

# **Carcase data: big value for informing genetics**

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# How do we evaluate animals for genetic merit?

## Genetic Effects

- All known information
- DNA Parentage
- Heritability's
- Correlated traits

## Fixed + Random Effects

- Sex
- Age
- Herd
- Contemporary/management grouping
- Environment (Random)



**(Simultaneously Estimate)**



**Unbiased Breeding values**

**estimate of an animals genetic merit  
as a parent compared to other animals**

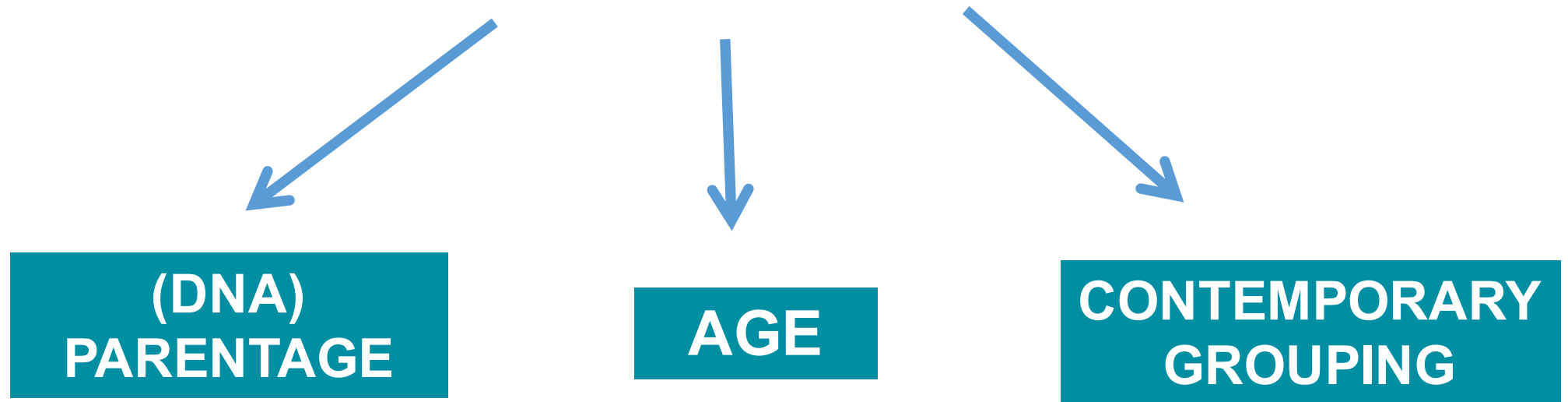
# Questions

- Can we assess the average beef carcass through the works for carcass quality?
- Can we use the abattoir collected data from the 'average carcass' for genetics?

# Why isn't this data genetically usable?

- Not able to estimate genetic and fixed effects fairly

## What do we need?



# How can we get this data?

- Cull stud bulls and heifers
  - Small numbers, low effectiveness
- Research stations
  - Absent in NZ
- Commercial performance recorded herds
  - Progeny tests
    - Cost is spread (recording other traits)
    - Industry coverage



# How are carcass traits measured?

- **Chemically extracted carcass IMF%**
  - Most accurate and objective measure of marbling
  - Expense/some product damage
- **Lab tests**
  - Shear Force
  - Cooking loss

# How are carcass traits measured?

- **Abattoir Carcass Grading**
  - MSA and Aus-Meat, possibly EQ?
  - Most effective data to collect across EQ traits
  - Only way to get raw RBY + CW otherwise generated from trait correlations
  - NZ has never collected before

(Reverter et al. 2000)





# How are carcass traits measured?

- **Ultrasound scanning**

- Live animal at 400 days
- EMA, IMF, Rib and Rump fat measured
- Cheap & easy way to show differences
- Using live to estimate killed (correlation)
- Scoring data underpins

(Wilson, 1995)



TRAIT 1	TRAIT 2	GENETIC CORRELATION	COMMENT
Ausmeat Marble score	MSA marble score	0.99	Very strong correlation, low standard error
Carcase IMF %	Ausmeat Marble score	0.95	Very strong correlation, low std error
Scan Marbling	Ausmeat Marble score	0.65	Moderate std error
Scan rib, rump fat, EMA	MSA/Ausmeat	0.9	Very strong correlation, low std error

*\* Across breed carcass trait correlations*

# To remember...

- Scanning is still very useful (less so for marbling but absolutely essential)
- Abattoir data collection is the ultimate and underpins good selection

# How else are carcase traits measured?

- **Genomic marker testing**
  - Predict using a gene test – early
  - Developing in value, progeny tests will enhance
- **Trait correlations**
- **Future objective possibilities**
  - Spectral imaging in abattoir
  - RGBD cameras at 400 days

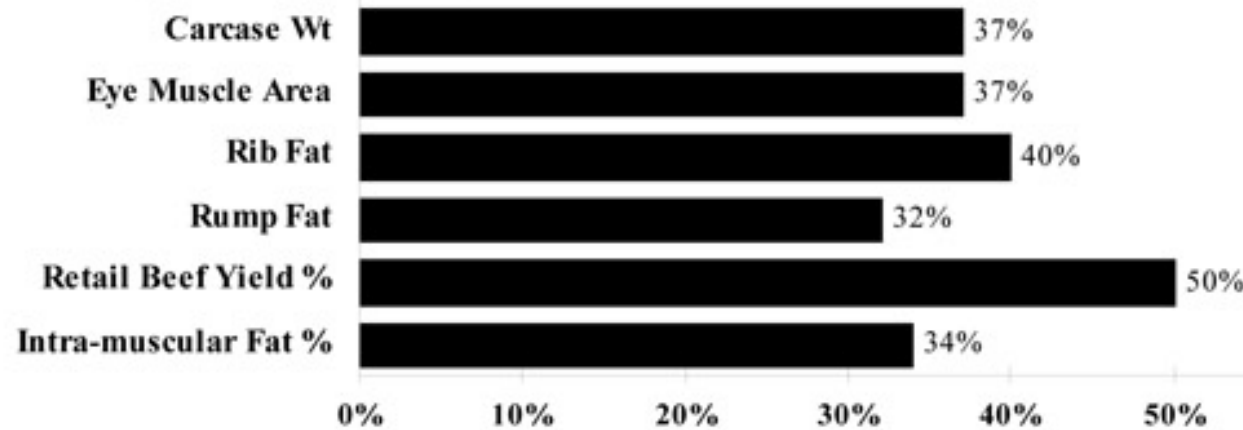


# If we could collect this data, What is it worth?

- NZ has never submitted abattoir data
  - Gains in selection accuracy - EBVs become a fairer estimate of their true value
  - Reduced confidence intervals (smaller EBV fluctuations at a given accuracy)
  - Carcase weight and dressing percentage key traits otherwise only recorded by trait correlation




# If we could collect this data, What is it worth?



- Carcase traits are highly heritable
- Increased genetic gain (increased accuracy)
- Meat market specifications (directly targeting)

# Progress = Balance

May 2015 Hereford GROUP BREEDPLAN																		
	Calving Ease DIR (%)	Calving Ease DTRS (%)	Gestation Length (days)	Birth Wt. (kg)	200 Day Wt (kg)	400 Day Wt (kg)	600 Day Wt (kg)	Mat Cow Wt (kg)	Milk (kg)	Maternal Value (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 (%)
EBV	-4.0	+1.4	-4.2	+3.8	+45	+72	+93	+58	+8	+15	+1.5	-4.2	+75	+5.1	+1.7	+2.8	+0.3	+1.8
Acc	87%	75%	97%	98%	97%	97%	96%	87%	86%	88%	96%	50%	85%	74%	77%	83%	75%	81%

With

Without

Lab Tests  
(Objective IMF)

Carcase Grading

Genomics

Trait  
Correlations

Ultrasound  
Scanning

# How can we get this data?

- Cull stud bulls and heifers
  - Small numbers, low effectiveness
- Research stations
  - Absent in NZ
- Commercial performance recorded herds
  - Progeny tests
    - Cost is spread
    - Industry coverage
    - cheaper

# Value in the market place

- Meat Standards Australia has shown us that genetics is a key way to influence carcase grading
- \$45 /head in SFF Beef EQ Reserve grade
- \$150 per head for 4% increase in yield
- Not about 1 individual trait
- One trait worth noting:  
Marbling (on its own) is worth a 24 cent premium Australian markets



<b>SFF BEEF EQ Grading Spec's</b>	<b>Breedplan Traits that Influence</b>
<b>Ultimate PH</b>	<b>Docility (trial)</b>
<b>Ossification</b>	<b>Carcase weight (kg), 400D (kg), 600D (kg)</b>
<b>Marbling</b>	<b>IMF (%), Rib fat (mm)</b>
<b>Rib Fat</b>	<b>Rib Fat (mm)</b>
<b>Eye Muscle Area</b>	<b>EMA (cm2)</b>
<b>Carcase weight</b>	<b>CW (kg)</b>
<b>Dressing %</b>	<b>RBV (%)</b>
<b>Fat Colour</b>	
<b>Meat Colour</b>	<b>Docility (trial)</b>

# CASE STUDY: TEAM TE MANIA



- 42 herds testing young sires- all DNA recorded and on Breedplan commercially
- All steers are feedlotted and abattoir carcass assessed
- Enormous pool of data feeds back to lift accuracy and deliver gain far faster than standard practice
- Premium for consistency hitting specs on top of premium!
- Value chain flow on effects



# TAKE THIS HOME WITH YOU

1. Animals can be only be used for genetic evaluation if we know:
  - *Age, parentage and contemporary grouping*
2. Abattoir carcase data is the highest value carcase data
3. Ultrasound scanning is good for showing genetics differences and is a very useful predictor
4. Abattoir grading is most easily completed in a progeny test where cost can also be spread
5. Cattle with the right genetic package (and management) will hit premium market spec's and deliver \$\$\$\$ to farmers

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- <http://www.mla.com.au/mbfp/Meeting-market-specifications>
- <http://www.silverfernfarms.com/our-co-operative/our-process/understanding-eating-quality-system-grading>



# Thank you.

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