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Producing the UK's first carcase trait Estimated Breeding Values (EBVs) using national abattoir data

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Implications Carcase trait EBVs produced from national abattoir data, for traits of direct economic importance to commercial breeders, will enable the beef industry to increase the rates of genetic improvement for carcase traits. Furthermore it will help to link the different sectors of the beef industry as they will all be using the same trait definitions from breeder to finisher to abattoir.

Introduction Farmers are paid for carcases using the EUROP system; however, pedigree animals are selected based on ultrasound muscle and fat depth. This reduces genetic progress as the traits are different reducing the efficiency of selection. In addition, the lack of clear signals between pedigree and commercial farmers often make it difficult for farmers to select the most appropriate sires. The aim of this study was to produce EBVs for the abattoir carcase traits providing tools to enable the industry to make genetic improvement for carcase traits of importance.

Material and methods Using the software MiX99, EBVs were produced for carcase weight and visually assessed EUROP fat and conformation class (converted to a numeric scale where higher values for both traits indicate more muscular and fatter carcases) using statistical models and genetic parameters previously developed (unpublished results; Pritchard *et al*, 2013). The animal models were adjusted for age and genetic parameters were moderately heritable with moderate positive genetic correlations between weight and conformation and moderate negative genetic correlations between fat and the other traits. Nearly 4 million abattoir records were available and matched to the BCMS database to obtain further information about the fixed effects and movement information. These data were reduced to just over half a million records from nearly 40,000 sires from 31 different breeds after data edits. The data edits applied removed records of non-prime slaughter animals (this accounted for the greatest loss of records), were incomplete (i.e. recent records not yet included in the BCMS data snapshot) or in error. A three generation pedigree was built and EBVs produced for approximately 1.4 million animals.

Results The first ever UK EBVs for abattoir carcase traits are shown in Table 1. As these EBVs have not been re-based the average EBVs are near 0, with some differences due to differences in breed. Within different breed subsets, the EBVs were shown to be normally distributed (results not shown) with a trend for those animals with the higher EBVs also being those with higher phenotypic values for the traits of interest. Figure 1 shows the average EBVs for high accuracy sires for individual breeds within breed types. It can be seen that for carcase weight, the continental breeds had the higher EBVs and the dairy breeds the lowest.

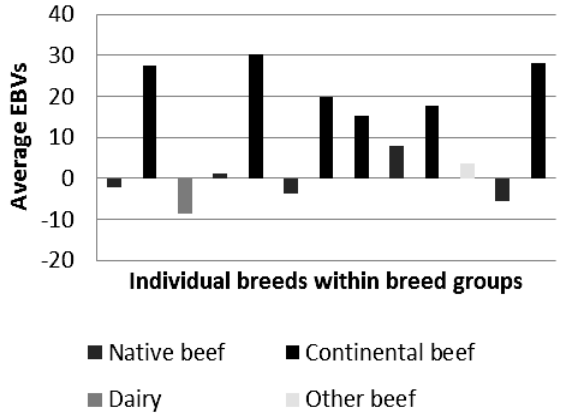

Figure 1 Average carcase weight EBVs of high accuracy sires within breed and breed type

Table 1 Summary of across-breed EBVs (reliability in brackets) for abattoir carcase traits (n=1,423,070)

Trait	Average	Std	Range
Dead weight (kg)	0.96 (0.26)	13.9	-56.6 to 76.8
Conformation (score1)	0.02 (0.18)	4.4	-9.7 to 11.9
Fat (score[1])	0.08 (0.25)	1.63	-10.9 to 10.1

[1] numerical score from 3 to 45 where higher values indicate carcases with more muscle and/or more fat

Conclusion These EBVs are the first of their kind in the UK and can be used to assist both pedigree and commercial farmers to produce animals that better meet market specification contributing to a more profitable and efficient beef industry.

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References

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