

# ***Preliminary genetic analysis of beef carcass data***

**Mike Coffey**

**Eileen Wall, Georgios Banos, Rainer Roehe**  
**SAC**

# Background



- Genetic improvement in beef is worth ~ £23m per year (32% return on investment)
- Uptake of EBV's has been slow but is improving
  - Have carcass EBV's but are measured in pedigree animals
- UK is only 65% self sufficient in beef and on a declining trend
- Specialisation of dairy cows has led to less dairy beef and calves being destroyed on-farm

# Background



- Abattoirs collect carcass data that can be used for genetic evaluations
- Evaluations for carcass traits will enable faster and more accurate market signals to flow back to breeders
- These could be used to effect change in the suckler cow herd
- Supermarkets, processors, primary producers and breeders could work on same market signals

# Background



- British Cattle Movement Service (BCMS) data is now available
- Can link abattoir data back to BCMS data
- Pedigrees can be built from these data

# Objectives



- Assess abattoir data quality
- Produce preliminary genetic parameters

- Data was made available from Dovecote Park Abattoir
  - Supply Hereford beef to Waitrose
- 77,825 records were received and 77, 616 were directly matched to BCMS

# Preliminary analysis of abattoir data



- High degree of success on little matching effort
- Could probably be improved substantially and pedigree formed from BCMS records
  - Better with breed society data too
- Matching allowed some simple analysis of phenotypic data
  - Numbers of offspring per sire, average weight of sires offspring, average age at slaughter etc

- 2846 sires
- Some cleaning of sire ID
  - 5 records like ABG0011
  - 1 record like AB50011
  - >Same sire
- 2264 different sires

# Data edits



- Dovecote record matched to an animal in BCMS *and* the BCMS record has an entry for the genetic dam (77,818)
- *plus* that animal must have a dam ID that can be matched to an animal ID in BCMS (51,317)
- *plus* the BCMS record has an entry for the sire (25,148)
- *plus* have a recorded sire ID in Dovecote record that matches to an animal ID in BCMS (15,799)
  
- *plus* sire has at least 2 offspring
- *plus* at least 2 animals from the last finishing location
  
- 14,923 records from 1449 sires

# Data edits (cont)



- Additional data edits applied
  - Dam breed types collapsed (HOL, FRI, HF, BF)
  - Classes transformed to numeric scale (Signet)

- Simple multi-variate model for fat, weight and conformation
  - sex of the slaughtered animal
  - age at slaughter (linear and quadratic)
  - year-season of birth (conformation and fat)
  - year-season of slaughter
  - Year-herd at slaughter
  - breed of the dam
  - sire of the slaughtered animal as random

# Genetic correlations



	<b>Weight</b>	<b>Grade</b>	<b>Fat</b>
<b>Weight</b>	0.89 (0.05)	-0.02 (0.06)	0.14 (0.07)
<b>Grade</b>		<b>0.39</b> (0.04)	0.40 (0.07)
<b>Fat</b>			<b>0.23</b> (0.03)

# Genetic parameters



	<b>Weight</b>	<b>Grade</b>	<b>Fat</b>
<b>Heritability direct</b>	0.95 (0.05)	0.37 (0.03)	0.28 (0.03)
<b>Heritability maternal</b>	0.55 (0.14)	non-estimable	0.47 (0.15)
<b>Genetic correlation (direct-maternal)</b>	-0.80 (0.11)	non-estimable	-0.43 (0.17)

# Genetic analysis



- 14,923 records
- 1449 sires (offspring count of 6.98: SD 11.28)
- Difference between top 5 and bottom 5 sires for each trait:
  - offspring carcass weight 72.9 kgs heavier
  - Conformation grade 3.9 points higher
  - Carcass fat 4.2 points higher
- There is useful genetic variation!

# Summary



- Carcass data can be linked to BCMS
- Carcass trait evaluations are possible using carcass data plus existing data
- There is sufficient genetic variance to enable selection
- Selection using carcass evaluations will increase beef output and
  - Reduce wastage
  - Reduce carbon footprint
  - Bring breeders and market closer together

# Acknowledgements



- Dovecote Park
- Waitrose
- BCMS
  - BCMS is part of the Rural Payments Agency
- RERAD (Scottish Government)



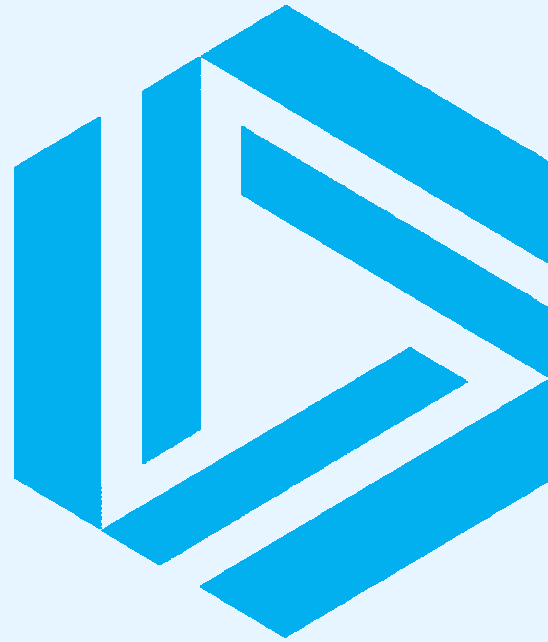
The Scottish  
Government



DOVECOTE PARK

Waitrose





# SAC

**S**✓**ccess** through **Knowledge**

# Transformation



## CONFORMATION

EUROP	E	E	E	+U		-U	R	R	R	+O		-O	+P		-P
Numerical scale Conformation	42	42	42	35		31	24	24	24	17		13	8		4
15 point scale	+E	E	-E	+U	U	-U	+R	R	-R	+O	O	-O	+P	P	-P
Numerical scale Conformation	45	42	39	36	33	30	27	24	21	18	15	12	9	6	3

## FATNESS

EUROP	1	1	1	2	2	2	3	3	3	4L		4H	5L		5H
Numerical scale Fatness	6	6	6	15	15	15	24	24	24	31		35	40		44
15 point scale	-1	1	+1	-2	2	+2	-3	3	+3	-4	4	+4	-5	5	+5
Numerical scale Fatness	3	6	9	12	15	18	21	24	27	30	33	36	39	42	45