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2017 MSA Excellence in Eating Quality Awards

The role genetics plays in achieving the perfect MSA Index

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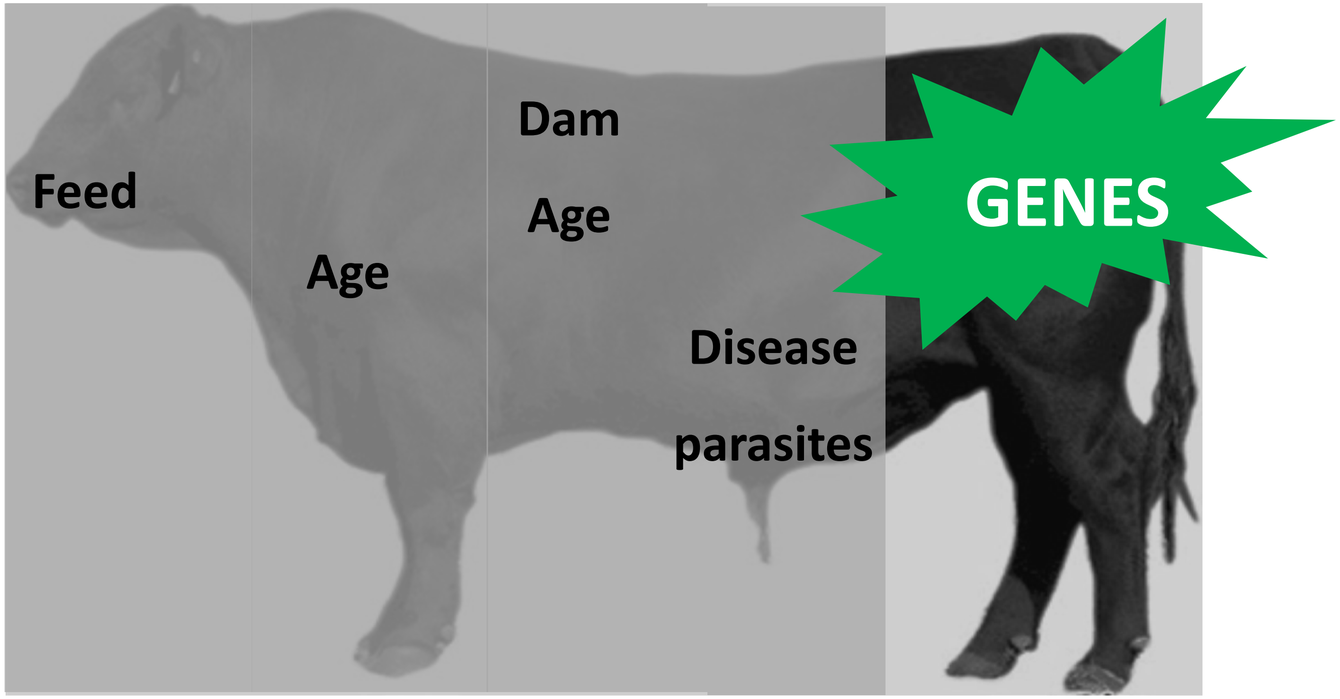
We buy genes

(and a mobile delivery system)

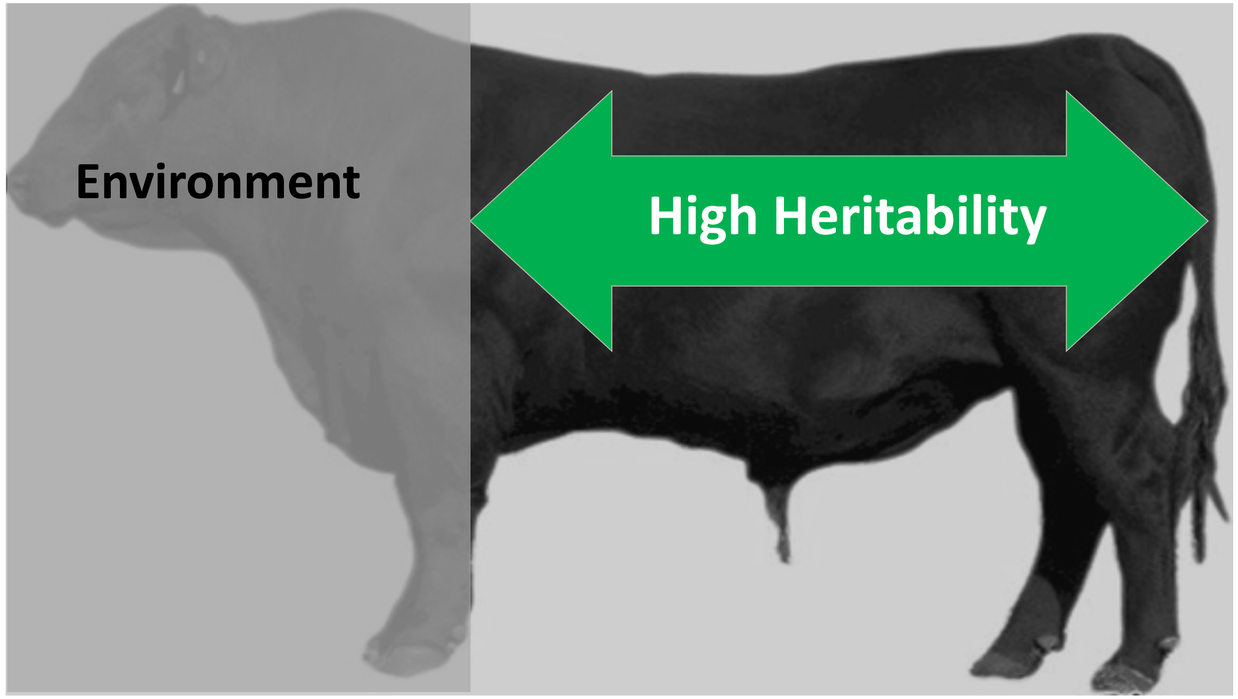
To produce profitable cattle

What influences an animal's performance?



What influences an animal's performance?

Example: Frame Size or Yield



What influences an animal's performance?

Example: Reproduction traits

Which traits are for YOU?

That depends on:

Your production system

Your crystal ball

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Which traits are for YOU?

- Weaning %
- Growth
- Carcase
  - lean meat yield
  - eating quality
- Maternal
- Feed intake
- Management - welfare

Identify which traits drive profit in your business and select for those traits!

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What impacts on the MSA Index?

The key factors impacting on eating quality influenced by the producer are:

- Tropical breed content
- MSA marbling score
- Ossification score
- HGP status
- Milk-fed vealer category
- Saleyard status

Other factors include:

- Rib fat
- HSCW
- Sex

What impacts on the MSA Index?

The key factors impacting on eating quality influenced by the producer are:

- Tropical breed content
- MSA marbling score
- Ossification score

Can influence with EBVs

- Rib fat
- HSCW

- HGP status
- Milk-fed vealer category
- Saleyard status

- Sex

Tropical Breed Content

Bos Indicus % impacts on EQ outcomes

Carcase input	Size of effect on the MSA Index (units)
Tropical Breed Content (TBC)**	0% = 0 12% = -1.6 18% = -3.2 25% = -3.9 38% = -4.7 50% = -5.2 75% = -5.5 100% = -6.3

- In production systems where Bos Indicus content is required, select traits within breed that will improve EQ.

MSA Marbling Score

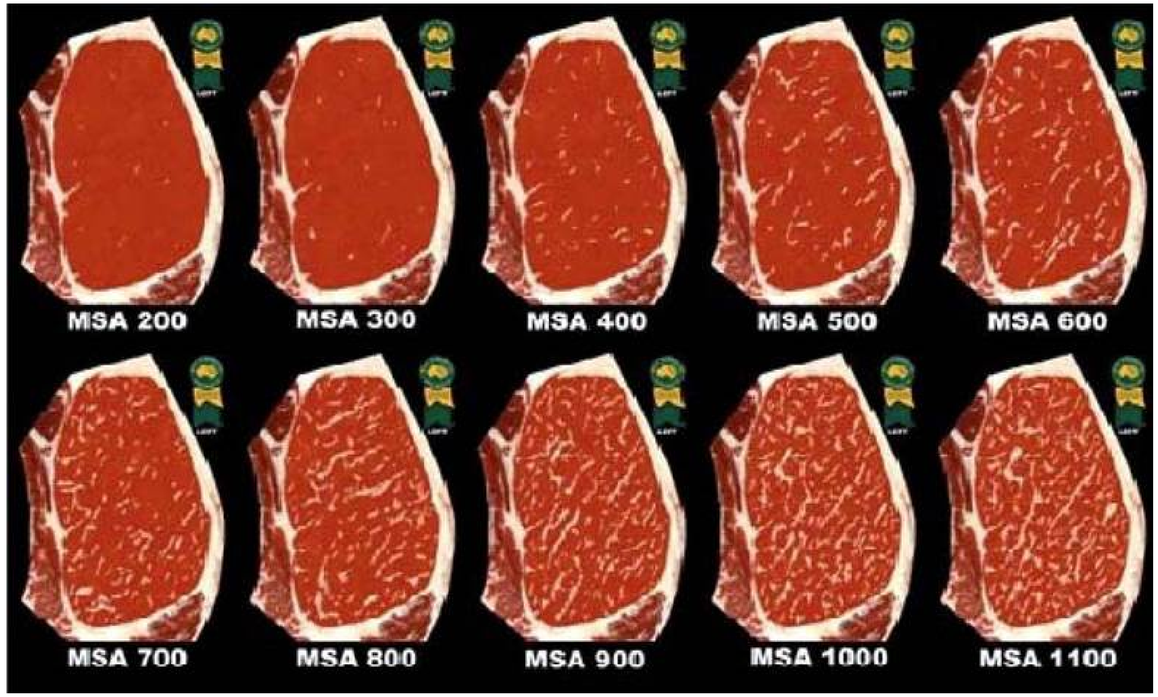
Intramuscular Fat EBV (%)

- Genetic difference in the percentage of intramuscular fat at the 12/13th rib site in a 400 kg carcase.
- Depending on market targets, larger more positive values are generally more favourable.
- Up to a 7.5% range for some breeds

Wagyu only

- Marble Score EBV & Marble Fineness EBV

↑ IMF
(marbling)



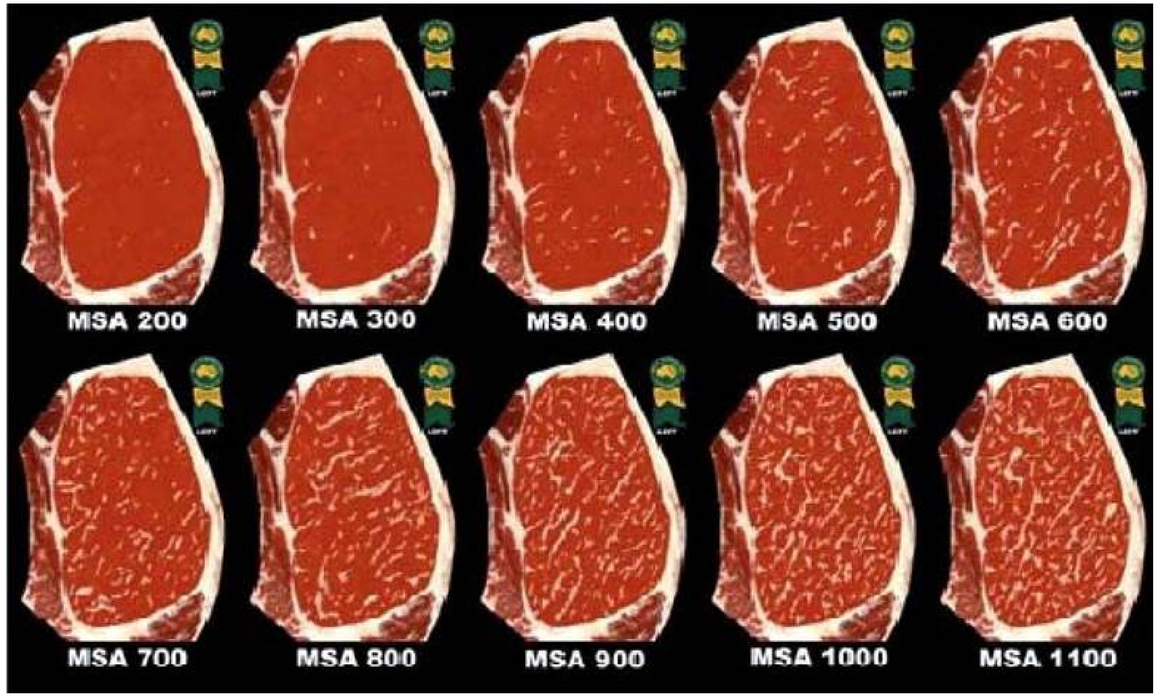
IMF EBV impact on MSA Index

1% increase in IMF EBV of sire =

27 ± 5 MSA marble point increase in progeny =

~0.43 point increase in MSA index

Marbling is
major driver of quality



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Ossification and HSCW

400 and 600-Day Weight EBV (kg)

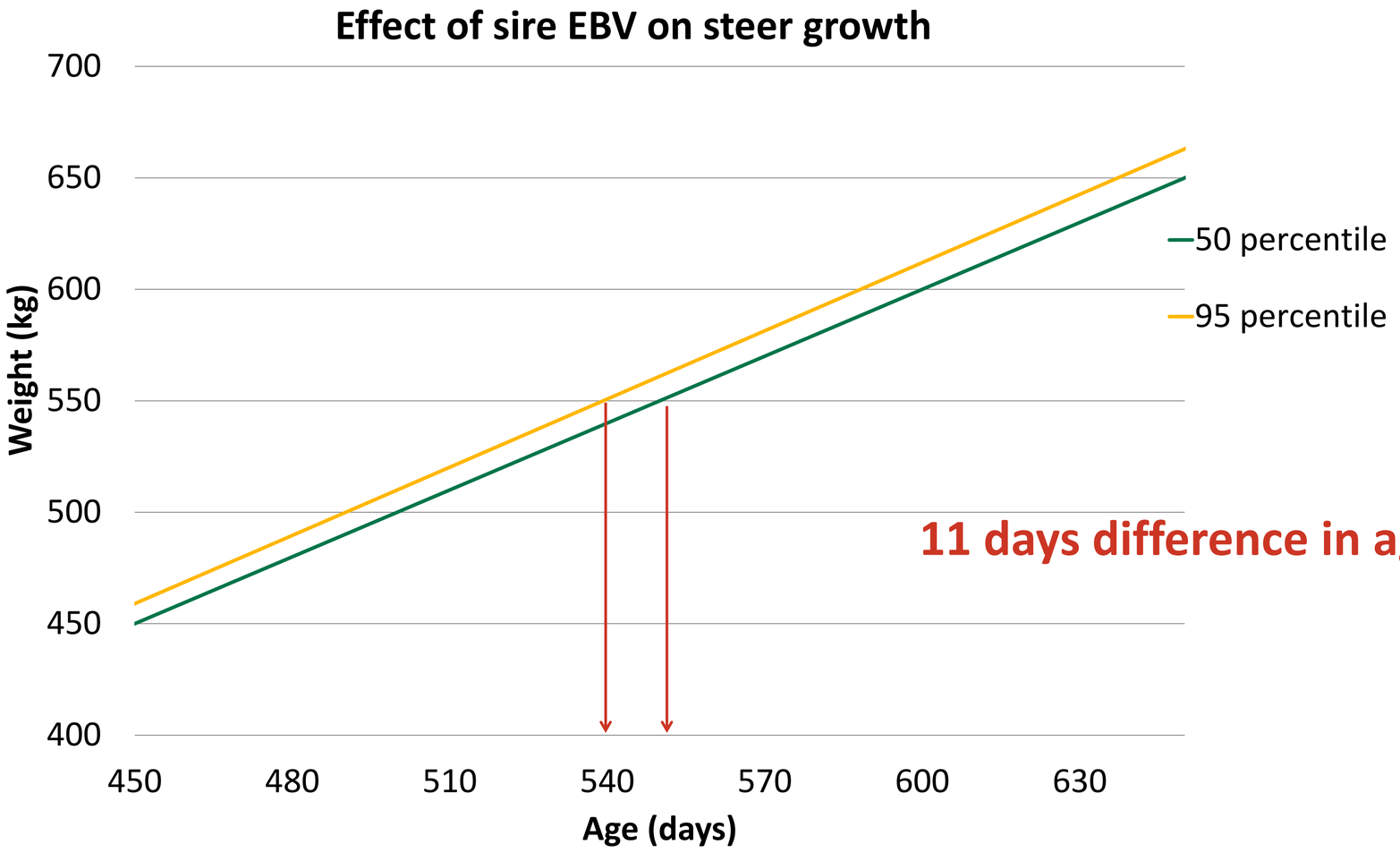
- These EBVs are the best estimates of an animal's genetic merit for yearling weight and beyond
- Faster growth means less days on feed, earlier turnoff
  - Younger turn-off ages
  - Lower ossification
- Or heavier carcass weights

↑ Carcass Wt

Optimise Growth
(reduce Ossification)

Within carcass specs

Effect of growth on Ossification



11 days difference in age at slaughter to reach same weight

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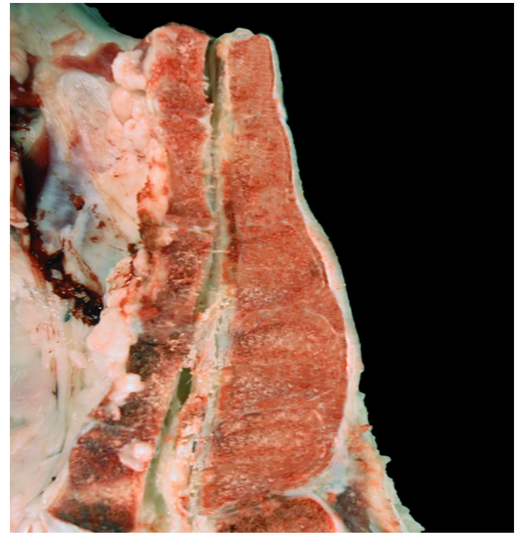
Effect of growth on Ossification

- Saving of **11** days to get to same weight
- Ossification increases by approximately
  10 units in 2 months = **0.17** per day
- 11 days saves **1.9** units of Ossification
- Increases MSA Index by **~0.1** averaged over a mob

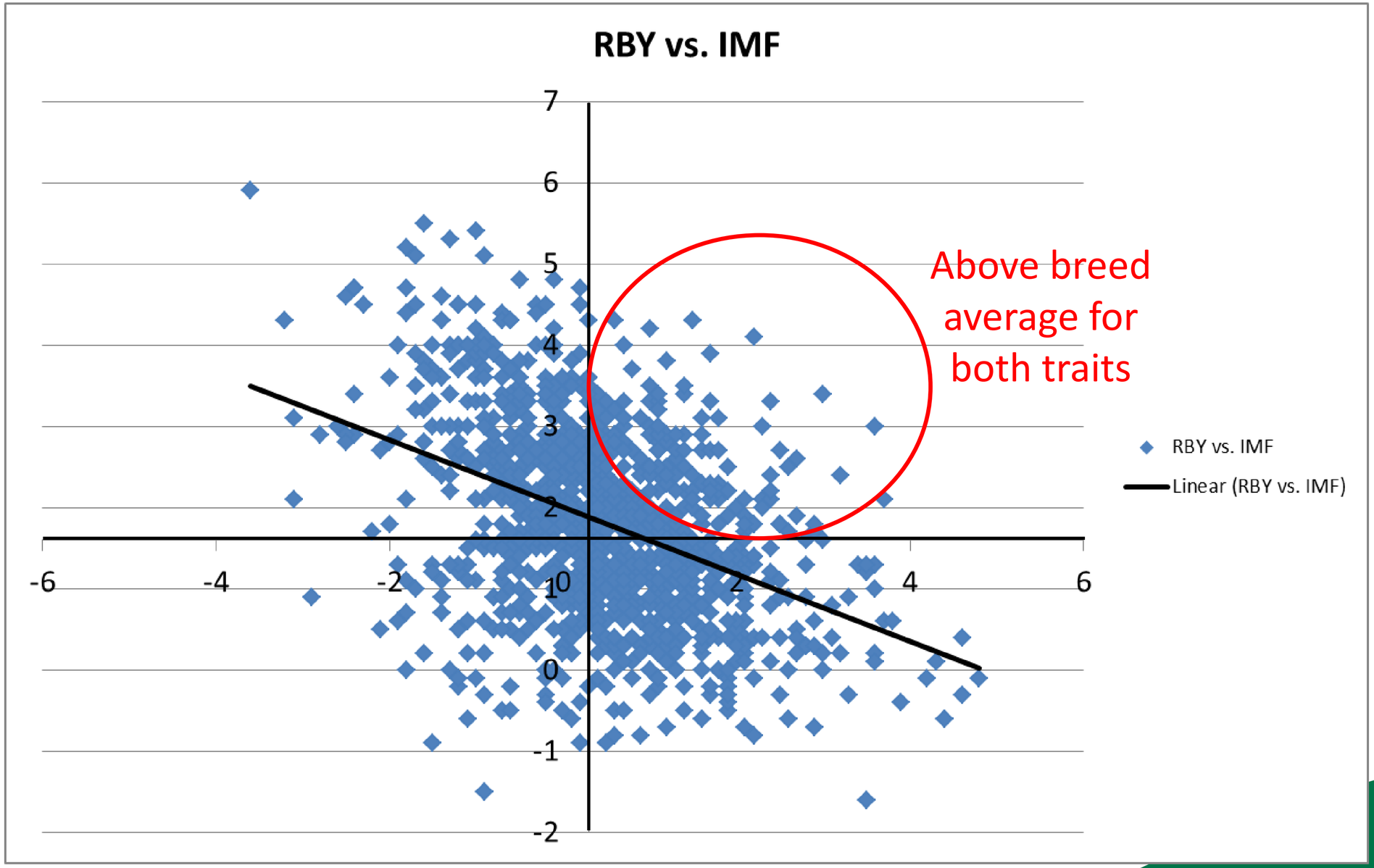


Rib Fat

Rib Fat and Rump Fat EBVs (mm)

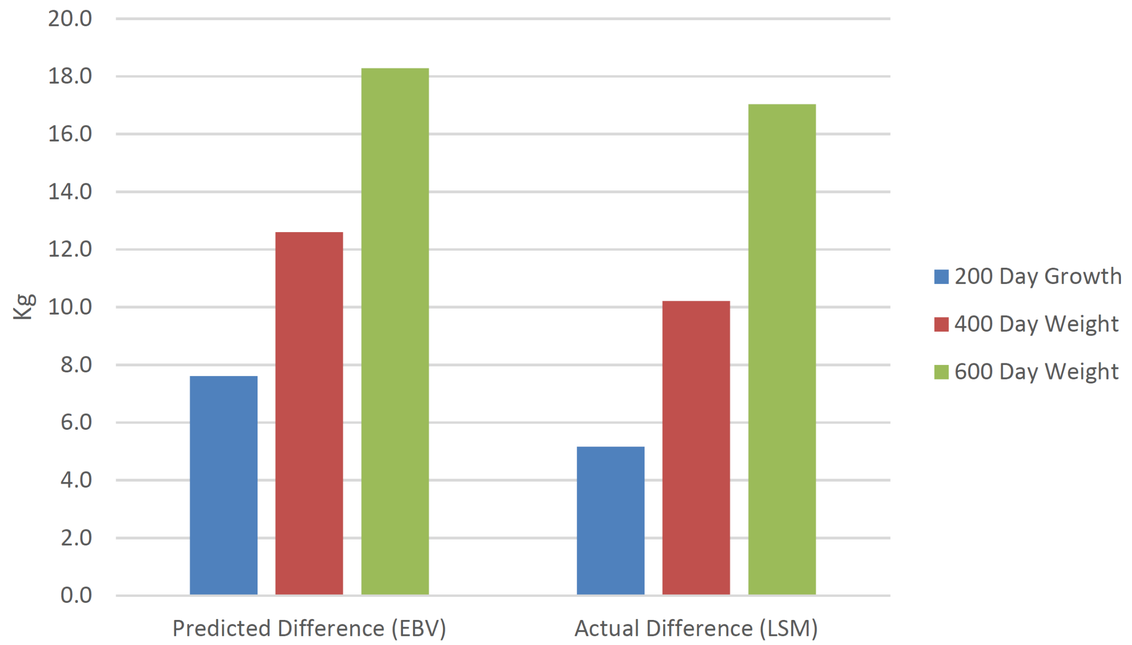
- Genetic differences in fat distribution on a standard 400 kg carcase.
- Sires with low, or negative, fat EBVs are expected to produce leaner progeny at any particular carcase weight than will sires with higher EBVs.
- Fat is a balancing act;
  - Cow herd needs to be able to maintain condition
  - Slaughter cattle, what do your kill sheets tell you?
  - Higher fat is favourably related to EQ
  - Not so good for lean meat yield

Managing the relationship between RBY & IMF



PREDICTION VS ACTUAL: GROWTH TRAITS

Trait	200 Day Growth	400 Day Weight	600 Day Weight
Predicted Difference (EBV)	7.6 Kg	12.6 Kg	18.3 Kg
Actual Difference (LSM)	5.2 Kg	10.2 Kg	17.0 Kg



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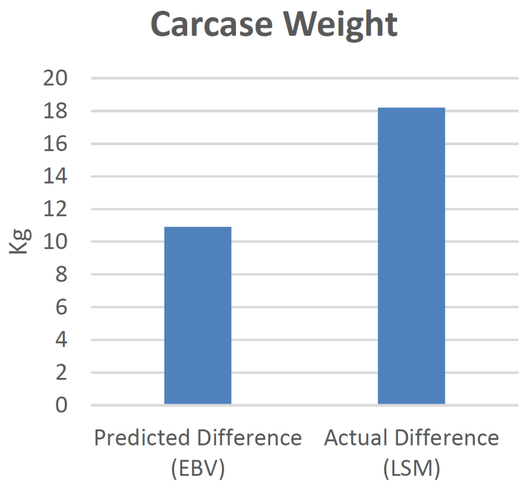
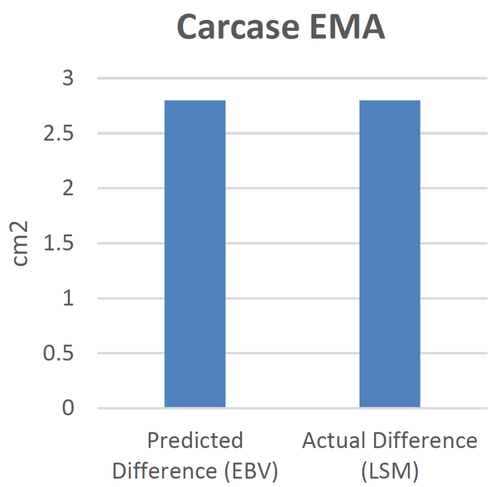
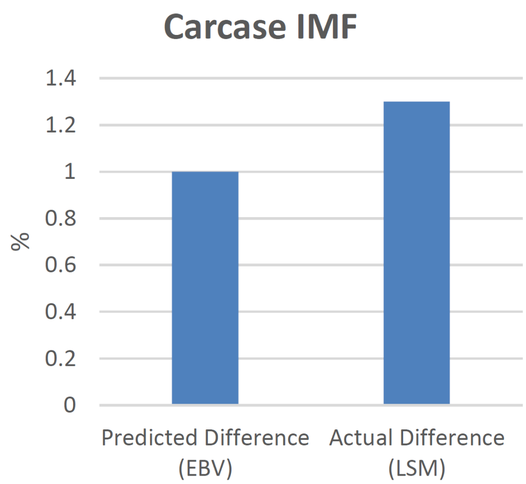
PREDICTION VS ACTUAL: CARCASE COMPOSITION

Trait	Carcase Wt	Carcase EMA	Carcase IMF
Predicted Difference (EBV)	10.9 Kg	2.8 cm2	1.0 %
Actual Difference (LSM)	18.2 Kg	2.8 cm2	1.3 %







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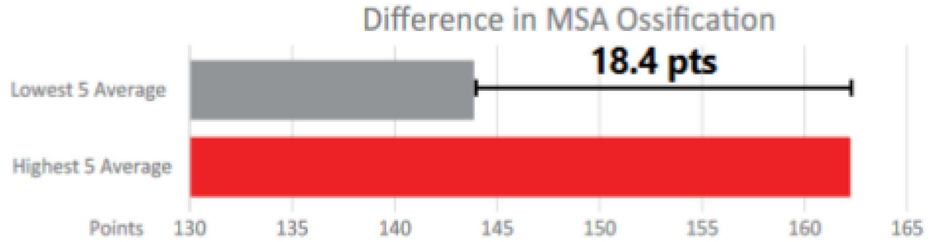
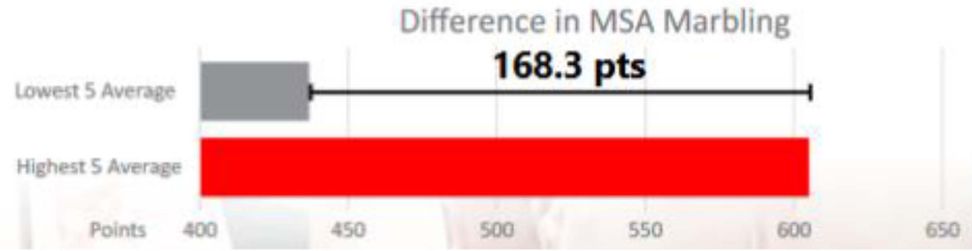
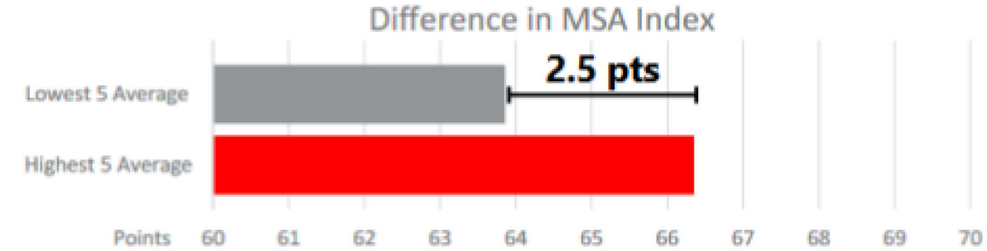
Variation in Carcase Quality







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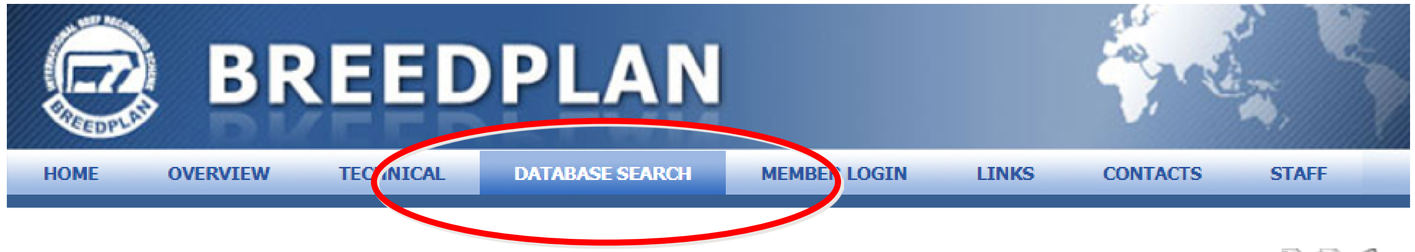
Finding animals – http://breedplan.une.edu.au or breed society website.



Database Search

Click on the link below to access the Internet Solutions facility of a particular Breed Society in Australia, New Zealand, North America, South Africa, Namibia, Argentina, United Kingdom and Hungary .

The Internet Solutions facility provides the ability to search a particular Breed Society's database for a range of animal, member and EBV/EPD details. Note - while the Breed Societies listed below are all utilising ABRI's Internet Solutions search facility, the EBV/EPD details available for some Breed Societies have been generated by genetic evalautions other than BREEDPLAN.

Australia

Angus Australia

Australian Belmont Red and Tropical Composite Register

Australian Bazadais Cattle Society
Australian Belted Galloway Association
Australian Braford Society
Australian Brahman Breeders Association
Australian Brangus Cattle Association
Australian Galloway Association
Australian Gelbvieh Association
Australian Highland Cattle Society
Australian Limousin Breeders Society
Australian Lowline Cattle Association
Australian Piedmontese Cattle Association
Australian Red Poll Cattle Breeders Inc.

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August 2017 Santa Gertrudis GROUP BREEDPLAN																
	Gestation Length (days)	Birth Wt (kg)	200 Day Wt (kg)	400 Day Wt (kg)	600 Day Wt (kg)	Mat Cow Wt (kg)	Milk (kg)	Scrotal Size (cm)	Days to Calving (days)	Carcase Wt (kg)	Eye Muscle Area (sq cm)	Rib Fat (mm)	Rump Fat (mm)	Retail Beef Yield (%)	IMF (%)	Flight Time (secs)
EBV	-	-	+14	+22	+32	+32	+2	+1.1	-0.7	+12	+4.1	+0.7	+0.8	+0.9	+0.2	+0.16
Acc	-	-	68%	69%	70%	67%	53%	71%	59%	60%	56%	62%	61%	52%	62%	70%
Breed Avg. EBVs for 2015 Born Calves Click for Percentiles																
EBV	-0.3	+1.3	+10	+16	+21	+25	+0	+0.8	-0.1	+10	+2.0	+0.1	-0.2	+0.6	+0.0	+0.03

Traits Observed: 200WT,400WT,600WT(x2),SS,FAT,EMA,IMF

SELECTION INDEX VALUES		
Market Target	**Index Value**	**Breed Average**
Domestic Index ($)	+$ 21	+$ 14
Export Index ($)	+$ 25	+$ 15

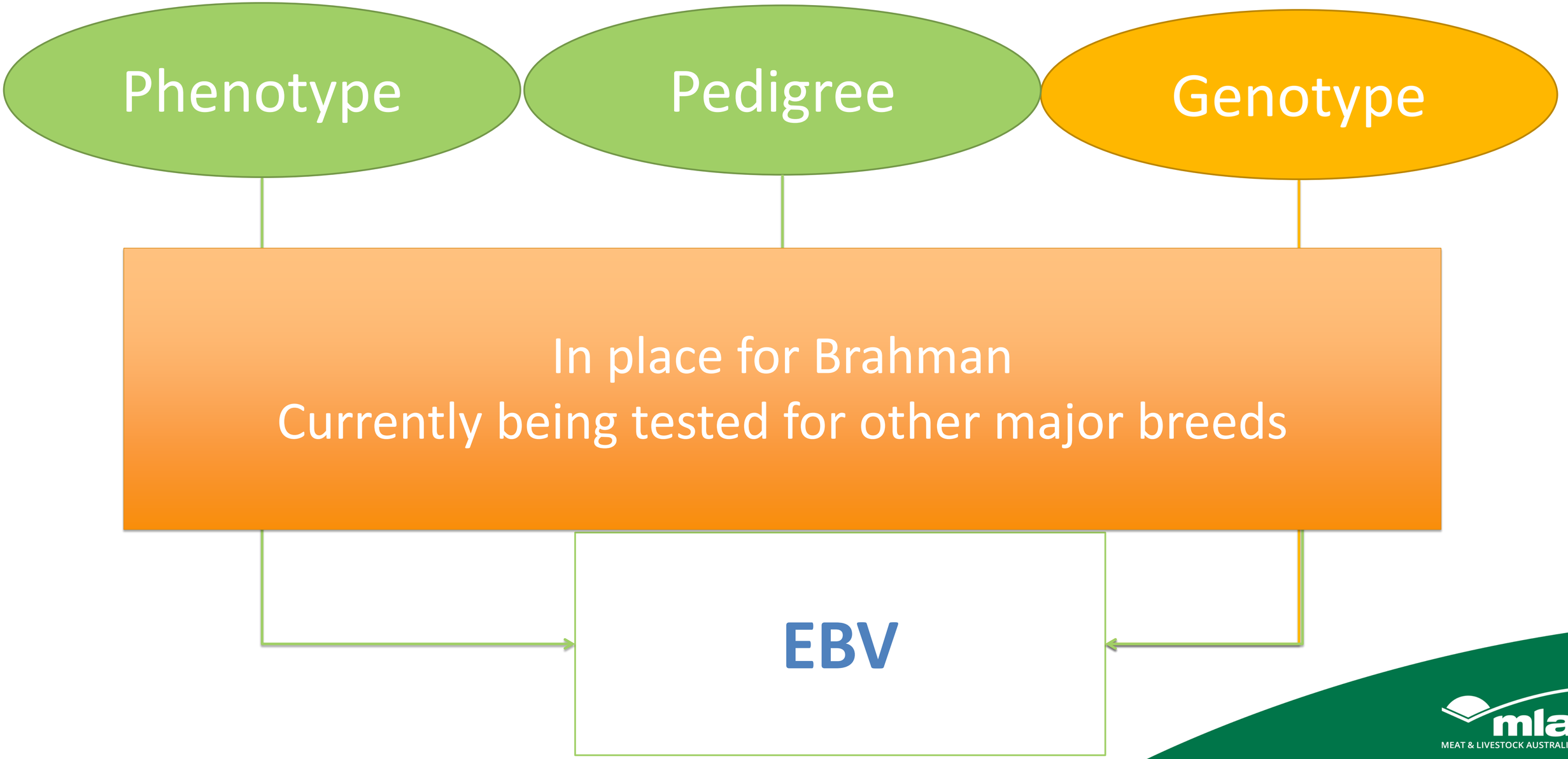
Genomic Prediction: basic idea

1) measure lots (of animals) phenotypes and their DNA
→ Reference population

2) A breeder tests DNA on young animals

Prediction from DNA → genomic breeding values

Single Step Analysis



What could be possible in the future?

Single step analysis could pave the way for genomic predictions for commercial cattle

- Commercial feeder steer test
  - Does an individual have the right genes for long fed, short fed or grass finishing?

- Significant development through the National Livestock Genetics Consortium

Take home messages

- Select bulls on the genes they carry (not how fed up they are)
- Identify the traits that drive profit in your business
- MSA index can be influenced by:
  - IMF EBV
  - 400 & 600 Day Weight EBV
  - Rib Fat EBV

For more information

- http://breedplan.une.edu.au
- http://sbts.une.edu.au OR http://tbts.une.edu.au
- Breed Society