

Using cow carcass weight to select efficient cows

Getinet M. Tarekegn, Harriet Bunning, Marco Winters, Raphael Mrode, Mike Coffey

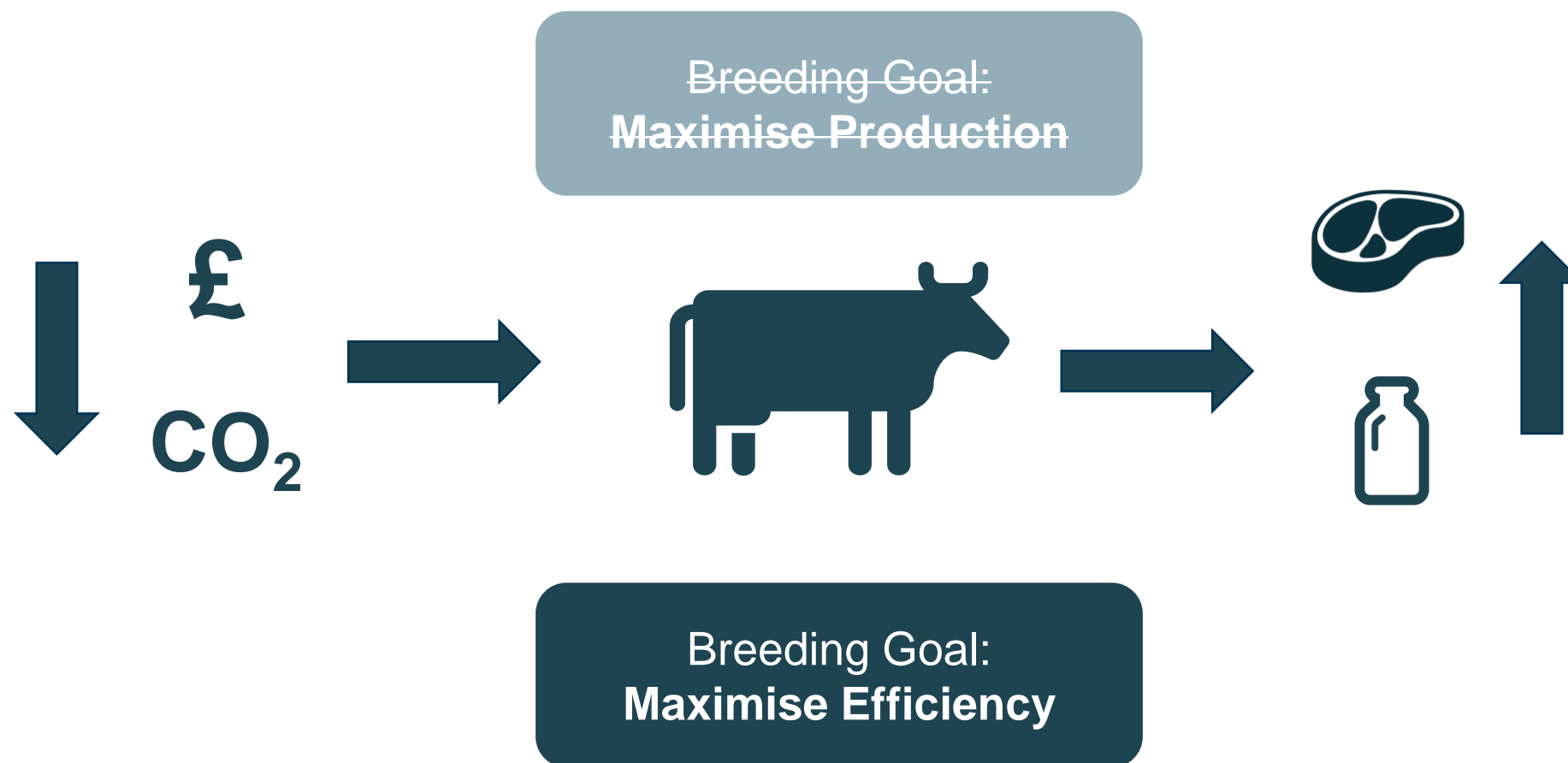


Breeding for Efficiency

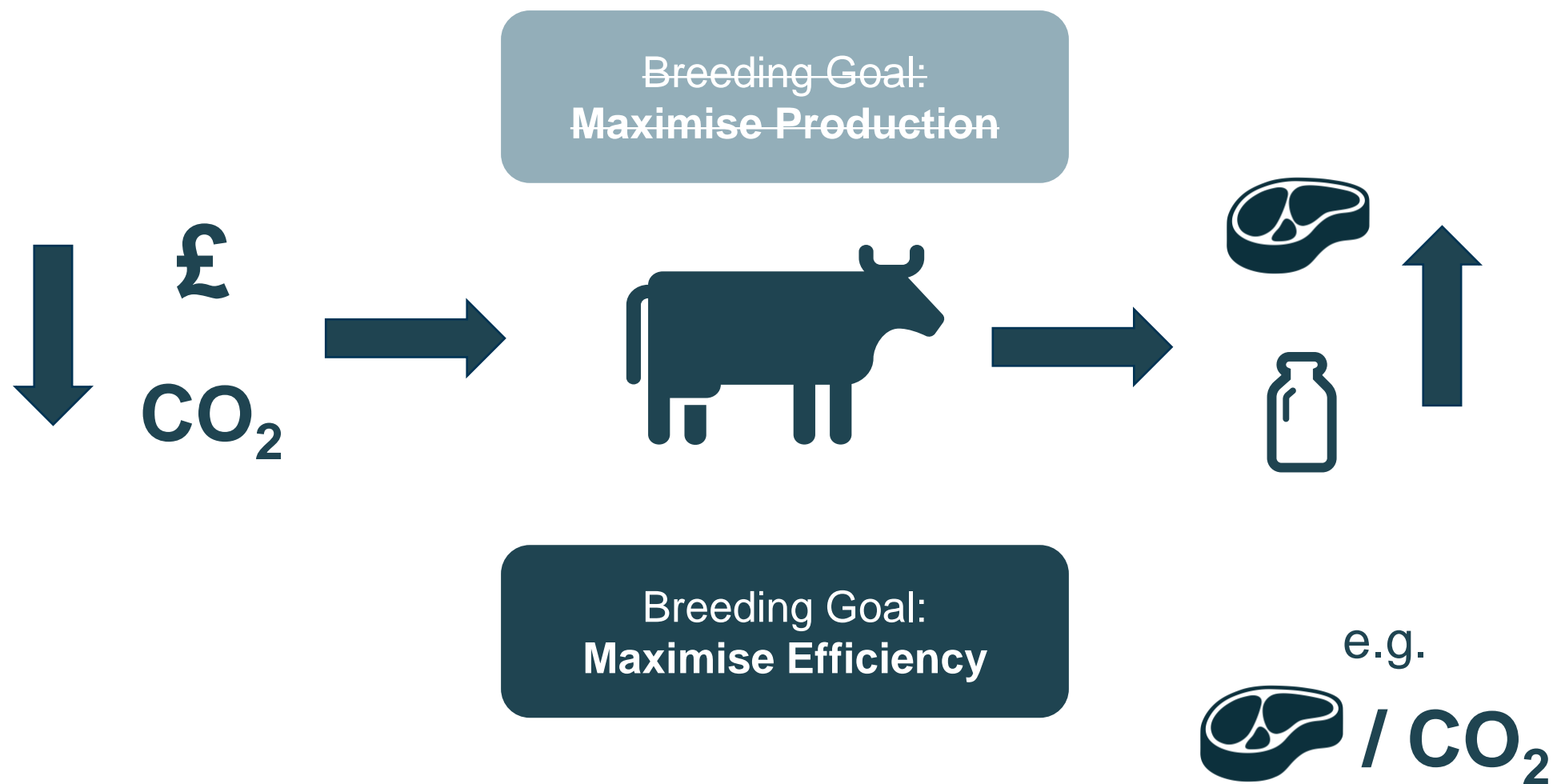
Breeding Goal:
Maximise Production



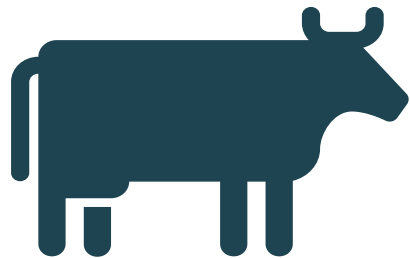
Breeding for Efficiency



Breeding for Efficiency



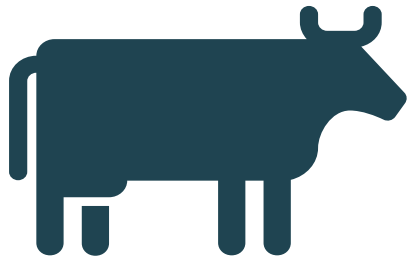
Breeding for Efficiency



How much does it cost (£ or CO₂) to keep a cow?

Ideal phenotype: Dry Matter Intake or Methane

Breeding for Efficiency

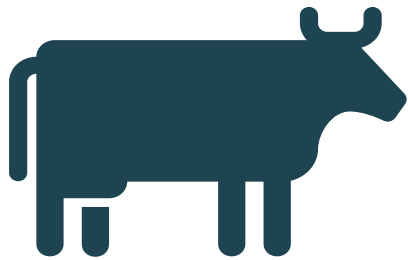


How much does it cost (£ or CO₂) to keep a cow?

Ideal phenotype: Dry Matter Intake or Methane

Potential proxy: Cow Weight

Breeding for Efficiency



How much does it cost (£ or CO₂) to keep a cow?

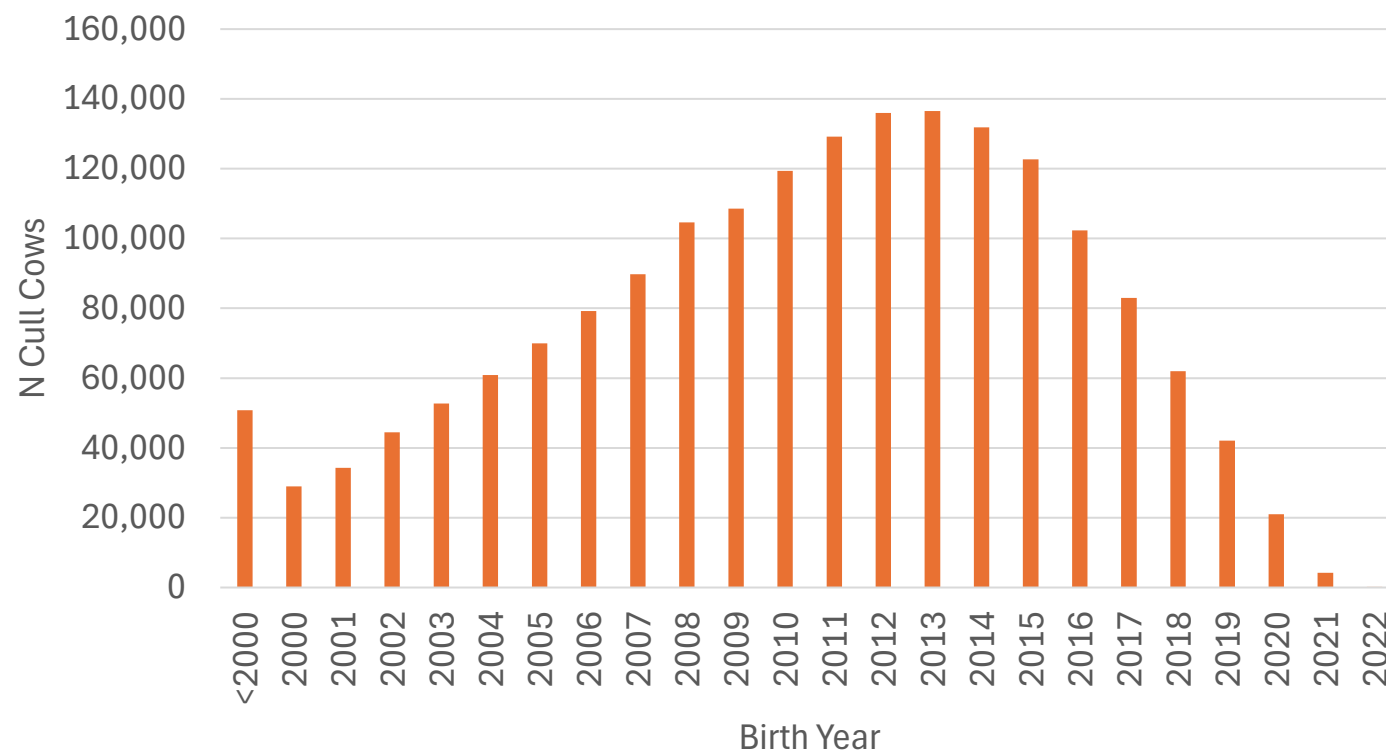
Ideal phenotype: Dry Matter Intake or Methane

Potential proxy: Cow Weight

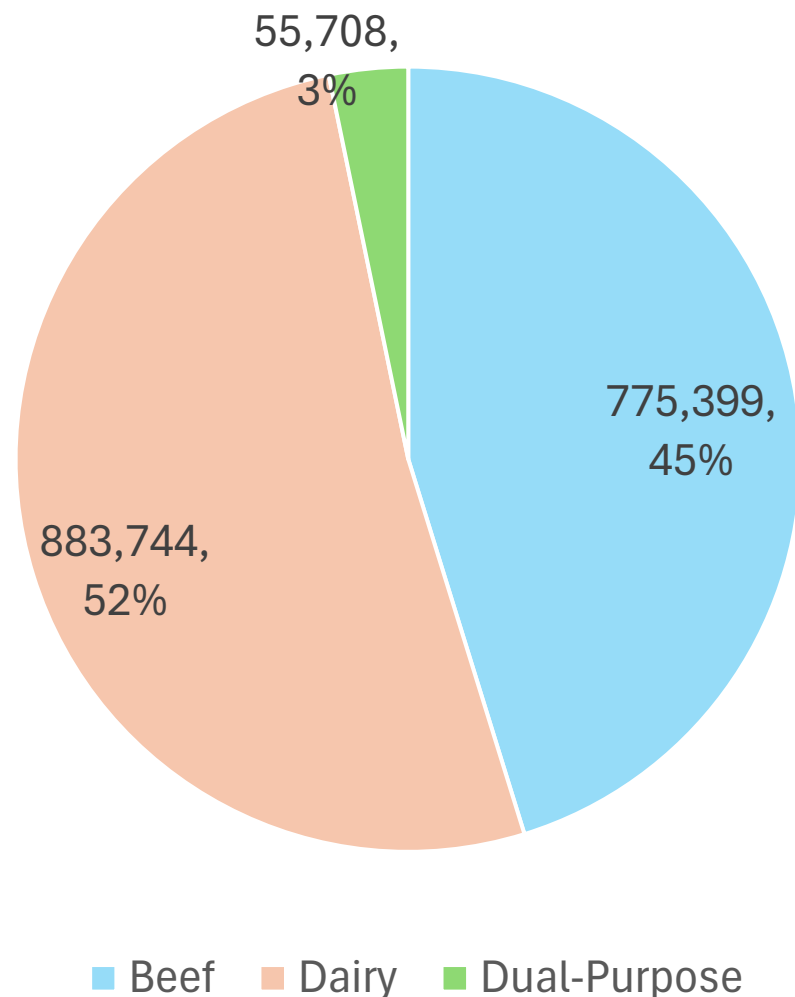
BUT No national liveweight data

Cull Cow Carcasse Data

- UK Carcasse Database: 14.5 million animals
 - Carcasse Weight
 - EUROP Conformation
 - EUROP Fat
 - Date of Slaughter
- >1.8 million cull cows
 - Must have had > 0 calves



Cull Cow Carcass Data: Breeds



- 220 different breed codes
- Inc. crossbred
- Most common:
 - Holstein
 - Lim X
 - Friesian
 - Angus X
 - Simmental X

Aim: Calculate genetic parameters for cull cow carcass traits to check viability for use as proxy traits

Materials & Methods

- Cows 1095 – 7811 days old
 - Carcase weight 275 – 500kg
 - 4991 cows born 1998 – 2010 included
 - 5 generations, pedigree including 32,917 animals
 - 12 breed groups included, with Limousin most common
- Phenotypes:
 - Carcase Weight (kg)
 - EUROP Conformation (45 points)
 - EUROP Fat Class (45 points)

Materials & Methods

$$Y_{ijklmno} = Sr_i + S_j + A_k + CYBSB_l + BYBSB_m + a_n + e_{ijklmno}$$

Where:

- Sr_i = source of the cows
- S_j = Season of birth
- A_k = Age of the cows fitted as covariate
- $CYBSB_l$ = combination of cow-year of birth-season
- $BYBSB_m$ = breed-year of birth-season
- a_n = Animal as Random
- $e_{ijklmno}$ = Residual

The heritability estimates were generated using REMLF90 program of the BLUPF90 family.

Results

Traits	h^2	SE
Carcass Weight	0.79	0.003
EUROP Fat Class	0.36	0.095
EUROP Conformation	0.32	0.081

Results

Traits	h^2	SE
Carcass Weight	0.79	0.003
EUROP Fat Class	0.36	0.095
EUROP Conformation	0.32	0.081

Prime Traits	h^2	SE
Carcass Weight	0.42	0.022
EUROP Fat Class	0.45	0.023
EUROP Conformation	0.42	0.022

Results

Traits	h^2	SE
Carcass Weight	0.79	0.003
EUROP Fat Class	0.36	0.095
EUROP Conformation	0.32	

Higher heritability due to less environmental variation?

Prime Traits	h^2	SE
Carcass Weight	0.42	0.022
EUROP Fat Class	0.45	0.023
EUROP Conformation	0.42	0.022

Conclusion

Traits	h^2	SE
Carcass Weight	0.79	0.003
EUROP Fat Class	0.36	0.095
EUROP Conformation	0.32	0.081

- Preliminary results show moderate to high heritability for cull cow carcass traits
- Good potential target traits for selective breeding

What Next?

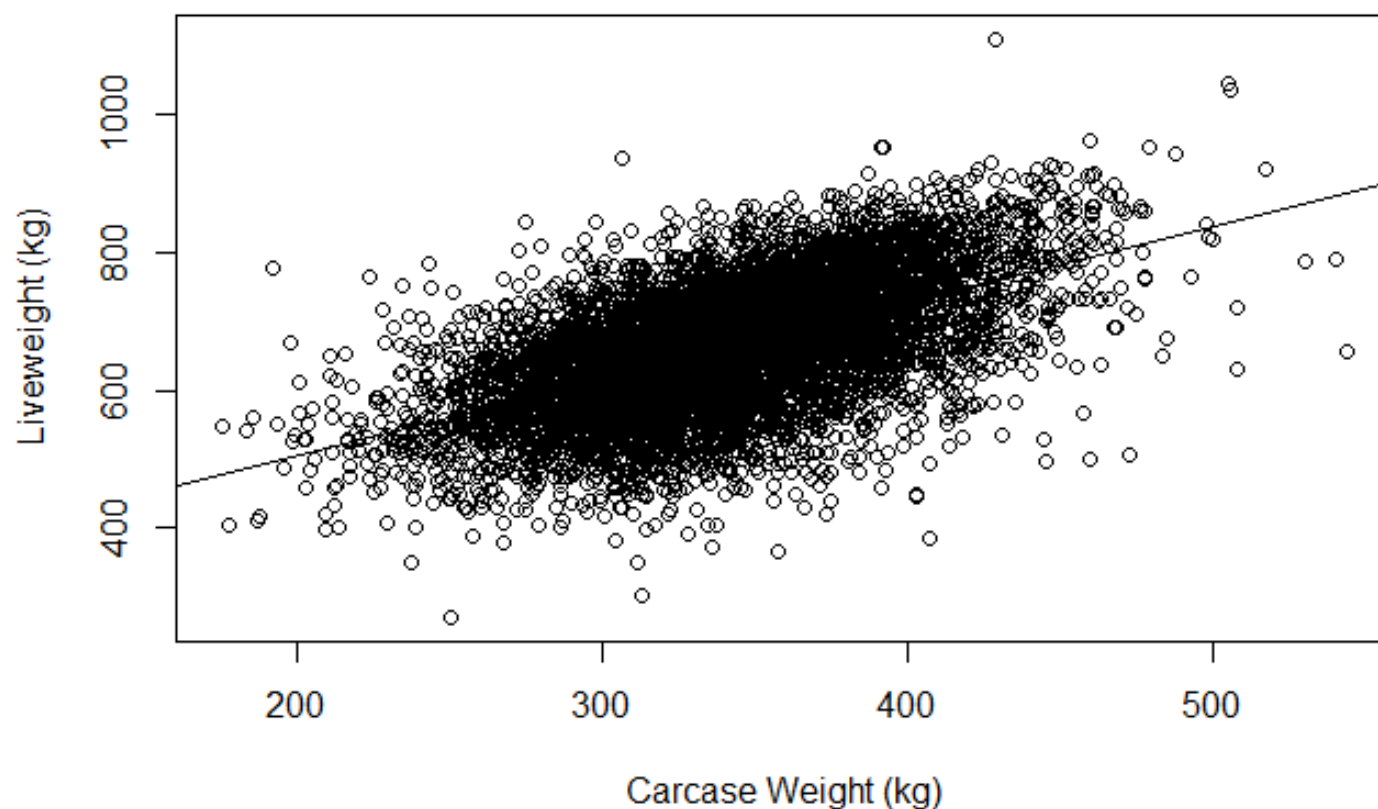
Use these phenotypes to predict liveweight

Options:

1. Use constant killing out percentage (only carcass weight)
2. Use EUROP corrected killing out percentage (carcass weight, conformation & fat)
3. Also use other data (age & days since last calving)

Option 1: Carcase weight alone

Liveweights for Stabiliser cows provided by Stabiliser Cattle Company



Liveweight = $286 + 1.1 * \text{Carcase Weight}$

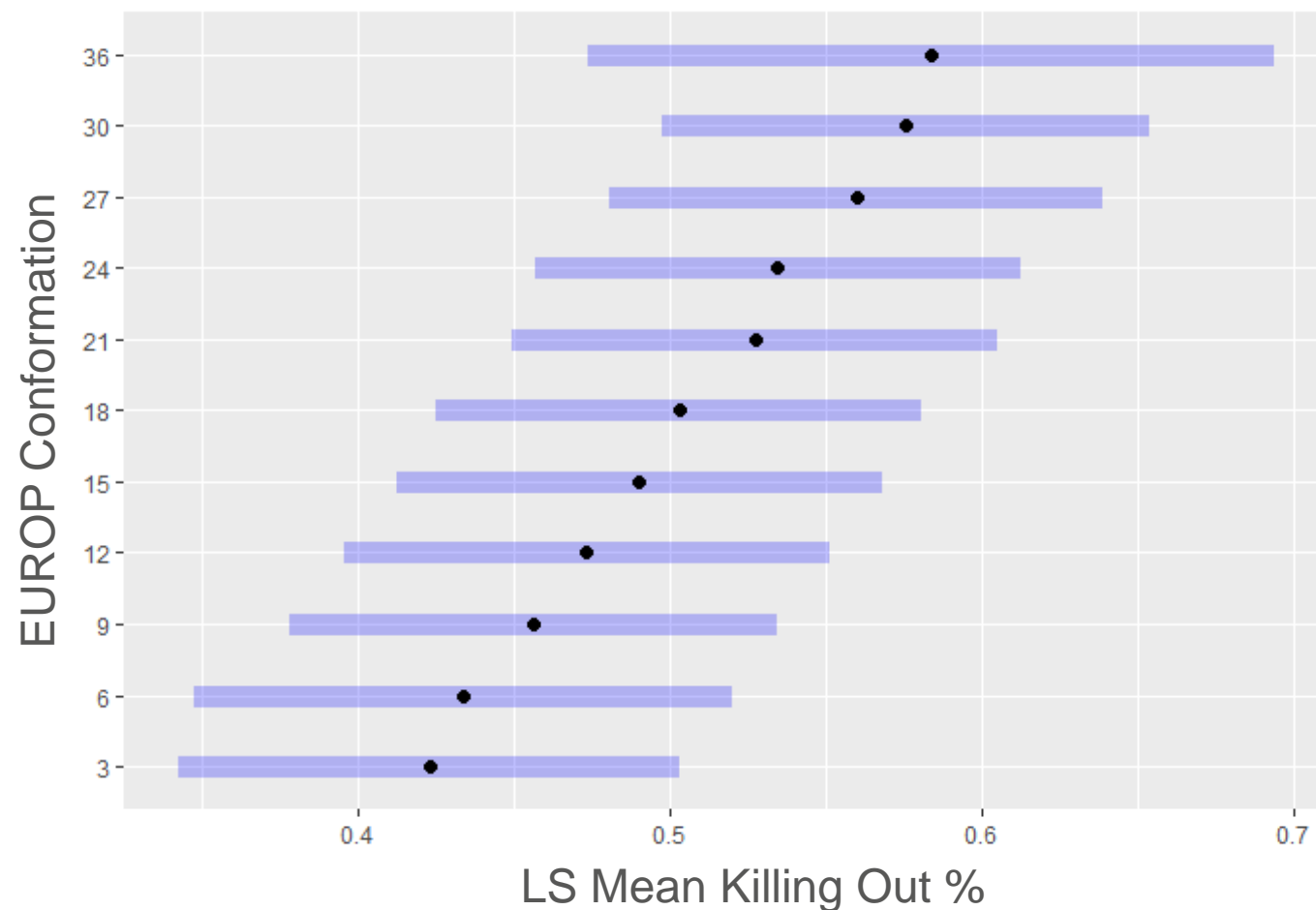
$R^2 = 0.32$

Mean KO% = 52%

Option 2: Include other carcass traits



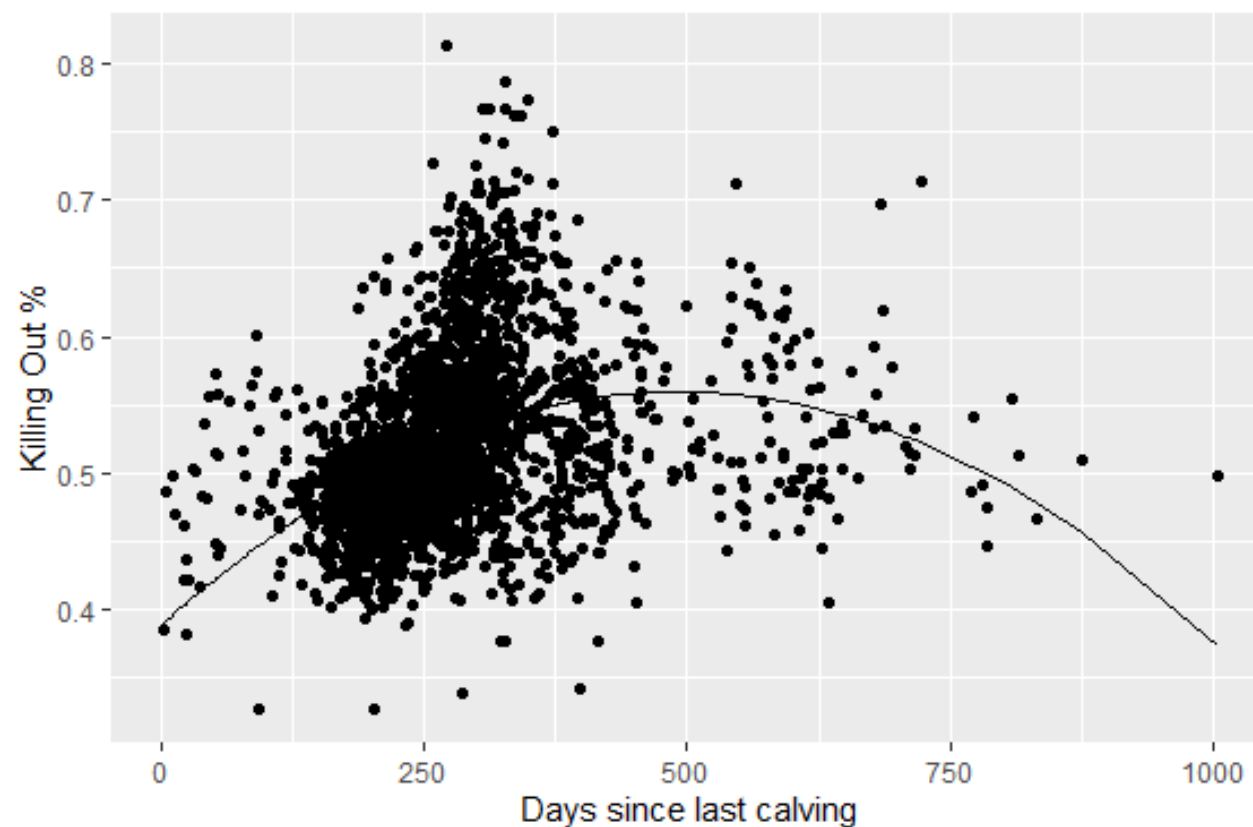
Liveweights for Stabiliser cows provided by Stabiliser Cattle Company



- Preliminary results suggest that both EUROP Conformation and Fat have effects on killing out percentage
- Suggests using more variables to predict liveweight may be better

Option 3: Include other variables

Liveweights for Stabiliser cows provided by Stabiliser Cattle Company



- Preliminary results suggest days since last calving also has an important effect on killing out percentage
- Opportunity for QA e.g. remove animals > 400 days since last calving

What Next?

Use these phenotypes to predict liveweight

Options:

1. Use constant killing out percentage (only carcass weight)
2. Use EUROP corrected killing out percentage (carcass weight, conformation & fat)
3. **Also use other data (age & days since last calving)**

Next: Test prediction model using other breeds

Calculate genetic parameters for predicted liveweight

Summary

- Cull cow carcass data is an untapped source of useful phenotypes
- Cull cow carcass weight is highly heritable
- There is potential to predict cow liveweight using carcass weight
- Other factors (such as EUROP grade, and calving data) may improve this prediction

Cull cow carcass weight could be used as a proxy to select low input cows

Thank you for listening

For more info on UK National Beef Evaluations:

ahdb.org.uk/knowledge-library/national-beef-evaluations

