

Form BEEF

DATA COLLECTION

Country (or countries)	UK
Trait name	Carcass fat (CFA)
Breed(s)	Limousin (taken from across breed evaluation including on phenotypes from 73 other breeds)
Trait definition	The carcass is graded under the EUROP scale with the five main classes (1, 2, 3, 4, 5) but abattoirs differed by the use of both the 7 point and 15 point scale. The 15 point scale was used and converted to a numerical value 1 to 15 and the 7 point and 15 point scales were applied to this as shown in Table 19. A 15 point scale with values 1 to 15 as used by Hickey et al (2007 ¹) would result the same as the values 3 to 45.
Method and frequency of measurement	One measurement per animal
Who does the performance recording?	ABP food group (there are 6 other abattoirs but we are only supplying ABP data)
Method of collecting data	Carcass is scored according to the EUROP grading system
Which animals get recorded?	Any animal slaughtered at an ABP processing plant
Is birthday recorded?	Yes
Is day of recording available?	Yes
Are the data adjusted and/or selected? If yes please describe the methodology applied	All breeds are adjusted to a common variance by scaling the records on an individual for each trait using the following formula where i is the appropriate breed and sex and j is the appropriate sex but breed type=2. Scaled phenotype = Average(i) + [(phenotype – average(i)) * (std(j)/std(i))] Breed types are defined as 1= Dairy, 2=Native beef, 3=Continental beef, 4=Other
Time period for inclusion of records	08/10/2001-19/10/2018
Criteria (data edits) for inclusion of records	Remove duplicates Must be prime slaughter animal Sex must be recorded 12months<Slaughterage<36 months Carcass weight>50kg Dam age must be recorded Traits must be within ±3sd (for sex)

¹ Hickey, J.M., Keane, M.G., Kenny, D.A., Cromie, A.R., and Veerkamp, R.F. 2007. Genetic parameters for EUROP carcass traits within different groups of cattle in Ireland. Journal of Animal Science 85:314-321.

	Birth herd must be recorded Finishing herd must be recorded Sire or maternal grandsire must be known Birth contemporary group < 5 Killdate recorded Birthdate recorded killdate supplied by the abattoir must be within 10 days of BCMS
Is embryo transfer applied? How are ET animals been identified? ¹ Is recipient mother ID recorded?	ET animals removed
How do you treat incomplete data?	Whole record removed if any of the above criteria are not met
MODEL	
Model used for genetic evaluation ^{2a}	MT-AM-FR
Environmental effects ^{2b}	BirthHYS, 170231 (F) Slage (R) Slage ² (R) Killsite, 11 (F) Sex, 3 (F) Finishingherd, 23195 (F) Killseason, 52 (F) Killseasonsex, 156 (F) Dam age (R) Percentagedairy (R) Het 1 (R) Het 2 (R) Het 3 (R) Het 4 (R) Het 5 (R) Het 6 (R) Rec 1 (R) Rec 2 (R) Rec 3 (R) Rec 4 (R) Rec 5 (R) Rec 6 (R) Slagepercentdairy (R) Slagedamage (R) Damagepercentdairy (R) Percentdairysex (R) Slage ² sex (R)
Use of genetic groups and relationships	A relationship matrix is formed based on available pedigree and genotype information. Genetic groups are based on the animal's breed type. Breed types are defined as Dairy, Continental beef, Native beef, Other
Genetic parameters in the model ³	See appendix I

<p>Adjustment for heterogeneous variance in evaluation model</p>	<p>Heterosis and Recombination coefficients were calculated from the breed type proportions of the animal's sire and dam and the formulae are as follows:</p> $[\text{heterosis}]_{ij} = (([\text{sire}]_i * [\text{dam}]_j) + ([\text{sire}]_j * [\text{dam}]_i)) / 100$ $[\text{recombination}]_{ij} = (([\text{sire}]_i * [\text{sire}]_j) + ([\text{dam}]_i * [\text{dam}]_j)) / 100$ <p>Breed types are defined as 1= Dairy, 2=Native beef, 3=Continental beef, 4=Other</p> <p>Het 1 and Rec 1 = breed types 1 and 2 Het 2 and Rec 2 = breed types 1 and 3 Het 3 and Rec 3 = breed types 1 and 4 Het 4 and Rec 4 = breed types 2 and 3 Het 5 and Rec 5 = breed types 2 and 4 Het 6 and Rec 6 = breed types 3 and 4</p> <p>These 12 terms are then fitted as covariates in the model</p>
<p>System validation</p>	<p>Pre evaluation data quality checks and formation of contemporary groups. Genetic evaluation undertaken using MiX99. Post evaluation checks include adjusting for the genetic base, quality assurance checks and data summaries.</p>
<p>Definition of genetic reference base Next base change</p>	<p>Genetic reference animals are those animals that are born in 2014.</p>
<p>Assessment of index quality (computation of reliability, connection)</p>	<p>Reliabilities are computed using the mix99 software using the Mistztal and Wiggans (1988) calculation method.</p>
<p>PUBLICATION</p>	
<p>Expression of genetic evaluations</p>	<p>EBVs and GEBVs are published for registered animals on https://www.taurusdata.co.uk/beef on behalf of British Limousin Cattle Society</p>
<p>Criteria per official publication of evaluations</p>	<p>EBVs are published where accuracy > 0.5 If genotyped on or before 01/03/2018 members have the option to publish their GEBVs If genotyped after 01/03/2018 all GEBVs are published</p>
<p>Number of evaluations / publications per year</p>	<p>6 times a year</p>
<p>Anticipated changes in the near future</p>	<p>None at this stage</p>
<p>Key reference on methodology applied</p>	<p>The mix99 software package is used for the genetic evaluations (Lidauer and Strandén, 1999; Vuori et al., 2006)</p>
<p>Key organization:</p>	<p>Scotland's Rural College (SRUC)</p>

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- 1) Use Appendix II BEEF for sample ID of ET animals
- 2a) Use abbreviation listed in the attached list of abbreviation to define the type of model.
- 2b) Use abbreviation for most common effects as listed in the attached list of abbreviation indicating, also, if the effect is treated as random (R) or fixed (F).
- 3) Use Appendix I BEEF for heritability/genetic variance estimates.

Form BEEF

Appendix I BEEF

Parameters used in genetic evaluation

Country: United Kingdom

Main trait group: Carcass fat (CFA)

Breed: Limousin

Trait ⁽¹⁾	Definition	h_d^2	h_m^2	$r_{g(d,m)}$	c^2	σ_p^2
CFA	Carcass fat	0.32	-	-	-	19.94

h_d^2 : direct heritability; h_m^2 : maternal heritability; $r_{g(d,m)}$: genetic correlation between direct and maternal effects; c^2 : repeatability of (maternal) permanent environmental effects; σ_p^2 : phenotypic variance.

1) If you have more than one trait provides the correlations between traits.

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Appendix II BEEF

Sample of ET animal IDs