Breeding For Resistance To Footrot In Sheep

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The Message

- Breeding for resistance to footrot is a sustainable solution to improve sheep welfare.
- Prevalence of footrot scores of >0 in Scottish Blackface, Mule (crossbred) and Texel sheep varied between 17% and 59% according to breed, flock and year.
- Heritability estimates are low (h^2 = 0.04 to 0.2) with the highest estimates being for the number of feet with scores >1 (h^2 = 0.23).
- Molecular marker development and validation for resistance to footrot are underway.

Introduction

- Footrot is a major welfare problem and is the main cause of lameness in UK sheep (picture A). Genetic selection for resistance is a sustainable approach to footrot control.
- The incorporation of footrot resistance into structured breeding programmes may reduce the dependency on chemical solutions to control disease in farm livestock.
- Previous research has shown that genetic variation exists and that the use of conventional breeding and marker-based selection are useful tools for breeders to identify susceptible sheep.

Methods

- Blackface, Mule and Texel sheep were used from experimental and commercial flocks that are linked genetically using common sires via their respective Sire Reference Schemes.
- Over 9,000 sheep across the UK were scored (picture B). Feet were scored at least twice and in different years on a 5-point scale (0-4) where 0=no footrot, 4=severely under-run footrot (pictures C & D). Mules were scored twice in the same year.
- Heritability estimates were undertaken using ASREML to examine the best approach for such data analyses and also to see if there is commonality among the results.

Results

- The prevalence of footrot for Blackface sheep differed both across years (2005=17%, 2006=18%) and across flocks (5-36%). Footrot levels were consistently high in Mule flocks, (2005=56%, 2006=43%).
- 19 pedigree Texel flocks representing >3,600 sheep were scored in 2006. Flock prevalence of scores >0 varied from <1% to 59% (average 29%).
- Heritability estimates based on repeated measurements in ewes differed according to the way in which footrot was defined, with the highest estimates being for the number of feet affected with score >1, (h^2=0.23 (Mule) and h^2=0.14 (Blackface).
- Phenotypic correlations between successive scores , within the same year or in successive years, were generally low (0.0 to 0.3), so there is merit in undertaking repeat footrot scores on the same animals.
- Prevalence of scores >1 in Blackface lambs (measured at ~20 weeks was 34% but h^2 was zero irrespective of trait definition or genetic model used.

Conclusions

- Footrot prevalence, as identified via foot inspection, is high in all 3 breeds/crosses.
- Large variation seen in prevalence both between flocks, breeds and years.
- Resistance to footrot is a heritable trait in ewes, but not in lambs.
- At least 2 footrot scores are recommended due to low repeatability.

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