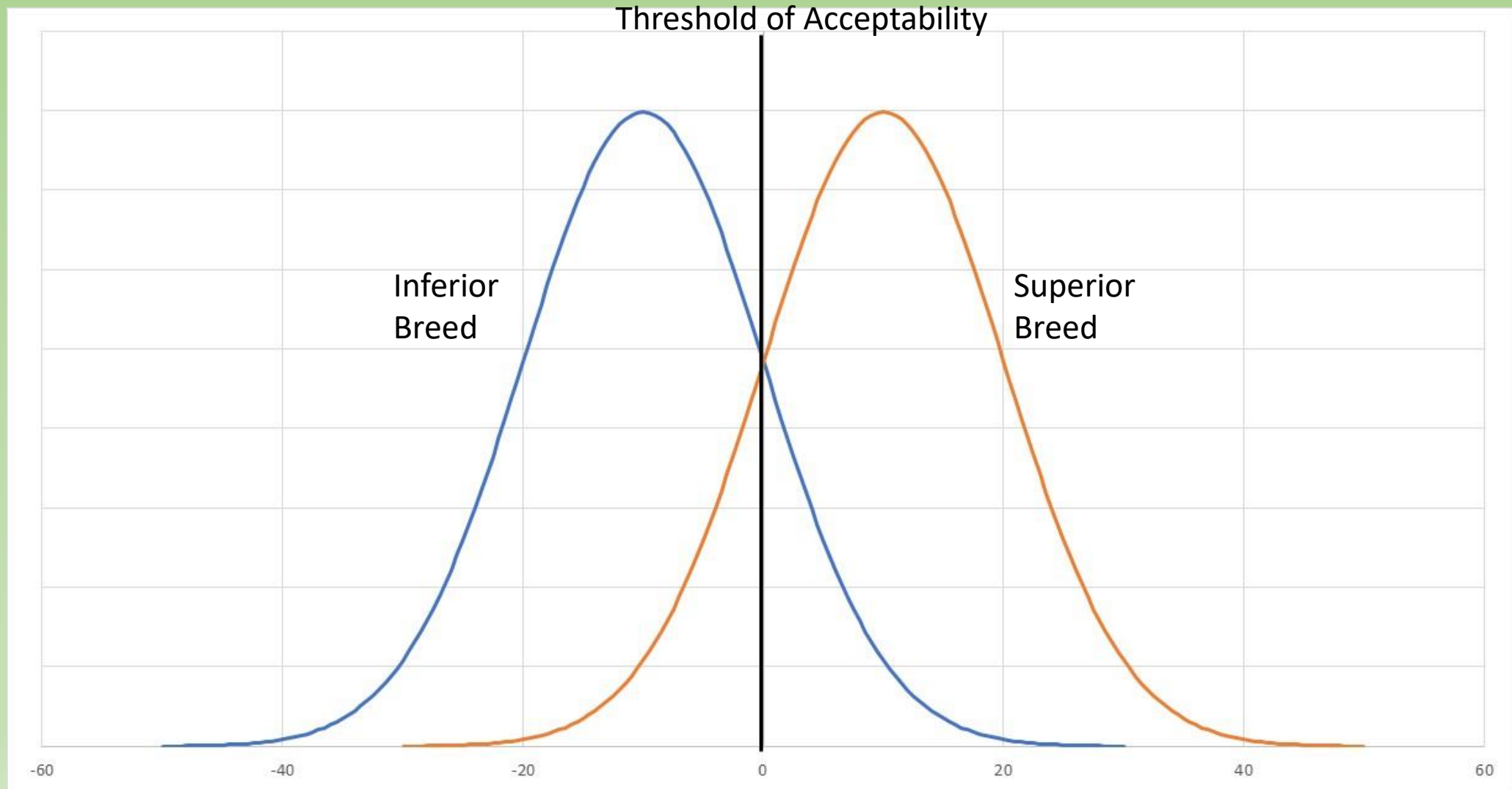


Genetic Trend for Fertility For Breeders Submitting Records



What about commercial cattle??

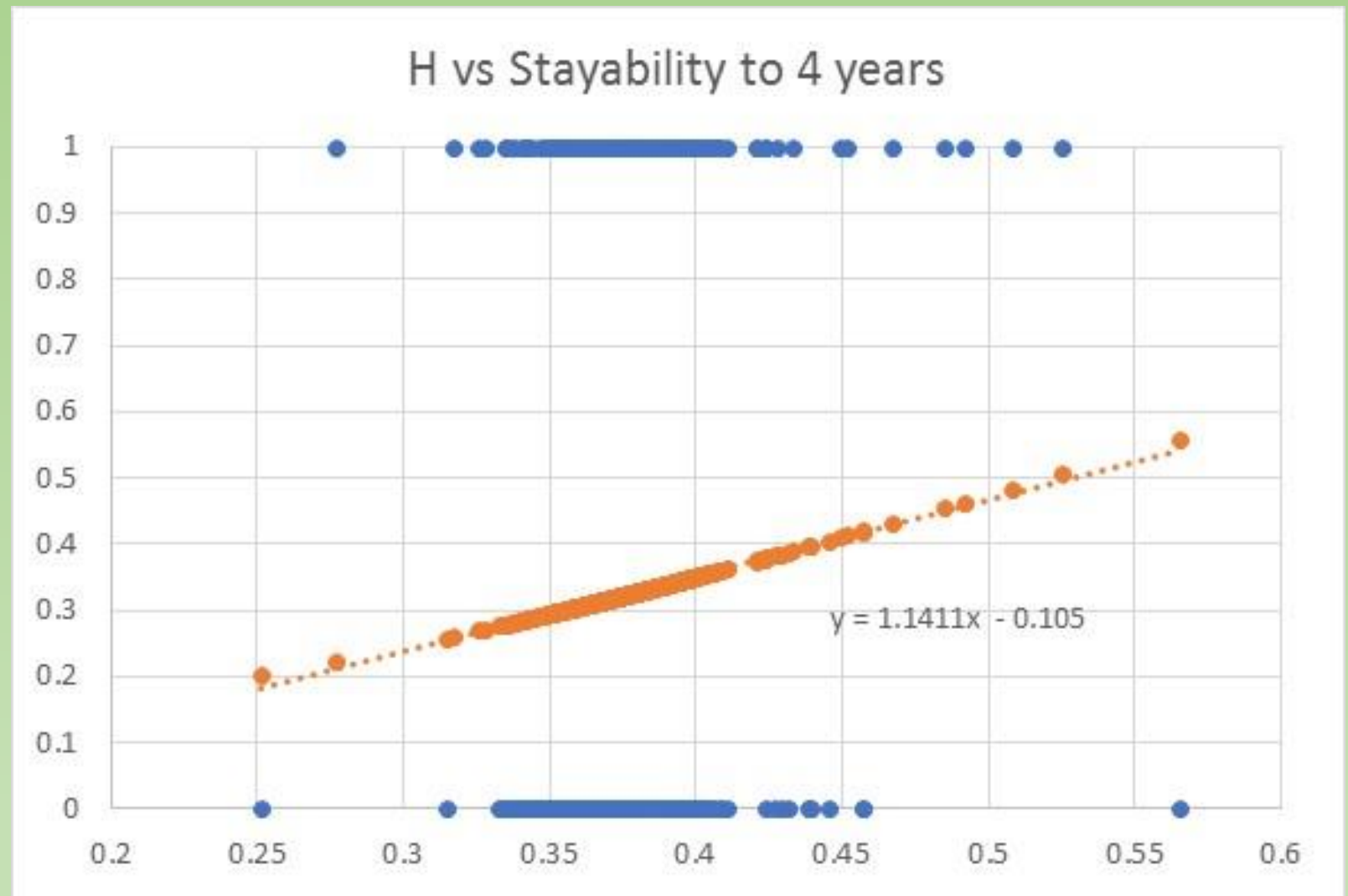
Conclusion



Why aren't indicus cattle used more across the USA?

1. Carcass Quality
2. Fertility
3. Limited access to genetics/bull producers
4. Docility
5. Tradition
6. Other

Losses from decreased heterosis in straight bred cattle don't make up for gains.



Questions??

