Methane impacts in Merino indexes

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AGBU Summit 2023

High Rainfall

Lamb Production

High Quality Wool

Low Rainfall
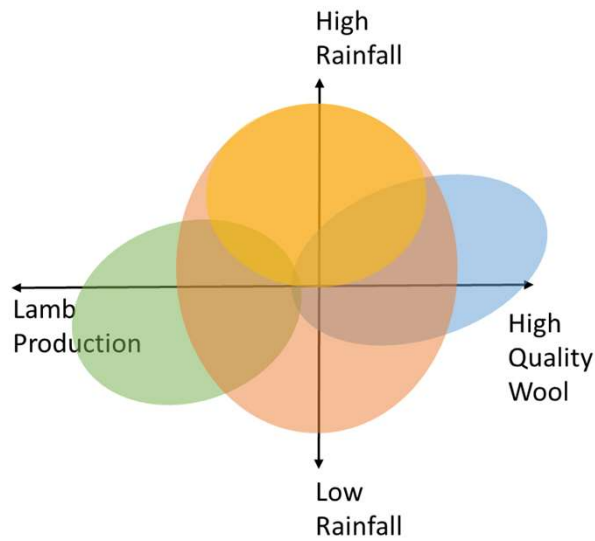
Trait	Maternal + Lamb	Sustainable Merino	Sustainable Merino - HR	Wool Production	Fine Wool
Clean fleece weight	●●	●●●	●●●	●●●●	●●●
Fibre diameter	●	●	●	●●	●●●
Lamb growth	●●●	●●	●●	●	●
Carcase composition	●●	●	●		
Adult weight	-●	-●	-●	-●	-●
Worm egg count			●●		●
Reproduction	●●●	●●	●●	●	●
Breech wrinkle	●●	●●	●●	●●	●●
Dag			●●		
Condition score	●●	●	●	●	●

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Evolution of sheep indexes

Wool

Lambs

Growth

Health and welfare

Resilience

Sustainability

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Advances in ASBVs

- Genomic evaluations
- Carcass and EQ traits
- New repro ASBVs
- Updated genetic parameters
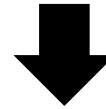- Methane and feed efficiency

2017   2020   2023

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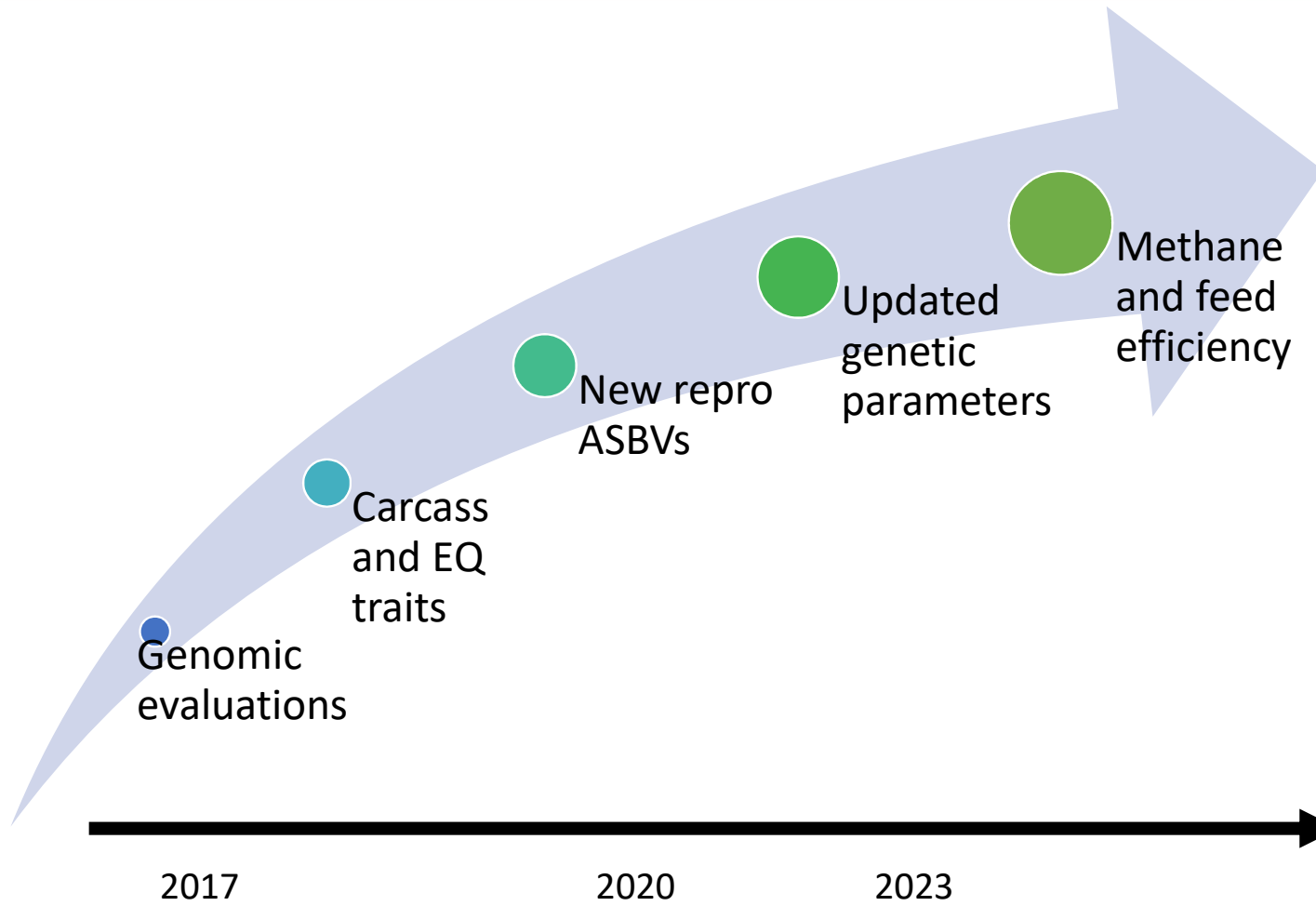
SheepObject 3

Improved modelling in SheepObject 3

- Flock modelling

- Feed requirements and costing

- Reproduction components

- Resilience and body condition

- Methane modelling

Flock structure inputs

↓

SheepObject 3.0

Build a flock over 10 years

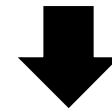Complete history

Reflects reproduction and mortality inputs

Provides full flock structure for year evaluated
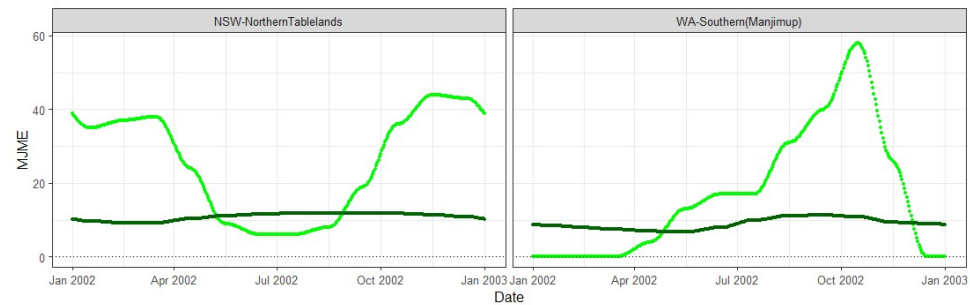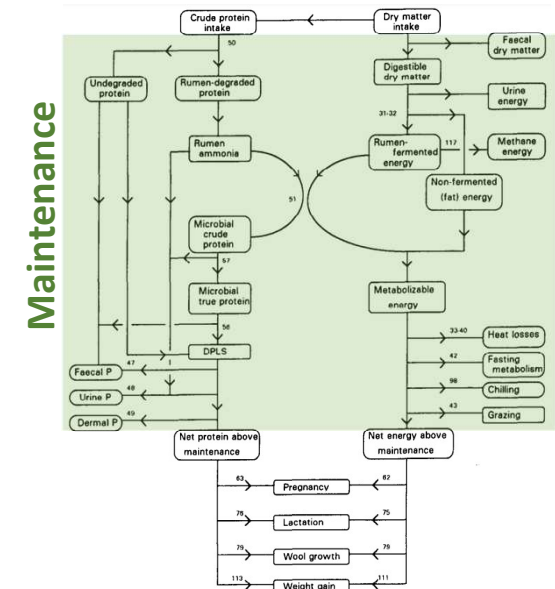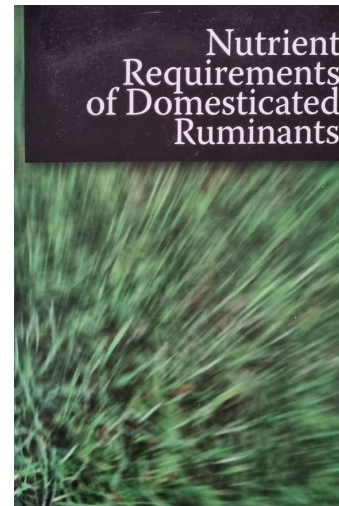
On every day for every sheep we know

- Age (variation in DOB)
- Birth and rearing type
- Dam's age
- Previous reproductive status
- Reproductive status

↓

- Cull on age, preg scan, etc
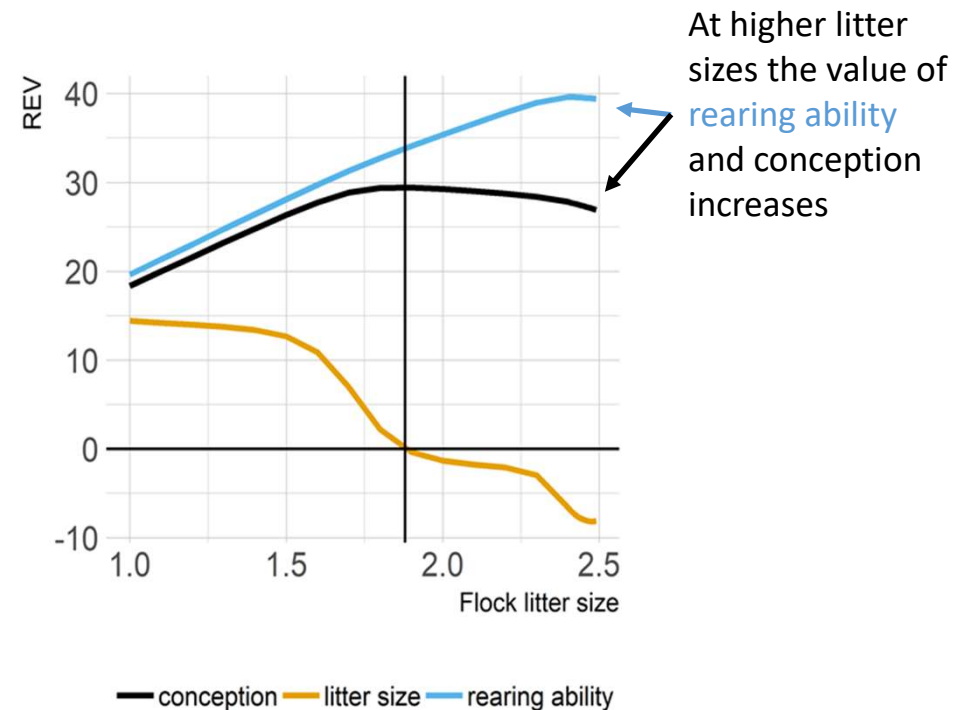- Shearing
- Sell lambs
- Animal husbandry
- Feeding

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Improved modelling in SheepObject 3

- Flock modelling

- **Feed requirements and costing**

- Reproduction components

- Resilience and body condition

- Methane prediction

Improved modelling in SheepObject 3

- Flock modelling

- Feed requirements and costing

- **Reproduction components**

- Resilience and body condition

- Methane prediction

At higher litter sizes the value of rearing ability and conception increases

Improved modelling in SheepObject 3

- Flock modelling

- Feed requirements and costing

- Reproduction components

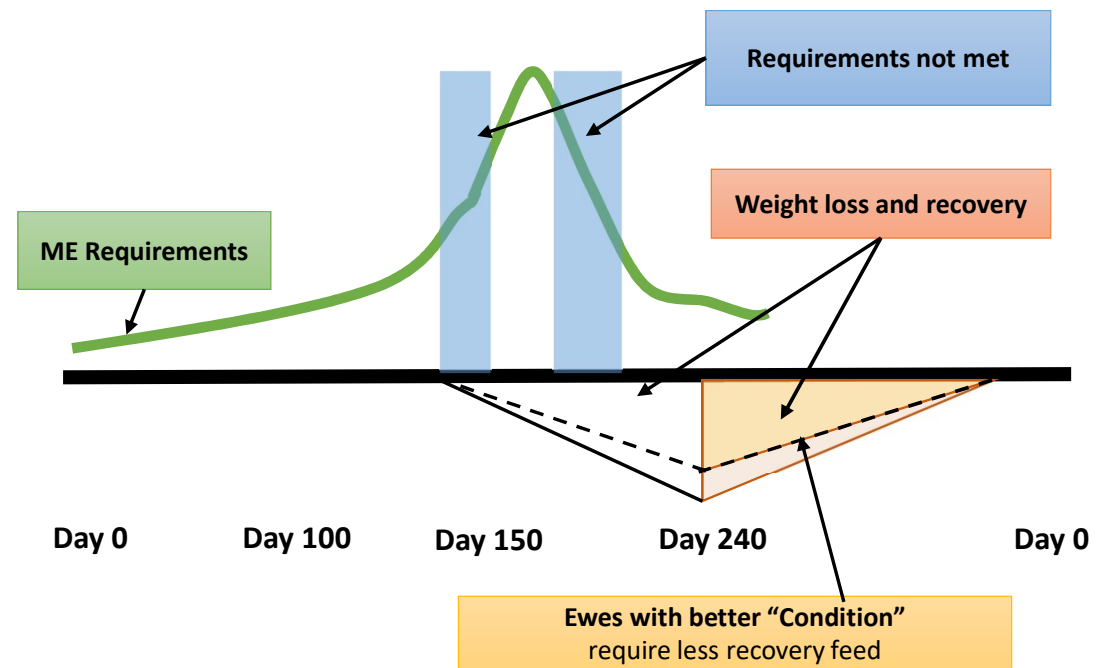- **Resilience and body condition**

- Methane prediction

Requirements not met

ME Requirements

Weight loss and recovery

Day 0   Day 100   Day 150   Day 240   Day 0

Ewes with better "Condition"
require less recovery feed

Body condition in ewes   Carcass yield and EQ in lambs

Improved modelling in SheepObject 3

- Flock modelling

- Feed requirements and costing

- Reproduction components

- Resilience and body condition

- **Methane prediction**

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Prediction of enteric methane emissions by sheep using an intercontinental database

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- Intake, diet digestibility, body weight
- Young versus adult sheep

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Methane outcomes in the SM index

Sustainable Merino index

Trait	Sustainable Merino
Clean fleece weight	●●●
Fibre diameter	●
Lamb growth	●●
Carcase composition	●
Adult weight	-●
Worm egg count	
Reproduction	●●
Breech wrinkle	●●
Dag	
Condition score	●

Key production system assumptions:

- Wethers sold as finished lambs at 10mo

- 65kg mature ewe size

- 6kg adult greasy fleece weight

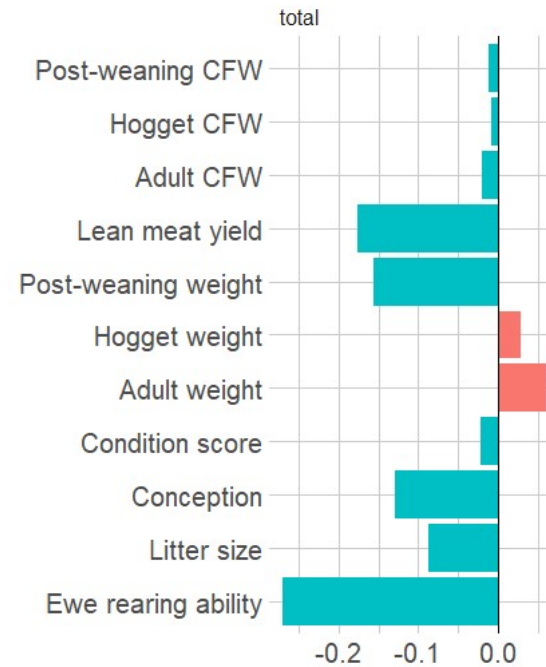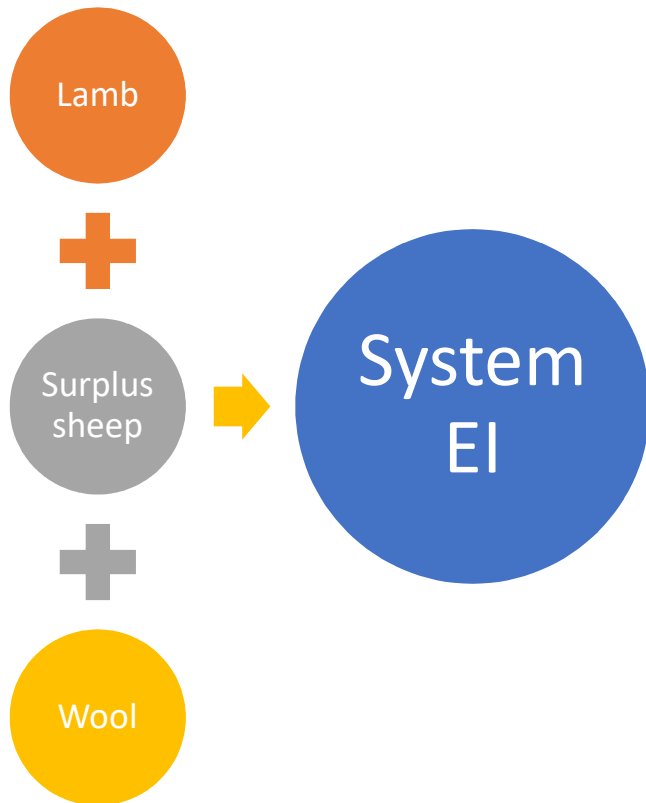- Ratio of wool:meat income of 46:54

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Impact of trait changes on methane production
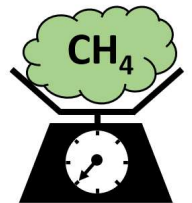
Trait	Methane production per ewe
Fleece weight	↔
Post-weaning weight	↑
Hogget/Adult weight	↑
Condition score	↓
Conception	↑↑↑↑
Litter size	↑↑
Ewe rearing ability	↑↑↑

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Methane intensity

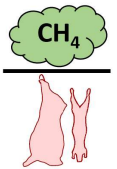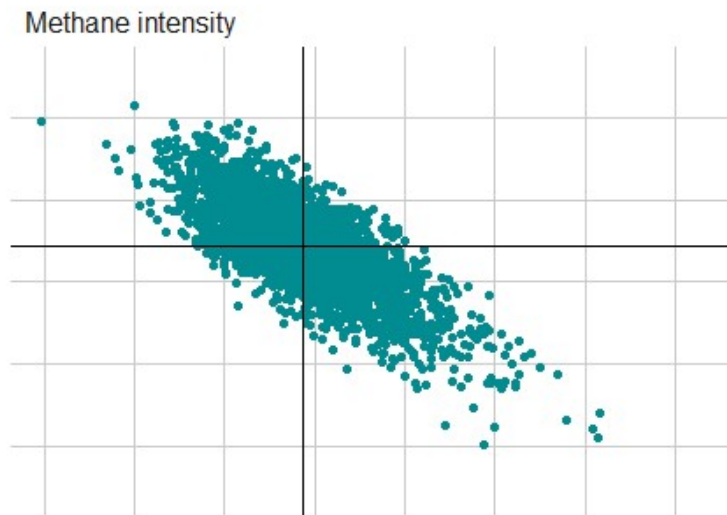Methane per kg of product → change for each trait relative to base flock
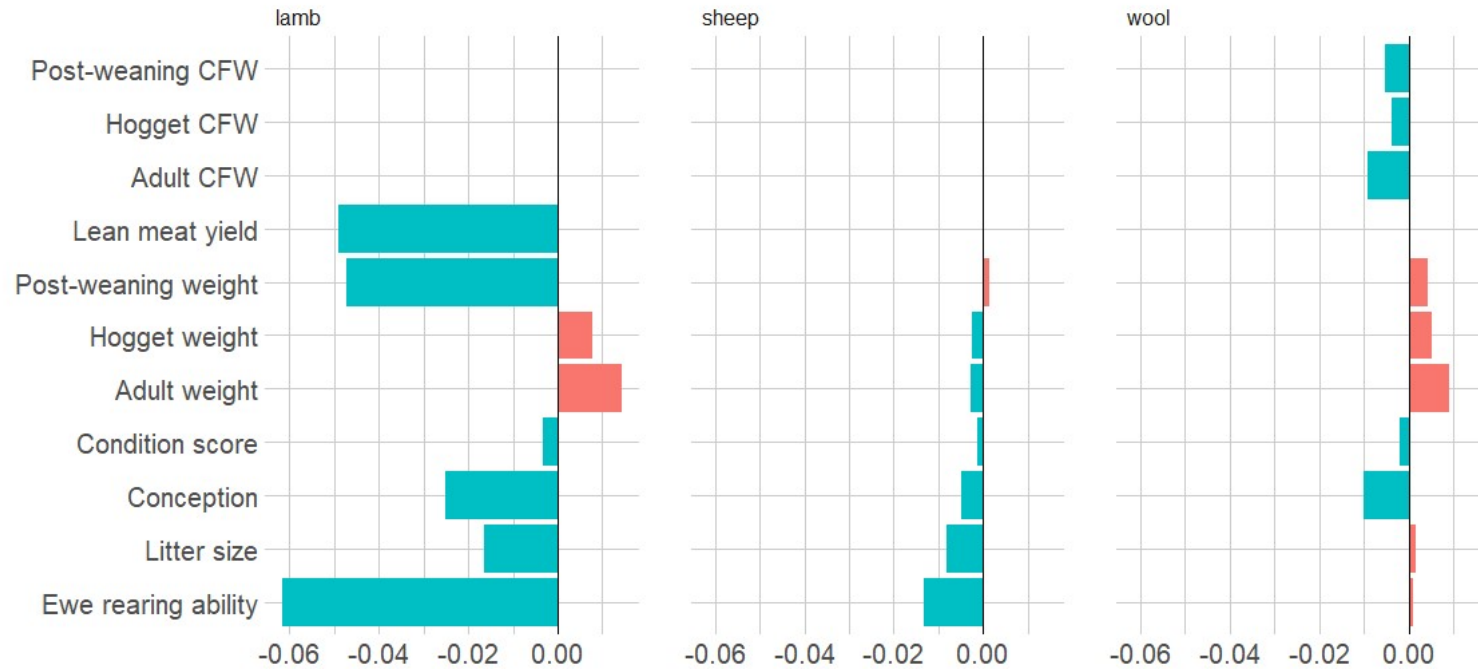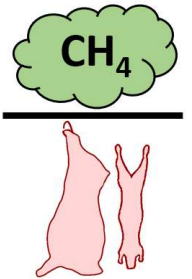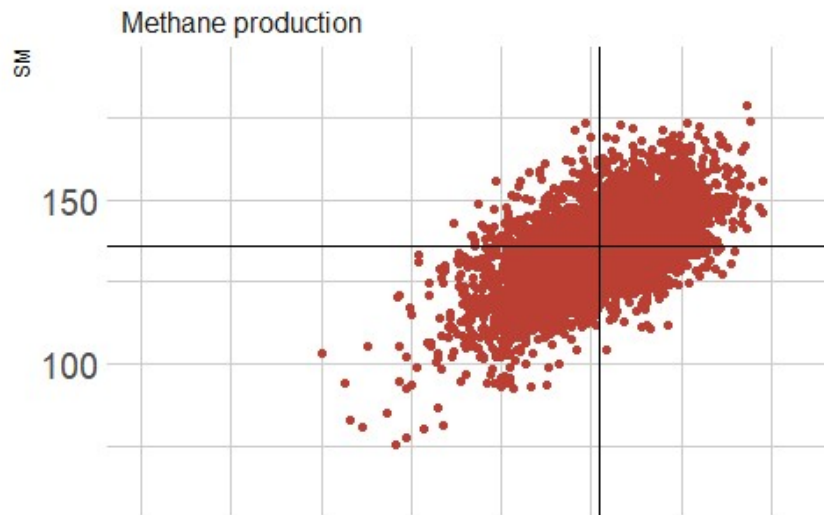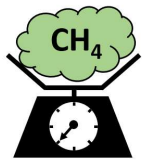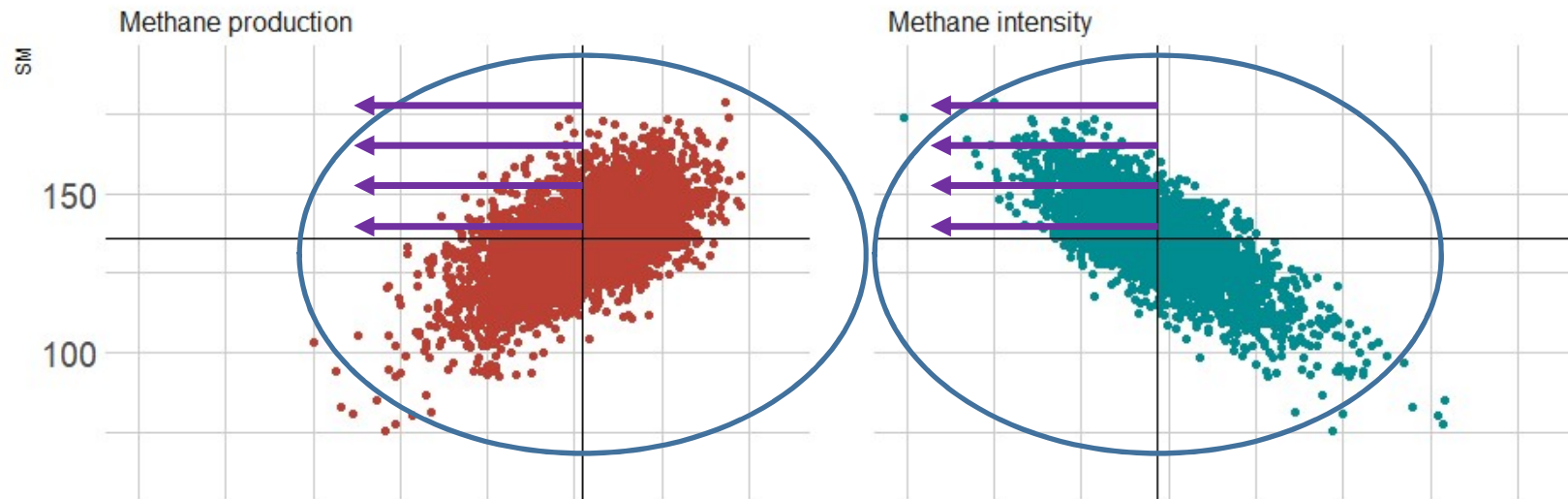
Total methane intensity
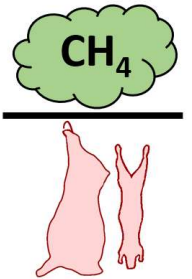
Methane sub-indexes

SM index values for current MERINOSELECT sires versus methane sub-index values

Current indexes increase methane per head but are improving methane intensity

...with methane EBVs

Pathways to reduced emissions

Without methane ASBVs	With methane ASBVs
Include carbon price in current indexes	Economic value for methane
Smaller, less fertile sheep *versus* reduce sheep numbers	Select low methane sheep with the same or better productivity

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Summary

- SheepObject has the capacity to address methane emissions

- Current indexes are improving emissions intensity but increasing methane per head

- Phenotyping remains the key

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