Validation of the Irish national sheep genetic evaluations

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Background: In Ireland, national sheep genetic evaluations have been implemented since 2009, however, to date no large scale study has been undertaken to investigate the accuracy of genetic evaluations in a large multi-breed population. The aim of this study was to validate the estimated breeding values (EBV) on a range of traits, using national data comprising 203,469 records across a range of phenotypic traits from 9,377 flocks.

Methods: The association between direct and maternal EBV on a range of lamb growth traits was quantified using a fixed effects model. For the lambing traits the association between direct and maternal EBV lamb survival and lambing assistance was quantified using logistic regression models.

Results: Birth weight increased linearly by 0.79 ± 0.02 and 1.14 ± 0.03 kg (P<0.001) per kilogram increase in EBV for direct and maternal birth weight, respectively. Weaning weight increased linearly by 0.86 ± 0.03 and 1.23 ± 0.07 kg (P<0.001) per kilogram increase in EBV for direct and maternal weaning weight, respectively. For lambs born in a litter size ≥2 (i.e. multiple litters) the log of the odds of an assisted lambing decreased linearly by -0.06 ± 0.008 and -0.10 ± 0.016 (P<0.001) per unit increase in EBV for direct and maternal lambing difficulty, respectively. The log of the odds of a live lamb at birth increased linearly by 0.18 ± 0.045 (P<0.001) per unit increase in EBV for maternal lamb mortality.

Conclusion: Results from this study show that selection of animals for a range of lambing and lamb growth traits will improve animal performance and flock profitability.

Keywords: sheep, validation, genetic evaluations