Information Notes

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Breeding for Resistance to Footrot

Background

Footrot is a major welfare problem in sheep and is the most common cause of lameness. The causative organism is Dichelobacter (Bacteroides) nodosus (D. nodosus), and is highly contagious, being easily transmitted from sheep to sheep via pasture, bedding or handling pens. The successful selection of sheep with improved resistance to footrot is likely to be cost-effective and will contribute to increased sustainability by improving animal health, welfare and productivity. The incorporation of footrot resistance into structured breeding programmes will reduce the dependency on chemical solutions to control disease in farm livestock. For example, it is anticipated that the use of zinc oxide and formalin would be greatly reduced in animal populations that are genetically resistant to footrot.

Results from preliminary analyses at SAC of the prevalence of footrot in Scottish Blackface sheep show that there is a wide variation in clinical footrot between offspring from different sires, with some sires having not offspring affected and others with up to 25% of their offspring affected. This shows that the exploitation of the genetic basis for footrot resistance is likely to offer a sustainable route to breeding healthier sheep. The exploitation of genotype information via the potential use of genetic markers associated with resistance to footrot, will allow breeders to select sheep to breed for increased footrot resistance. The development and use of a repeatable and objective scoring system to evaluate footrot in individual sheep is a prerequisite in the search for any association with molecular genetic markers.

Genetic testing for footrot

The development and use of a molecular genetic test for footrot resistance potentially has enormous advantages. This is because of the practical difficulty of objectively scoring feet lesions well, and the difficulty of classifying them objectively and repeatably. In addition, with genetic markers, animals that are candidates for selection do not have to be exposed to infection to determine whether they are genetically susceptible or not. Additionally, this method can shorten the generation interval and accelerate responses to selection, and potentially offer a practical alternative to measurement protocols that require exposure to infection.

Objectives of research programme

The aim of this project is to develop robust procedures to identify individuals and family groups differing in their genetic resistance to footrot, to enable selective breeding for enhanced footrot resistance. Using information from Blackface, Texel and Mule sheep, the project will use both molecular techniques and conventional animal breeding strategies to investigate the links between genetic susceptibility and their expression of footrot. Together with a comprehensive assessment of the economic benefits of breeding for disease resistance, it will be possible to determine whether or not breeding for enhanced footrot resistance is a practical, feasible and economic option for the UK sheep industry.

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