

Using Genomic Estimated Breeding Values to improve abattoir carcass traits for Limousin cattle in the UK

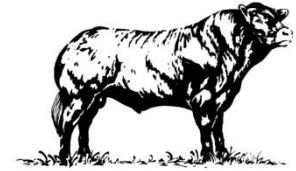
Acknowledgements



Food Group



British Cattle
Movement Service



LIMOUSIN

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Funding:

Technology Strategy Board
Driving Innovation



Project Aim



- 4 year project (2012-2015)
- Deliver to the Limousin industry genomic breeding values for abattoir VIA carcass traits

Exciting project



- Landmark project
 - 1st time genomics will be used in UK beef industry
- Platform for the future
 - New traits (fertility, feed efficiency)
 - Other breeds
- Accelerated genetic improvement
 - Genomic breeding value at birth (generation interval)
 - Actual abattoir carcase trait (accuracy)
- Improved market signals
 - Whole supply chain will use the same traits to describe and differentiate carcasses
 - Breeders > Commercial herds > Abattoir

Utilising data from multiple sources



SRUC



UK eartag

Carcase traits
Dates of birth &
slaughter, sex,
breed



British Cattle
Movement Service

UK eartag

Dates of birth &
death, sex,
breed, pedigree
(sire and dam),
full movement
information



UK eartag

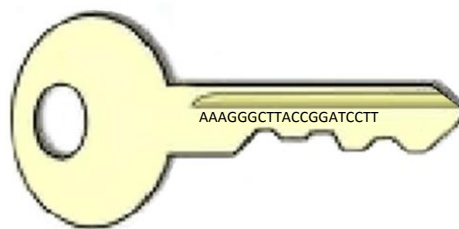
Dates of birth,
sex, breed,
pedigree (sire
and dam)



De-regressed VIA EBVs
(PHENOTYPES)



Genotypes
(REFERENCE POPULATION)



Video Image Analysis (VIA)



- Calibrated images (2D and 3D)
- Carcase weight and sex known
- Mechanically grades the carcass
 - EUROP conformation and fat classes
 - 7 primal cut yields



Preliminary VIA EBVS

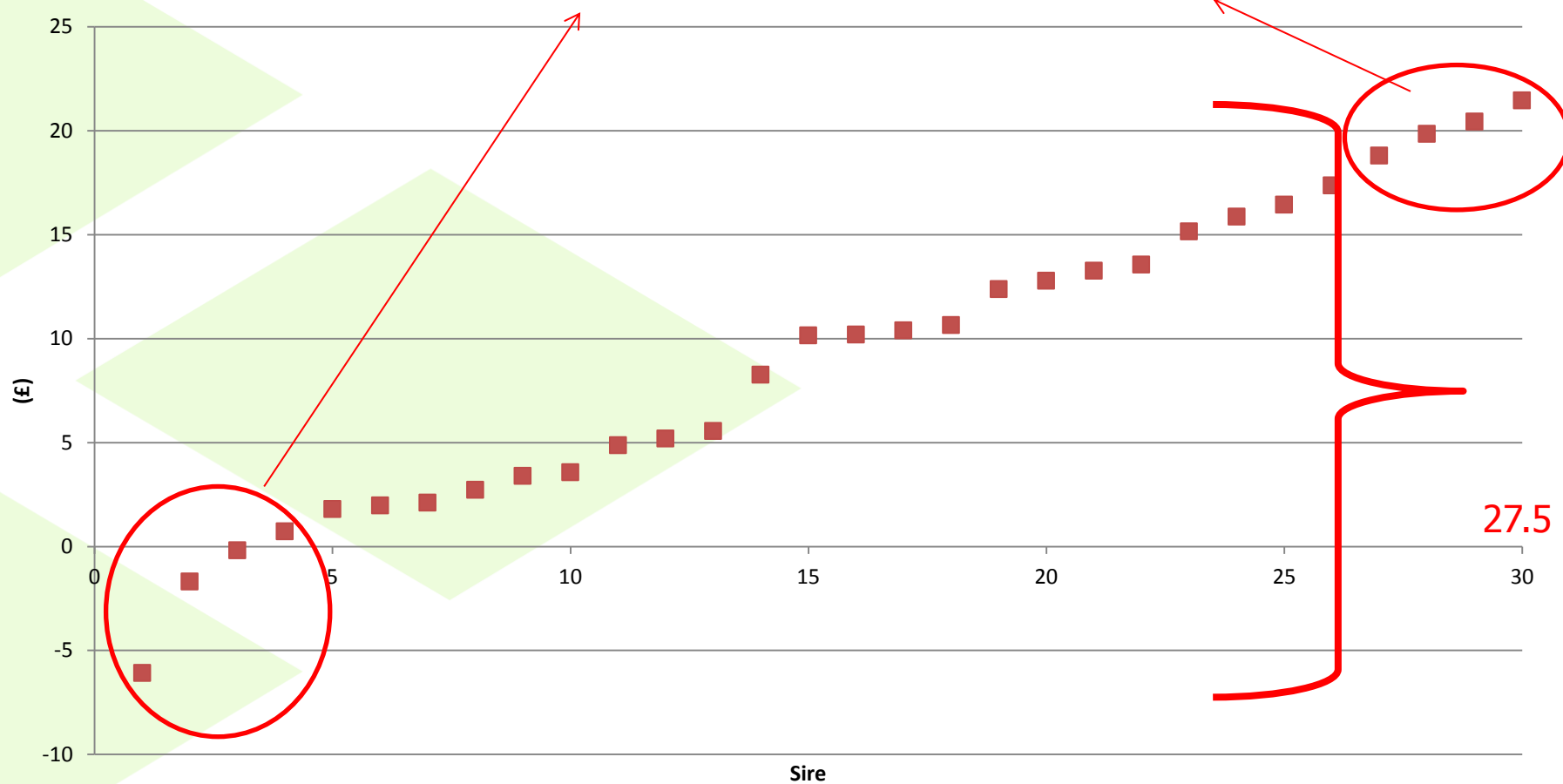


- Traits are carcase weight adjusted
 - Don't just want to select for bigger carcasses
- Heritability
 - 0 to 1 range
 - Live weight (kg)
 - $h^2 = 0.3$ to 0.5
- Genetic variation
 - Range of genetics in the population to select from

Trait	h^2
Carcase weight (kg)	0.25
EUROP conformation (score)	0.50
EUROP fat(score)	0.58
Striploin (kg)	0.37
Fillet (kg)	0.19
Topside (kg)	0.29
Rump (kg)	0.29
Silverside (kg)	0.28
Knuckle (kg)	0.33
Flank (kg)	0.28

30 Limousin sires

£447 vrs £910 (£463 difference in raw retail value)



- Developing genomic breeding values for the VIA carcase traits
 - Creating a UK Limousin SNP key
 - Identifying 2000 Limousin's with good phenotype information (accurate VIA EBVs) to genotype (MD)
 - Halfway there with genotyping
- Still checking GEBVs
 - Very early results show a correlation (GEBV,EBV) of 0.10 – 0.72 for VIA yields of a validation subset of animals
- Develop imputation methods
 - Fill in missing 'gaps' in the genotypes
 - Genotype at lower density (and cost) ~ 16K
 - Impute to a higher density ~ 50-80k
- Sequence (10x) 49 Limousin sires

Genesure ~ delivering to industry



- Owned by the 3 project partners
 - Operated by Limousin breed society
- Web based
 - BASCO website
- Order tests
 - Society tests (myostatin)
- Track test
 - Society management
 - Bar coded
- View results

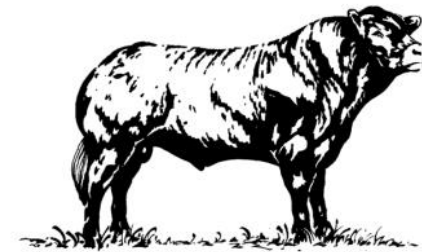
A screenshot of the BASCO GENESURE website interface. The page is titled 'You're logged in as Kirsty Moore, logout'. The navigation bar includes links for 'home', 'sheep search', 'beef search', 'my page', 'gtx suffolk download', 'breed societies', and 'help'. Below the navigation bar, there are links for 'fellow breeders', 'change password', and 'logout'. The main content area is divided into two columns. The left column, titled 'My Page', contains sections for 'emails and notifications', 'Please select a herd or flock', 'your flocks', 'your herds', and a search section for 'Beef and sheep search'. The right column, titled 'RONICK UK 542892', contains sections for 'Manage Your Herd Records', 'View Animal Details', 'View Reports', 'Herd Preferences', and 'Genesure'. The 'Genesure' section includes links for 'Place my order', 'Track my order', and 'View/Publish Genotyping Results'. At the bottom of the page, there is a note: 'To access the full range of features available to your herd, please register for performance recording' and a link for 'Register for Performance Recording'.

Conclusions



- This model has many benefits
- Farmers order GEBVs by accessing genesure via BASCO (which they are familiar with)
- Self perpetuating
 - The young animals receive the GEBV for selection purposes
 - Progeny eventually end up in the abbatoir generating phenotypes
 - As an older bull there are genotypes and accurate phenotypes available
 - Contribute to the SNP key
 - SNP key is frequently updated with the latest data and genotypes

Thank you



LIMOUSIN



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