

Facial Eczema Tolerance

SIL Technical Note

Relates to: Selection to increase tolerance to facial eczema
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Summary

Facial Eczema (FE) is a disease that can cause severe losses of production and death in sheep. It is possible to select for sheep that are more tolerant to the effects of the disease. This genetic improvement is possible without adverse effects on production and can have major, positive impacts on animal production and welfare.

Breeders wishing to select for FE tolerance must be registered users of the Ramguard® service. Animals are challenged with the facial eczema toxin and their tolerance measured in terms of the level of an enzyme in a blood sample. SIL treats FE tolerance as a separate sub-index (Goal Trait Group) that can be integrated into standard SIL indexes.

Background

FE is a significant disease for sheep, mainly particularly in the northern North Island of New Zealand. A toxin, sporidesmin, is produced by a fungus that lives in the base of pasture. This toxin has a serious effect on animal metabolism and causes liver damage. It reduces productivity and in severe cases leads to death. There is no known treatment.

Severity of disease outbreaks vary both between and within years and this has been related to environmental conditions (temperature, humidity, condition of pasture). Most importantly, sheep vary in their response suggesting that there is genetic variation for tolerance. This has proven to be true in several pioneering selection programmes run by breeders and in experiments undertaken by scientists.

Genetics of FE tolerance

It's almost all good news. FE tolerance is strongly inherited (c.40%) and is genetically independent of important production traits. So selection to improve tolerance will not directly reduce the response to selection for productive traits.

However, it is one more trait to select for which makes it harder for a sheep to be good at everything. So there will be some sheep that are good all round sheep but with low FE tolerance and others with high FE tolerance but weak on one or more other traits. Fortunately there will also be sheep that are highly productive AND strongly FE tolerant. Successful, commercial breeding programmes have found these sheep.

Selecting for FE tolerance

Animals need to be challenged with FE toxin and a blood sample taken to measure how they have responded. Variation in the challenge sheep are exposed to can compromise an effective selection programme for tolerance.

SIL uses the Ramguard® system developed by AgResearch. Tolerance is measured in terms of the level of an enzyme, gamma glutamyltransferase (GGT), produced by the liver. For an artificial challenge, sheep are dosed with sporidesmin at a level where about 50% of sheep show levels of GGT above 55 international units per litre of blood 21 days later. Ramguard® provides feedback to allow breeders to achieve optimal challenge conditions. This target of near 50% will give the best discrimination between degrees of tolerance (or susceptibility) to FE. Alternatively, a natural challenge can be used and blood samples collected when a

monitor group (sub-sample of animals) exhibits a high average level of GGT. Advice on what method is best for you can be obtained from SIL advisers or the Ramguard® service. It is recommended that the youngest animals to be tested are at least 3 months of age.

Recording FE data

SIL uses the Ramguard® testing regime and genetic evaluation system developed by AgResearch scientists at Ruakura working in collaboration with breeders actively selecting for FE tolerance. Tolerance is assessed on the basis of levels of an enzyme in a blood sample collected a certain time after a disease challenge. SIL requires the following information to perform a genetic evaluation for FE tolerance.

Contemporary group – animals grazing in separate groups since the start of the FE season and during the challenge period should be identified as such (mob codes).

Slaughter/ cull animals – if animals are culled due to severe FE symptoms, or sent for slaughter for other reasons, PRIOR to the 21 day blood sampling of the main mob(s), blood samples should be collected from them at the time of culling or before they are sent for slaughter. This is to avoid possible bias in the data collected. It is better to have some data than no data on these sheep.

Genetic evaluation

SIL bureaus can run genetic evaluations for FE tolerance along with other traits as part of the service they offer their breeder clients.

SIL predicts the breeding value (BV) for FE Tolerance using information collected for GGT 21 days after challenge. Low levels of GGT are best so better BV values are more negative.

SIL uses the performance of relatives in genetic evaluations. So genetic merit for FE tolerance can be predicted for sheep that have not been tested themselves AND an animal's BV is influenced by the performance of its relatives.

Reporting on FE tolerance

SIL recommends the use of the Facial Eczema sub-index, rather than BVs, on reports. The index is simply the GGT21 BV multiplied by its economic weight. It has the advantage of showing how much impact Facial Eczema has on the overall index of economic merit. The units for these indexes are the same – cents per ewe lambing – and in all cases, larger, positive values are better. This recommendation is made to help make reports easier to understand for ram buyers.

The economic weight that SIL uses for Facial Eczema is based on the effects Facial Eczema has on the survival and performance of breeding ewes and young ewe replacements over a 10 year cycle containing 2 severe and 3 moderate outbreaks.

The facial eczema sub-index is included in the DPO index as DPX. It is not included in the DPP index (Dual Purpose Production index) as this index does not include disease traits. There is no Facial Eczema sub-index for terminal sire sheep as their lambs are normally away before facing a natural facial eczema challenge. However, Facial Eczema breeding values can be produced for use by Terminal Sire ram breeders and included on reports.

Need more information?

Contact your SIL bureau, send an email to silhelp@sheepimprovement.co.nz or telephone 800-745-435 (0800-SIL-HELP). Alternatively you can contact the Ramguard® Service directly, C/o **Kees Wesselink**, AgResearch Ruakura, tel 07-838-5259.