How much impact is genetics having on carcass quality and eating quality

12th September 2022, MII Meeting

Importance of lamb performance

Replacement

Health 1%
Production 27%
Maternal 36%
Lambing 36%
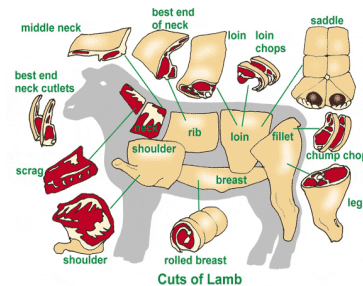
Terminal

Health 2%
Lambing 42%
Production 56%
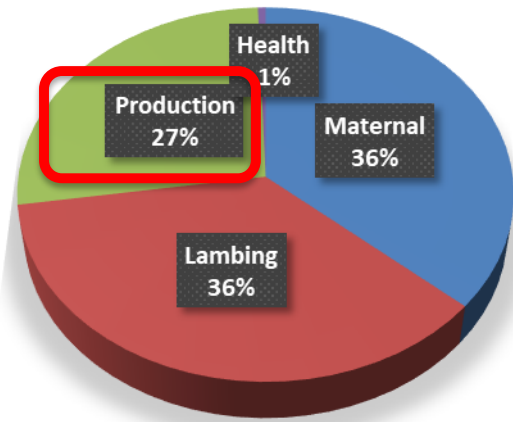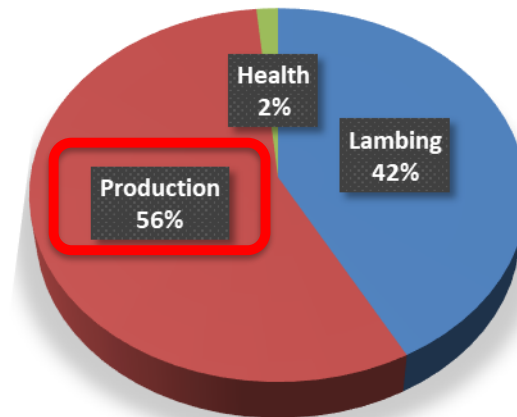
Days to slaughter
Carcass conformation
Carcass fat

3

Importance of lamb performance

40 day weight

Birth weight

Weaning weight

Ultrasound Scanning
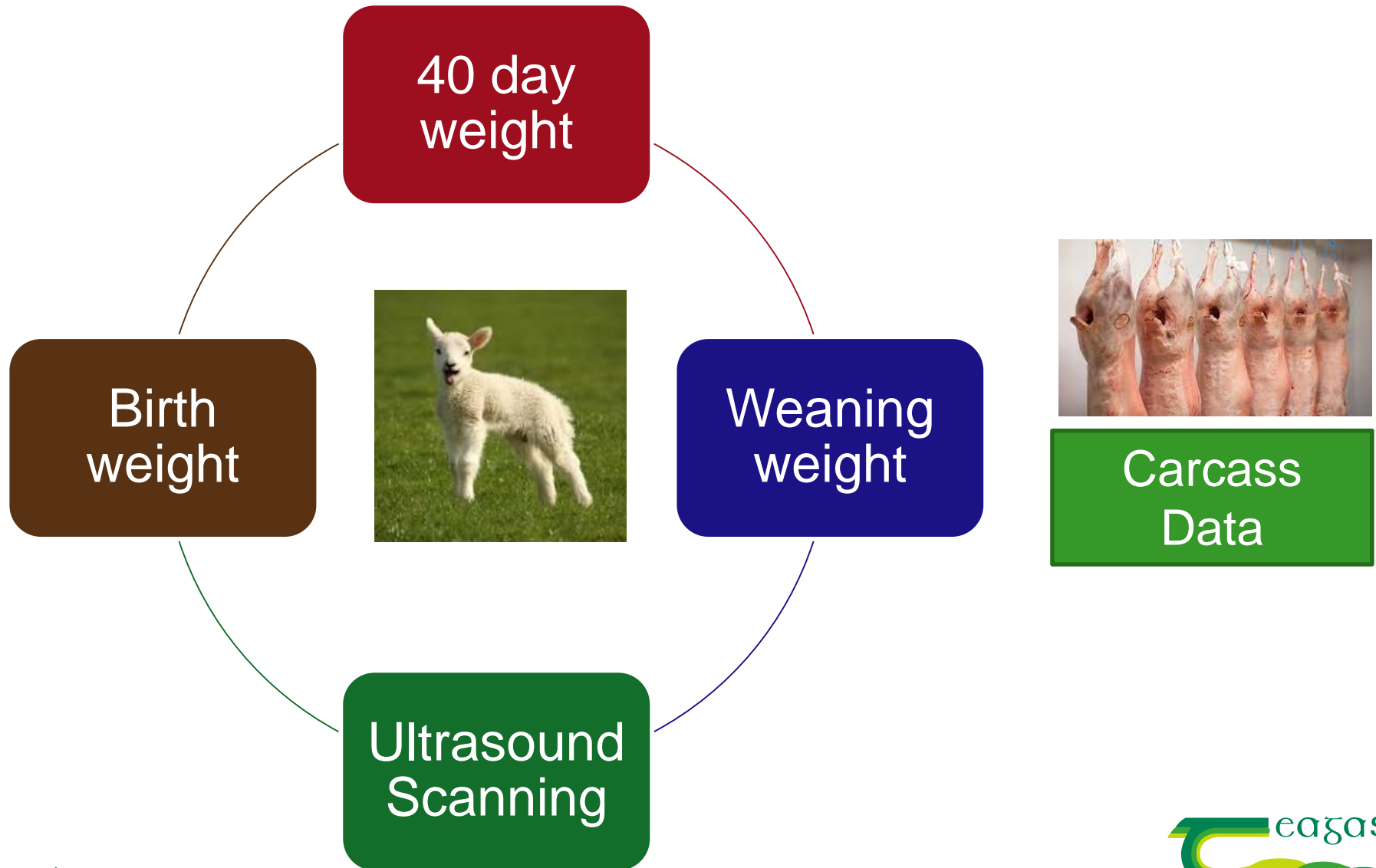
Carcass Data

Objective

Update lamb performance module to include new carcass data

Carcass Data

- 15,714 lambs slaughtered

- 38 commercial flocks

- 8 factories

Carcass Information:

%	E	U	R	O	P
1	0	0	0.03	0.01	0.05
2	0.03	14.64	32.58	0.31	0.01
3	0.10	20.83	28.66	0.46	0.01
4	0	0.66	1.53	0.01	0
5	0	0	0.08	0	0

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Carcass In Spec Trait

- In Spec:
  - Carcass weight (16 to 21 kg)
  - Carcass conformation (E, U, R)

%	E	U	R	O	P
1	0	0	0.03	0.01	0.05
2	0.03	14.64	32.58	0.31	0.01
3	0.10	20.83	28.66	0.46	0.01
4	0	0.66	1.53	0.01	0
5	0	0	0.08	0	0

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Carcass In Spec Trait

- In Spec:
  - Carcass weight (16 to 21 kg)
  - Carcass conformation (E, U, R)
  - Carcass fat (2 & 3)

%	E	U	R	O	P
1	0	0	0.03	0.01	0.05
4	0	0.66	1.53	0.01	0
5	0	0	0.08	0	0

In Spec for all 3 – 61%

Carcass Data - genetics

1. Are the traits under genetic control?

Trait	Range	Average	Heritability
Carcass weight	15 to 26 kg	20.54 kg	0.14
Carcass conformation	E, U, R, O, P	R	0.19
Carcass fat	1 - 5	2.55	0.09
Days to slaughter	95 to 365	201.62	0.16
Kill out	25 to 55%	45.37%	0.22
In Spec	0/1	61.09%	0.08 (0.02)

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Carcass Data - genetics

2. What's the relationship between carcass and lamb performance traits?

Legend: ■ Carcass weight ■ Carcass conformation ■ Carcass fat ■ Days to slaughter

Correlations:
- Scan muscle & carcass conformation **0.70**
- Scan fat & carcass fat **0.86**
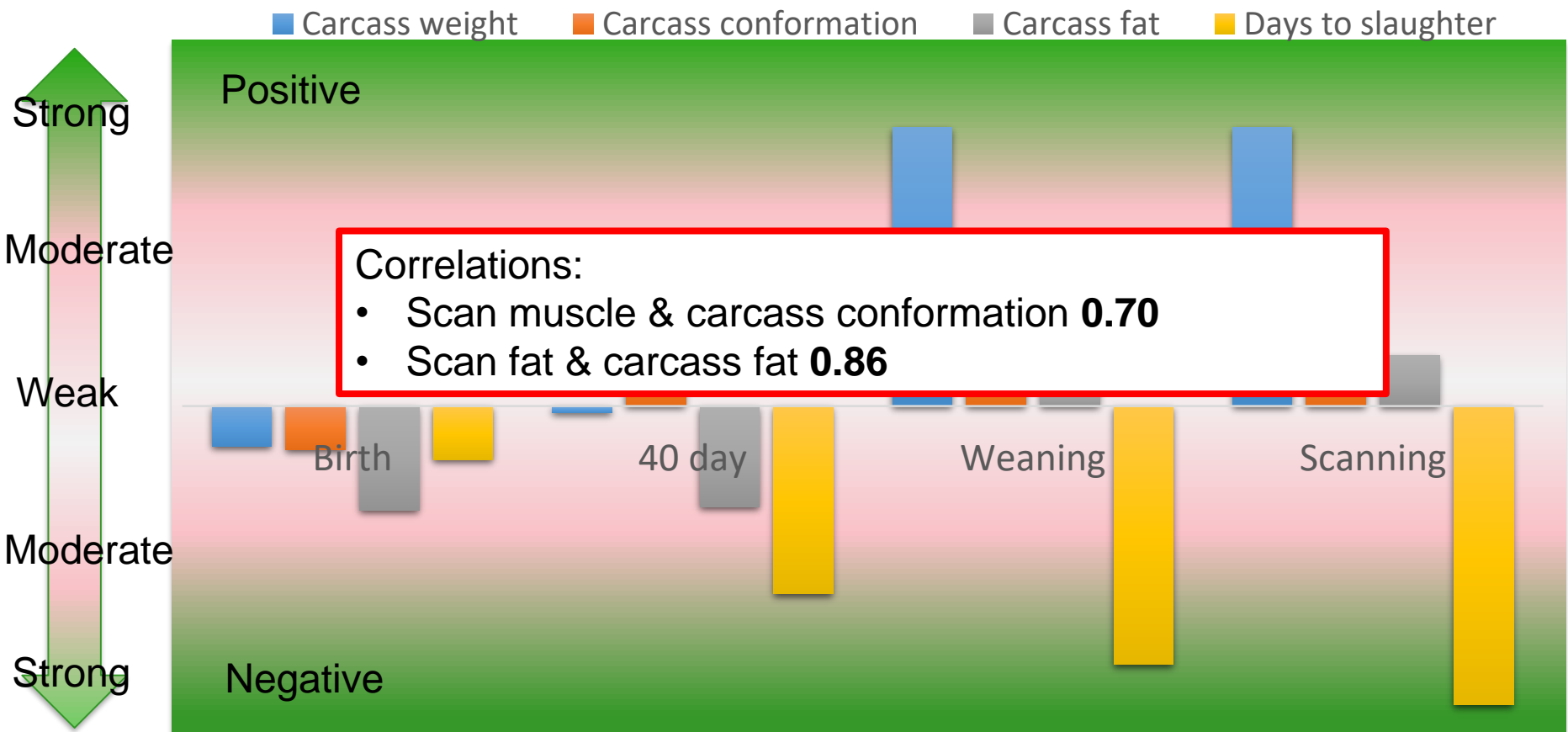
Days to slaughter

Days to Slaughter
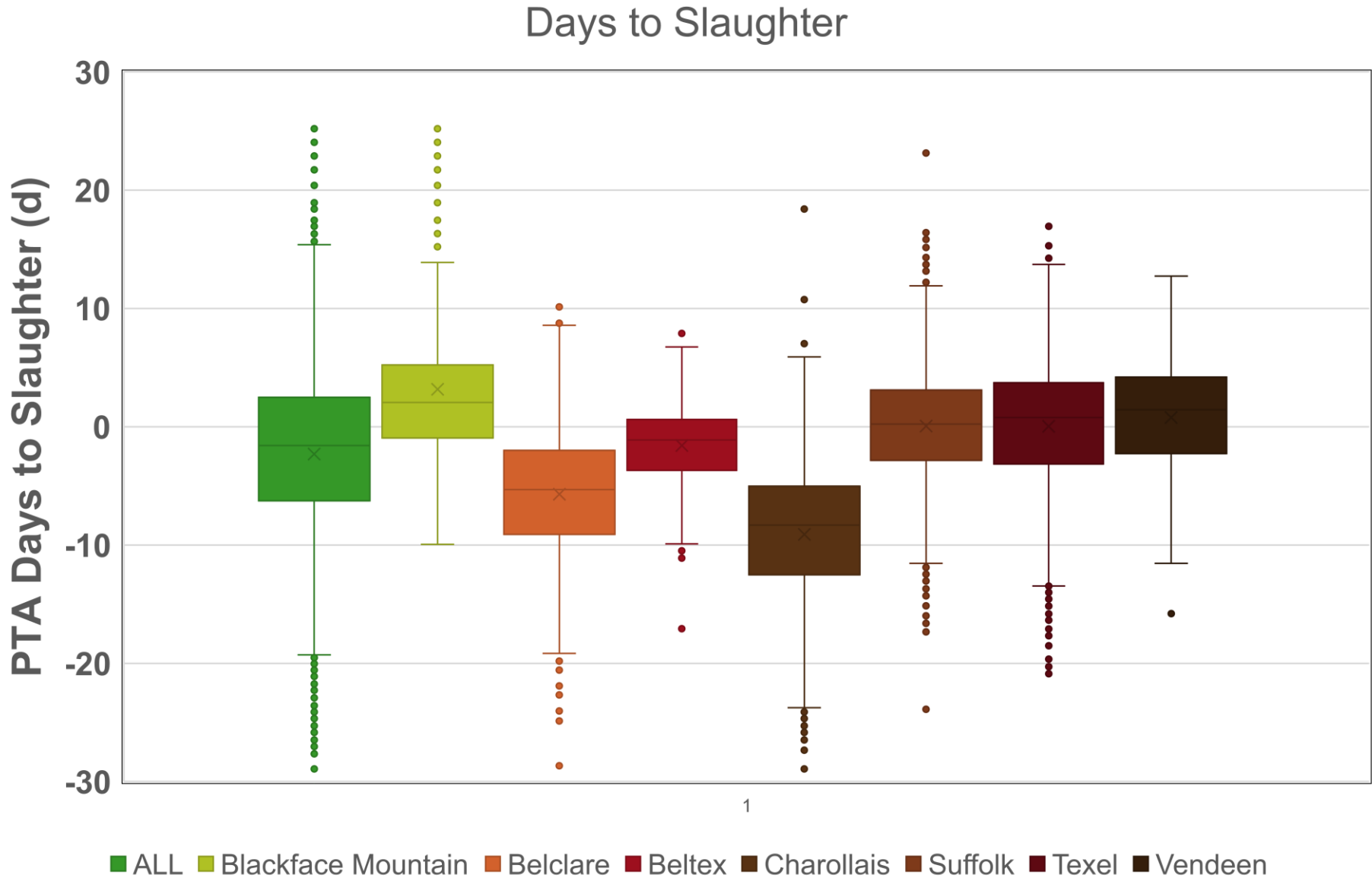
Kill out
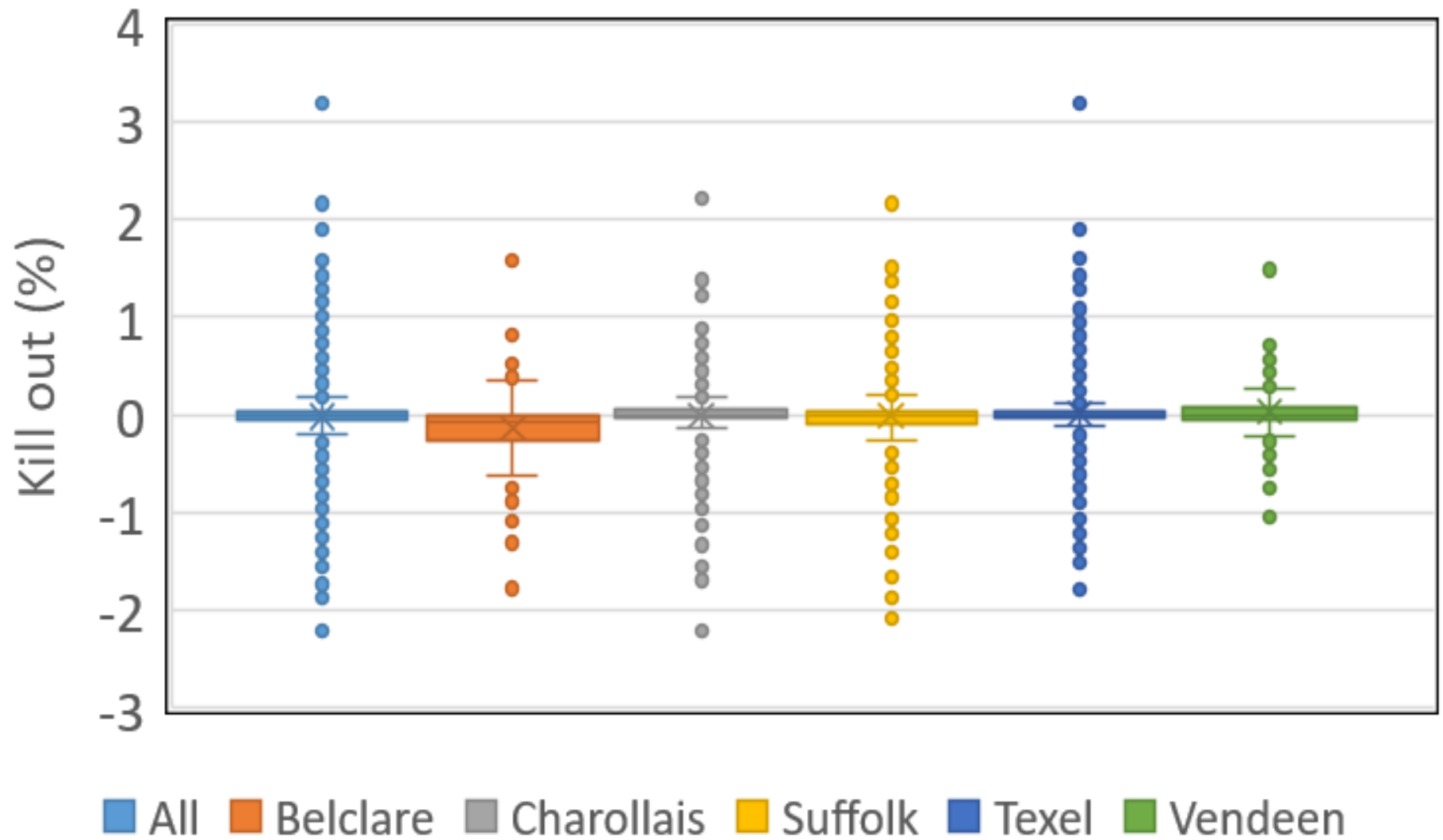
Environmental Impact

Impact on Indexes

Accuracy vs. Number of Progeny
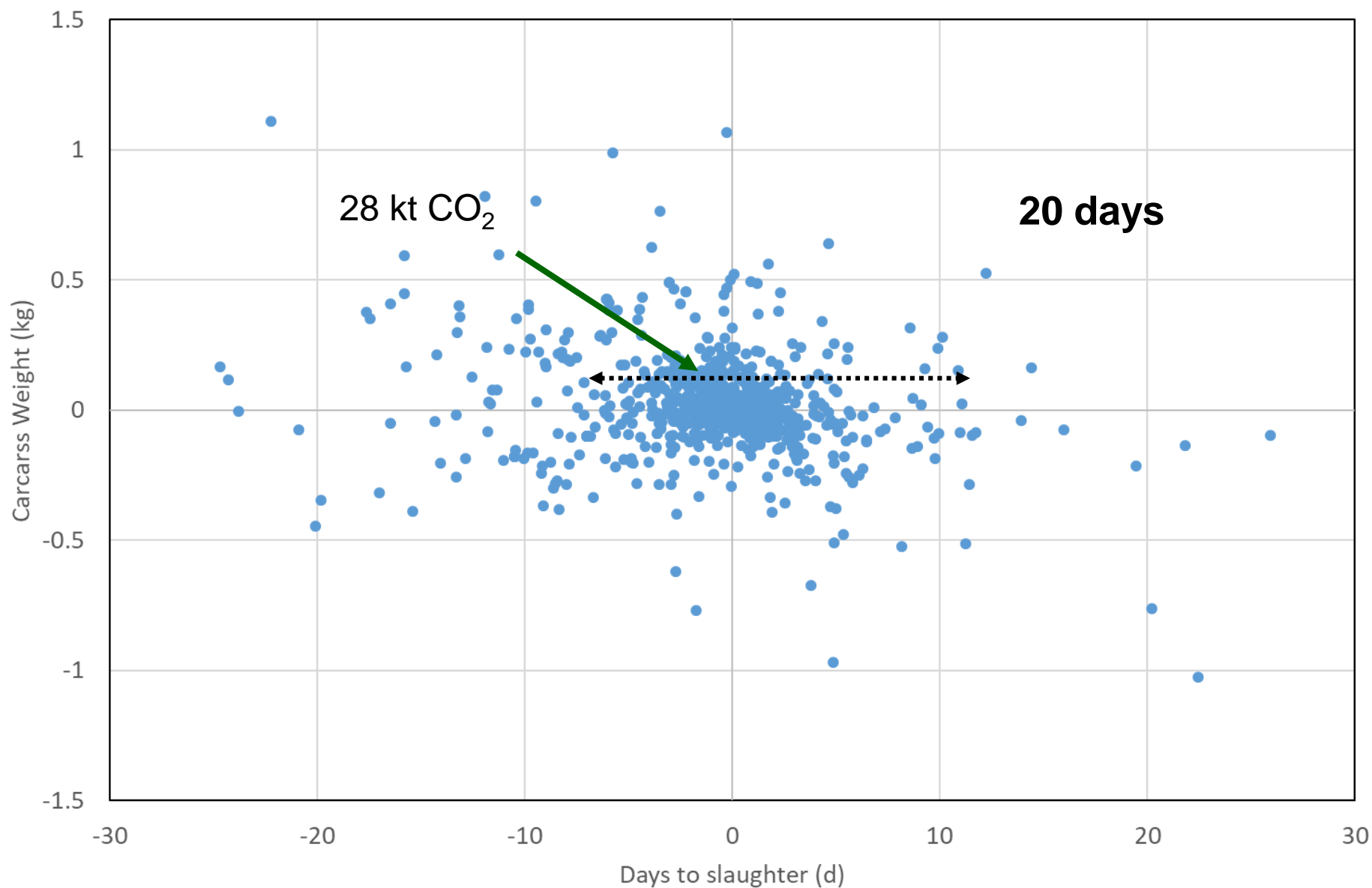
- - - Own LW — ■ — Progeny LW — ■ — Progeny Carcass
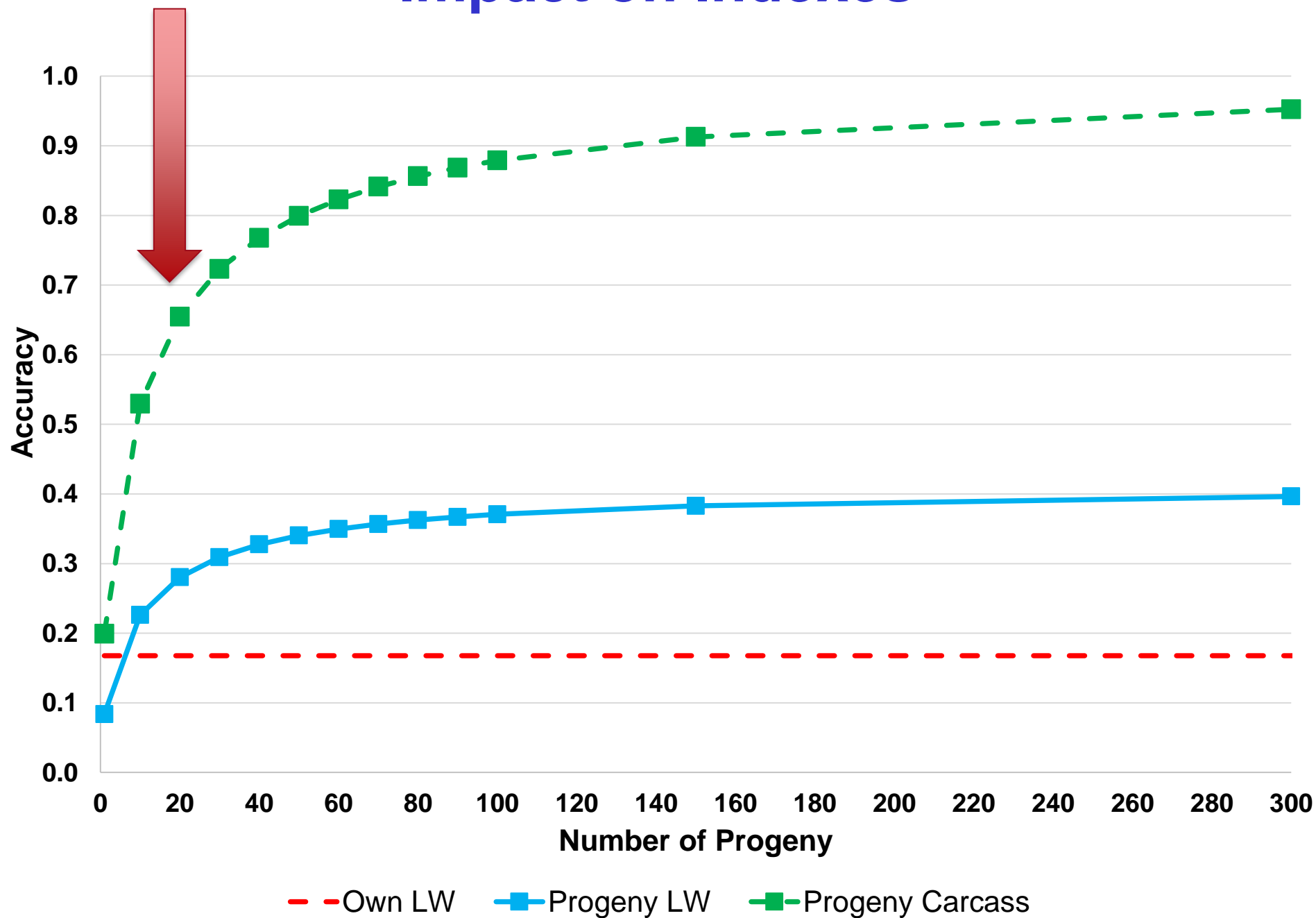
What is the impact of genetic selection on meat eating quality?

INZAC II

What's different:

- **Evaluate new changes to indexes**
  - **Genomic Selection**
  - **Across breed**
  - **Health and carcass data**

- **Carcass data**
  - **subset of lambs from each group slaughtered**

- **Focus on efficiency traits:**
  - **Greenhouse gases**
  - **Feed intake/ efficiency**

E

SU

TX (30)   TX (30)   TX (30)   TX (30)

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Sensory Methods

Objective

- **Identifies and measures attributes of a product**
- **Assessed by selected / trained panel**

Subjective

- **Measures acceptance / preference of a product**
- **Assessed by representative consumers**

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Meat eating quality attributes

Initial tenderness: resistance of meat to molar teeth during first 3 chews

| 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 |

Not tender   **Very tender**

Juiciness: release of liquid from the meat (first 3-4 chews)

| 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 |

Not juicy   **Very juicy**

Chewiness: number of chews to break-down sample for swallowing

| 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 |

Not chewy   **Very chewy**

Overall tenderness: initial tenderness & chewiness (before swallowing)

| 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 |

Not tender   **Very tender**

Lamb flavour: The intensity of lamb flavour perceived while chewing

| 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 |

Not lamby   **Very lamby**

Connective tissue: volume of connective tissue in the sample

None   Slight   Moderate   Severe

Results

	Initial Tenderness	Juiciness	Chewiness	Overall Tenderness	Lamb Flavour
Black	8.38 (0.48)[a]	8.23 (0.49)[a]	2.30 (0.48)[a]	7.82 (0.53)[a]	7.60 (0.49)[a]
Green	7.52 (0.24)[ab]	7.20 (0.25)[b]	2.82 (0.24)[a]	7.31 (0.27)[a]	6.58 (0.25)[b]
Red	7.13 (0.23)[b]	6.67 (0.21)[c]	3.16 (0.23)[ab]	6.83 (0.25)[ab]	6.20 (0.23)[bc]
Blue	7.05 (0.21)[b]	6.52 (0.23)[c]	3.41 (0.21)[b]	6.71 (0.23)[b]	6.06 (0.21)[c]

Conclusions

- Large amounts of carcass data included in indexes

- More accurate evaluations to carcass traits

  - Knock on environmental benefits

- Meat eating quality research underway

  - Preliminary results look very positive!

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Thank you for your attention

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