Eating Quality Indexes - Welcome

- Webex should prompt you to setup audio
- Please **MUTE** your phone
- Having problems? Email **drubie@mla.com.au**
- Please ask Questions and Feedback through the **chat**
- Feedback can also be made in the survey after the webinar
  - Link will be emailed out with recording of the webinar ASAP

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Eating quality indexes for terminal sires

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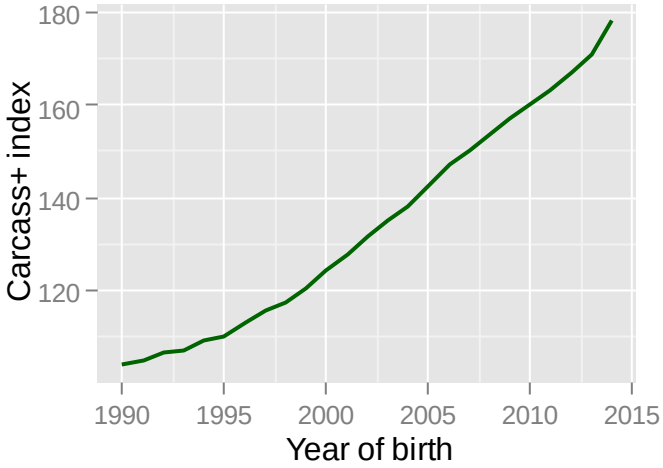
Breeding directions for meat sheep

- Long term gains in growth rate and lean meat yield

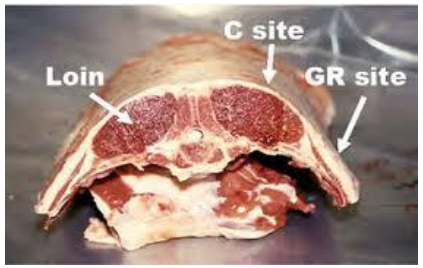


Carcass+ = simple breeding objective, accurately assessed

- To remain competitive the industry also needs to address meat quality:
  - Selection for growth and lean → decreased eating quality

Ingredients of an eating quality index

Animal performance



Carcass measurements

Consumer eating quality

Genomic testing

Index = Trait economic values X ASBV

SHEEP GENETICS

SHEEP CRC · mla MEAT & LIVESTOCK AUSTRALIA · awi Australian Wool Innovation Limited

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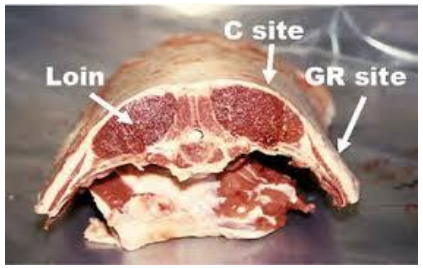

DEVELOPING THE INDEX

How to value eating quality

Sheep CRC Consumer eating quality data

- Tenderness
- Juiciness
- Flavour
- Overall liking

Scores on a 0 – 100 scale in CRC slaughter animals

MSA retail grading system

- Higher eating quality score → higher MSA retail grade

Willingness to pay surveys

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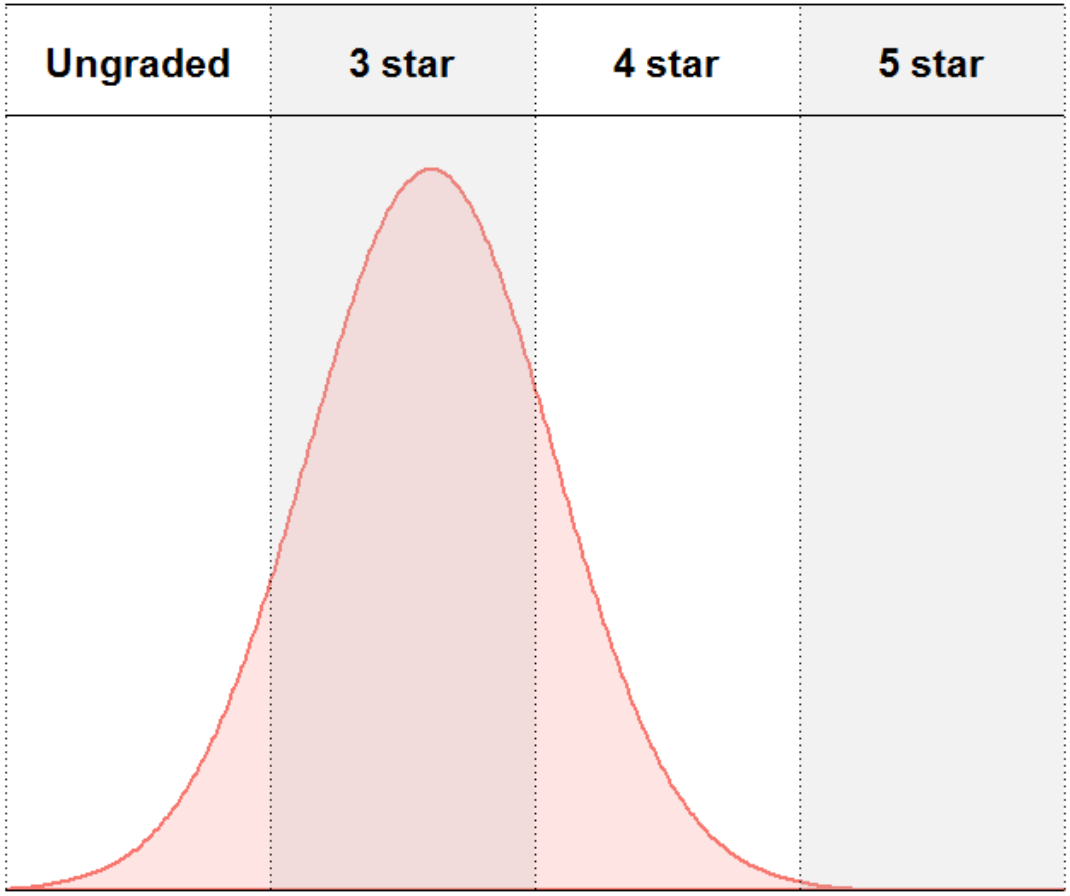
Large between animal variation in eating quality



… and therefore in MSA grade

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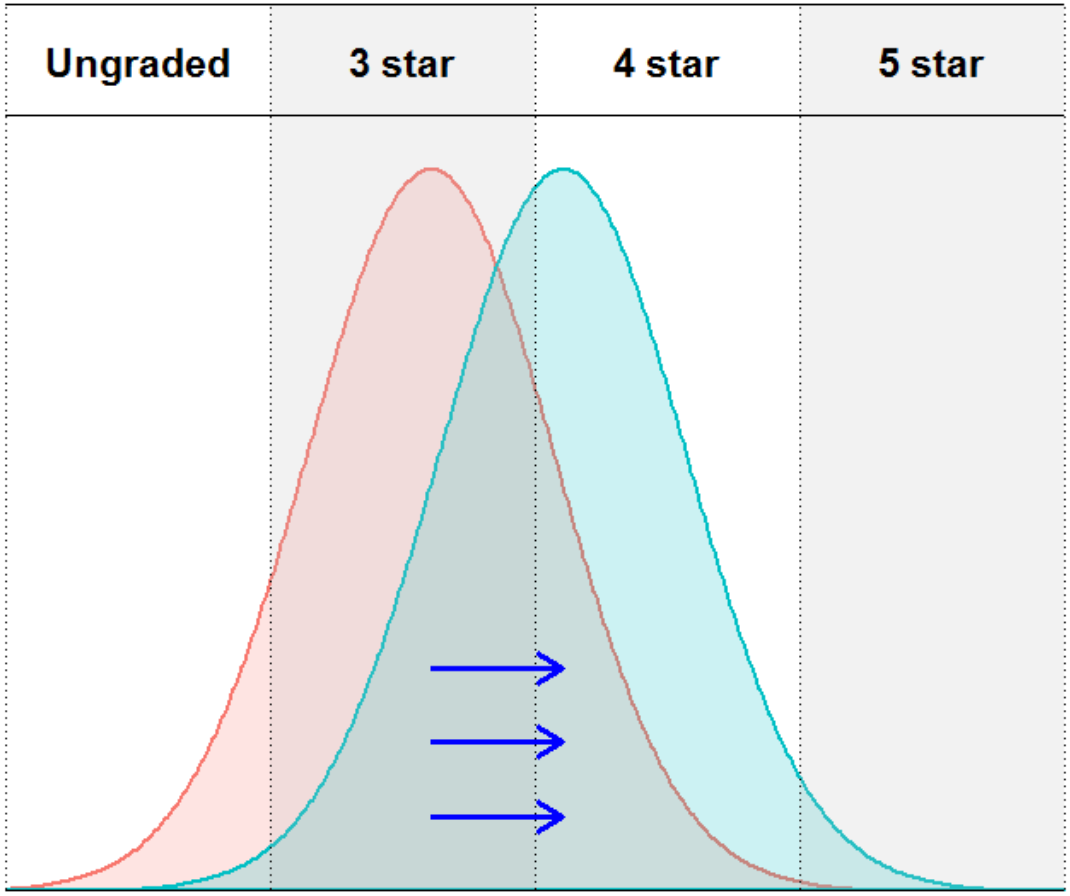
If we could improve eating quality score…



… we would increase the proportion of meat in higher MSA grades → increase in value

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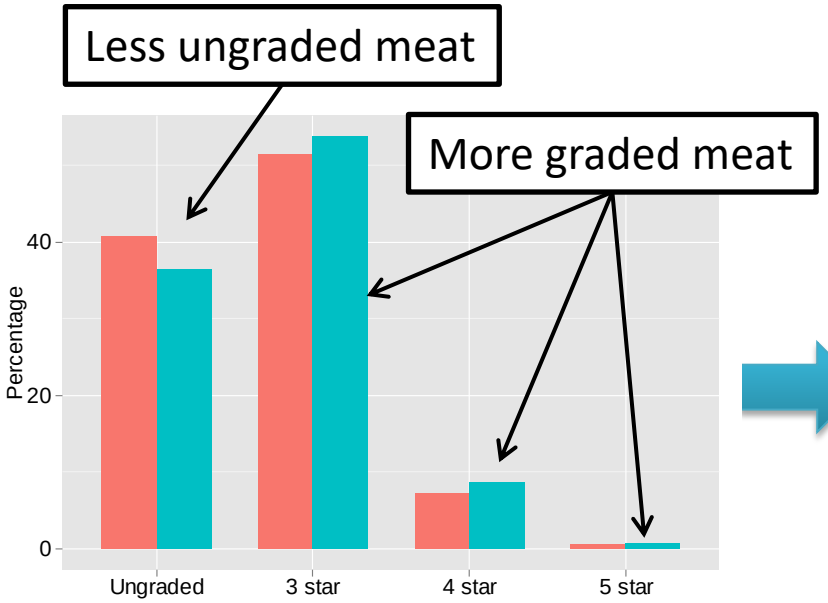
The economic value of improved eating quality



Consumers value quality

	n	Ungrade	3*	4*	5*
Mean	1,858	49%	100%	147%	200%

(Price relative to 3*, n = number consumers)

An increase by 1 score translates to:

- **An increase in carcass price of 15 c/kg***
- **Economic value of $3.21 per ewe**

(* If there was supply chain feedback)

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Economic weights based on carcass traits

Trait		Economic value ($/ewe)
Sale weight (kg)	pwt	1.83
Lean meat yield (%)	lmy	1.88
Dressing %	dress	2.04
Carcass eye muscle (mm)	cemd	3.27
Carcass fat (mm)	ccfat	-0.97
Eating quality (0 – 100 score)	tmsa	3.21

Index variations:

- **LMY** = carcass index ***without*** eating quality ($index equivalent to CPLUS)
- **LMYEQ** = carcass index ***with*** eating quality (as above)
- **LMYEQIMF** = extra emphasis on intra-muscular fat

The problem: unfavourable genetic correlations

Higher yield = poorer E.Q.

		lmy	tmsa	imf	sf5
Lean meat yield	lmy	1.00			
Eating quality	tmsa	-0.19	1.00		
Intra-muscular fat	imf	-0.51	0.38	1.00	
Shear force	sf5	0.42	-0.68	-0.55	1.00

Higher yield from **lower imf** and **higher sf5**
but … better E.Q from **higher imf** and **lower sf5**

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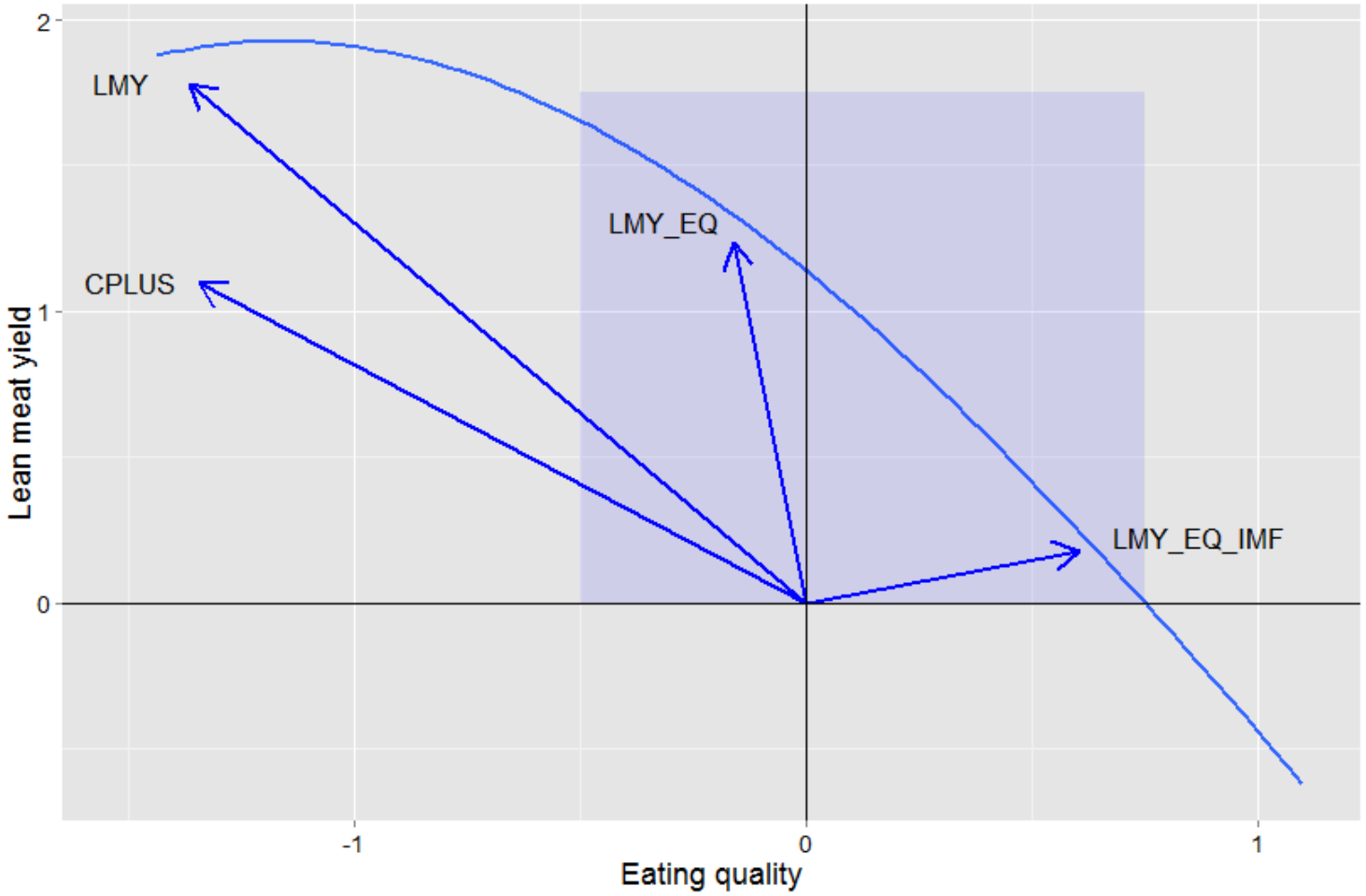
Varying the balance between LMY and E.Q.



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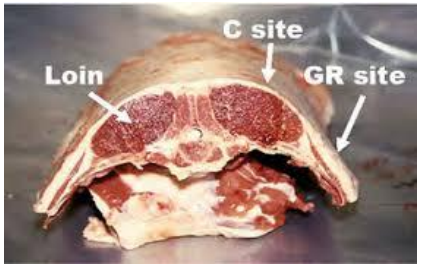
Correlations between breeding objectives

	CPLUS	LMY	LMYEQ	LMYEQIMF
CPLUS	1.00			
LMY	0.88	1.00		
LMYEQ	0.44	0.57	1.00	
LMYEQIMF	0.30	0.36	0.92	1.00



NEW ASBVS

Carcass and E.Q. ASBVs are needed for the index

- RBVs have been available since 2011:
  - Lean meat yield and dressing%
  - Carcass eye muscle and fat
  - Intra-muscular fat and shear force
- Single trait analyses
- Including genomic information via “single step”
- Limited in scope:
  - Resource population animals with measurements and genotypes
  - Animals genotyped by breeders in pilot projects etc
  - Some animals via pedigree

In 2016 we make the transition from RBV to ASBV

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The new analysis for carcass and E.Q. ASBVs

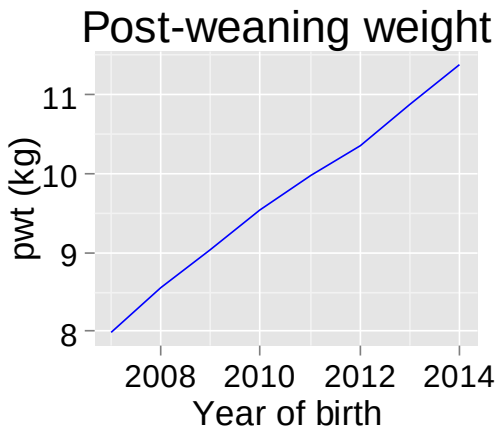
- Full multi-trait single step genomic analysis:
  - Body weight and scan traits
  - Carcass and eating quality traits

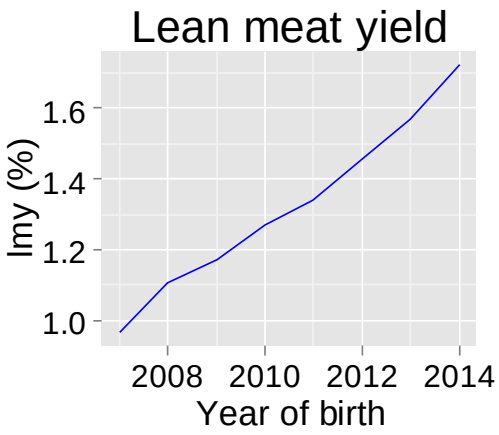
- Data from all LAMBPLAN animals from 2000 year of birth

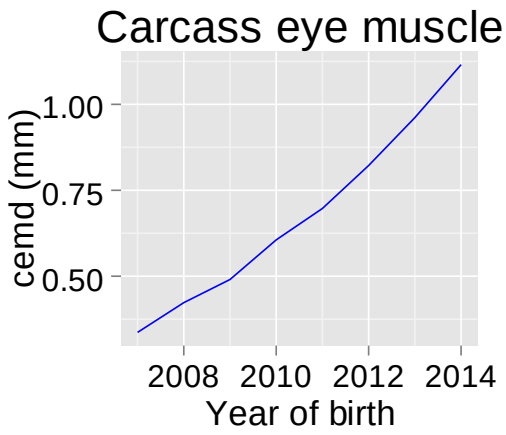
- All animals will have breeding values for all traits → reporting still subject to accuracy thresholds

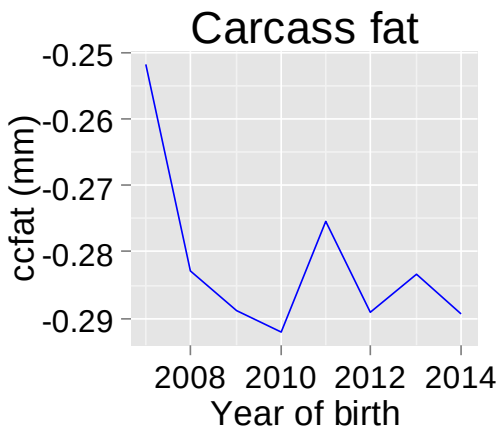
- ASBVs from this analysis used to build eating quality index

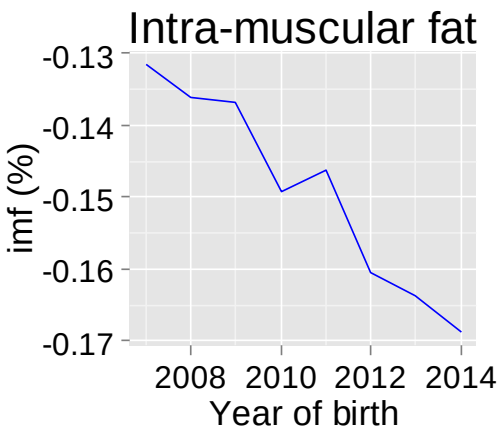
Genetic trends: 2007 – 2014

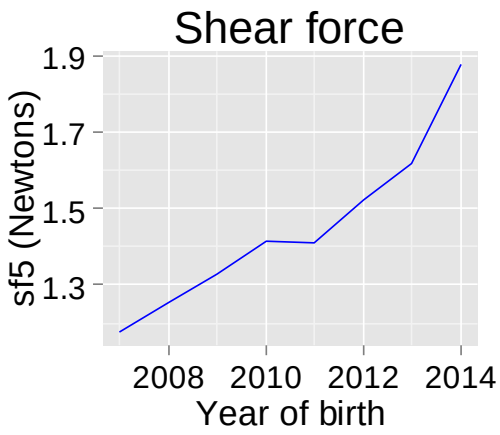












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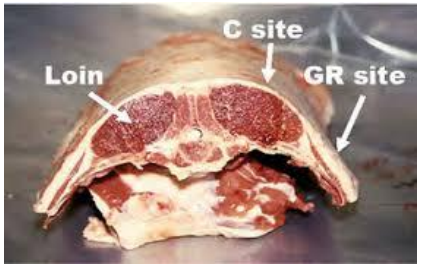
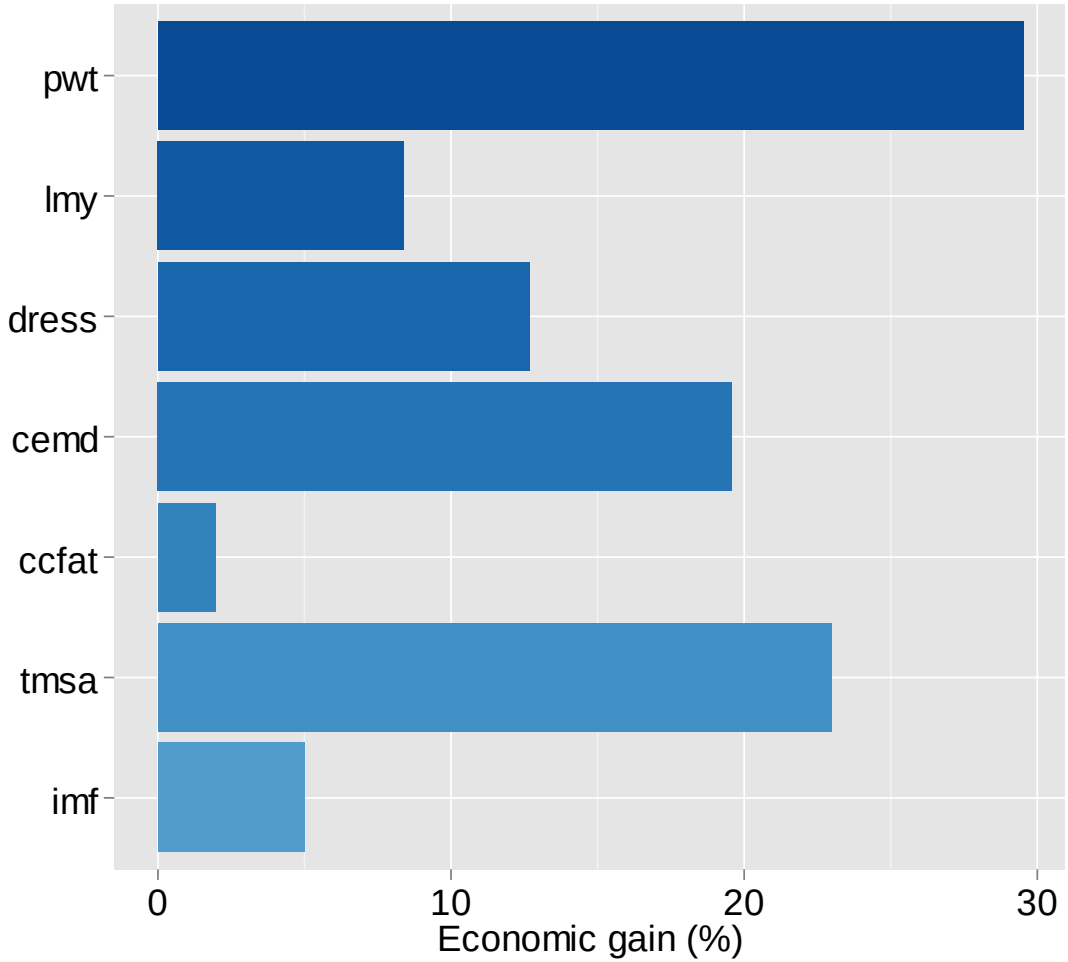
How to get ASBVs for carcass and E.Q.

- Need linkages to the genomic resource population
- Use sires who have been genotyped and progeny tested
- Enter sires for progeny testing
- Genotype your ram selection candidates



WHAT DOES THE INDEX LOOK LIKE?

Predicted trait gains over 10 years



	LMYEQIMF	CPLUS	
pwt	3.14	4.65	(kg)
lmy	0.87	1.91	(%)
dress	1.21	1.49	(%)
cemd	1.17	1.75	(mm)
ccfat	-0.40	-0.59	(mm)
tmsa	1.40	-1.40	(score)
imf	0.08	-0.35	(%)

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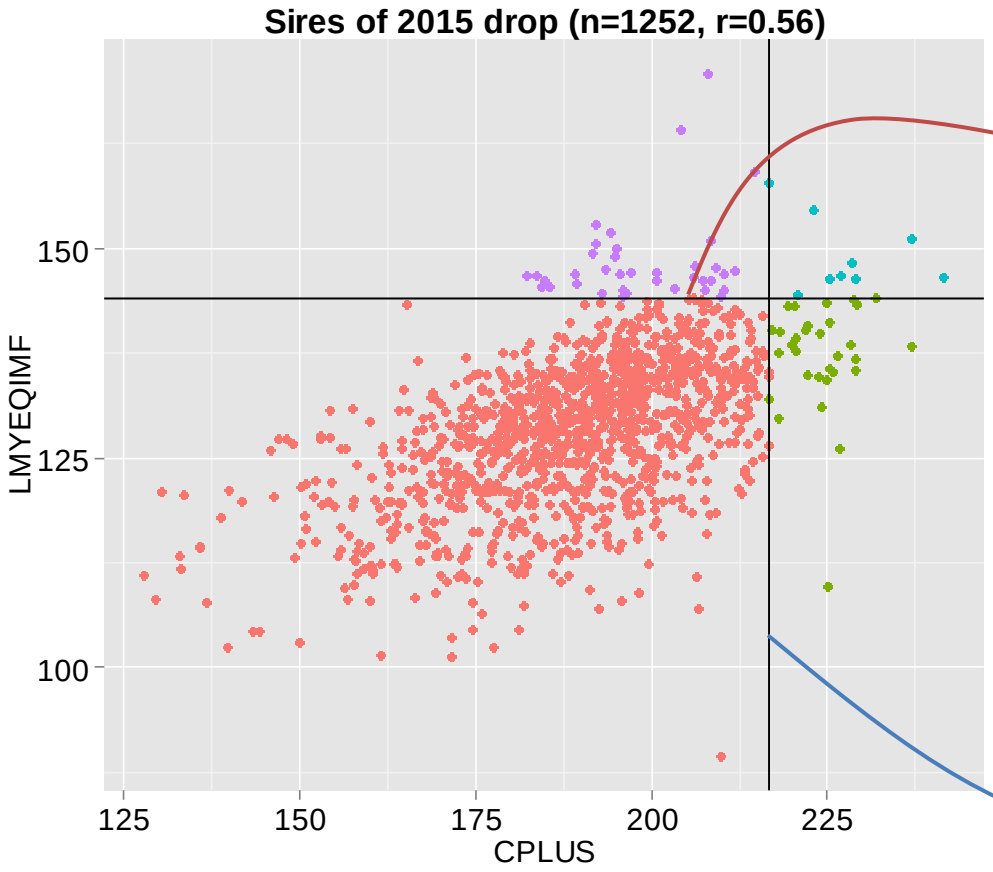
Index comparisons: example 1



Trait means of top 10% on each index

	LMYEQIMF	CPLUS	Mean
pwt	1.39	3.14	13.29
pemd	0.86	1.03	1.94
pfat	0.26	0.20	-0.32
lmy	0.06	0.97	2.24
cemd	0.95	1.00	1.71
ccfat	0.08	-0.08	-0.28
imf	0.28	-0.13	-0.18
sf5	-2.16	1.87	2.56

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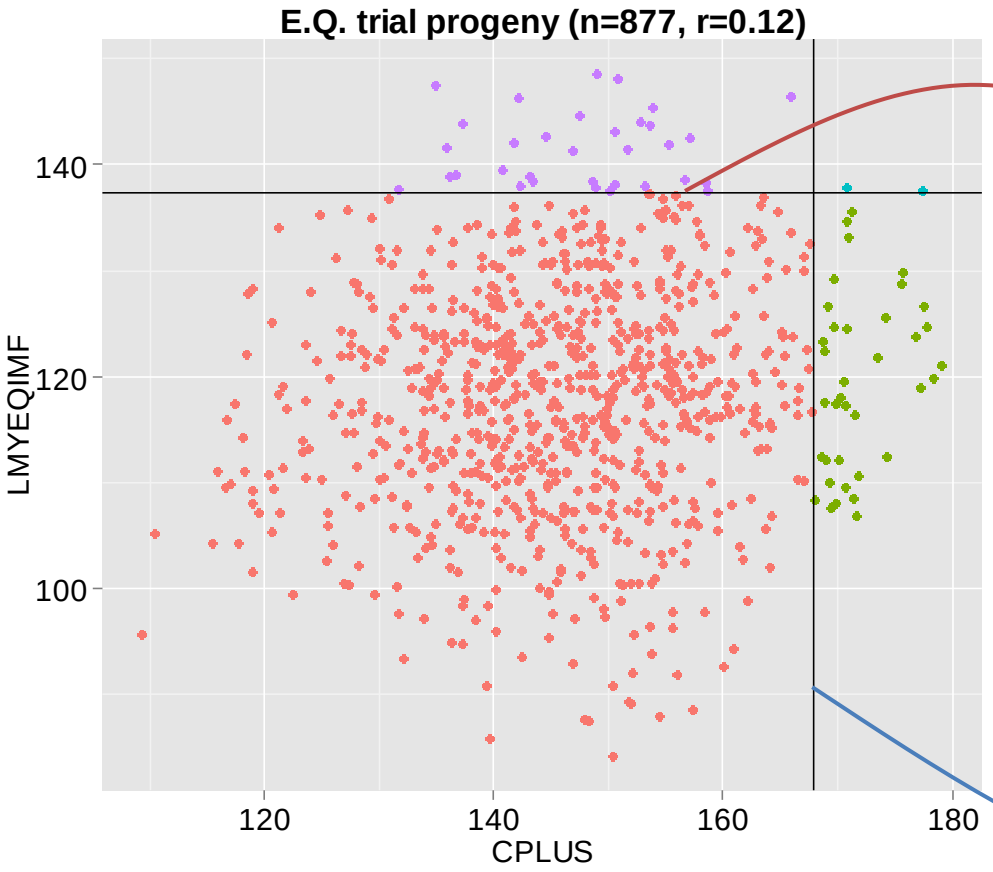
Index comparisons: example 2



Trait means of top 10% on each index

	LMYEQIMF	CPLUS	tmsa
pwt	-0.09	1.97	-0.29
pemd	0.34	1.09	-0.09
pfat	-0.05	0.08	-0.06
lmy	0.29	0.60	-0.02
cemd	0.86	1.11	-0.11
ccfat	-0.26	-0.07	-0.11
imf	0.49	-0.26	0.23
sf5	-3.20	1.57	-1.40
tmsa	**1.04**	**-0.01**	**4.71**

If we could select directly on eating quality

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The bottom line

- Focussing on increased yield leads to a decline in eating quality
- The resource established by the Sheep CRC, its partners and MLA has given us the tools to improve eating quality
- Antagonistic relationships between traits means large gains in both yield and eating quality are unrealistic
- Joint improvement is possible, optimised through use of the index
- To get the most out of the index breeders need to be linked to the reference flock via genotyping and progeny testing