

Dermatosparaxis

Gene Test



Background

Dermatosparaxis in sheep is found primarily within the White Dorper breed and crosses of that breed. It is an inherited skin disorder attributable to having abnormal collagen in the skin, and causes extreme skin fragility. Dermatosparaxis affects lambs and they suffer from tearing of the skin. The severity of the condition usually results in death or euthanasia.

In White Dorper sheep, dermatosparaxis behaves as a monogenic recessive trait. This means it is primarily controlled

by a single gene (called *ADAMTS2*) that is found on one of the non-sex chromosomes and two faulty or mutant copies of the gene are required for lambs to be affected.

The mutant or abnormal form of *ADAMTS2* has a small change in its DNA that creates a severely shortened and faulty enzyme that stops collagen from being processed correctly in the skin. This mutation is in a key part of the gene and can be detected using DNA sequence analysis or gene-typing technologies.

Selection against this causative mutation could be used to eliminate dermatosparaxis from White Dorper and White Dorper-cross sheep, to reduce the current cost of this disease, and to stop its wider spread into other breeds and flocks.

The Lincoln University Gene-Marker Laboratory has developed a gene-test to detect the mutation in *ADAMTS2* and is offering a DNA typing service to sheep breeders using White Dorper Sheep or White Dorper-cross genetics.



Dermatosparaxis

Gene Test

Lincoln University Gene-Marker Laboratory Tests

A1/A2 Cattle Genetics	GDF9 Fertility
Booroola	Inverdale
Cold Tolerance	Microphthalmia
Dermatosparaxis	Scrapie
Footrot	T+ Muscling
Gaucher Disease	

The test

Blood samples collected from sheep can be 'typed' to reveal whether they carry one or two copies of the mutant (M) ADAMTS2 gene.

In our typing system we report the results simply as non-carrier, carrier or affected as follows:

(N, N) – non-carrier (0 copies of gene)
(M, N) – carrier (1 copy of gene)
(M, M) – affected (2 copies of gene)

Sheep have two alleles, reflecting that they have paired chromosomes and inherit one allele from each parent. They can therefore pass each allele on to their progeny in approximately a 50:50 ratio. The 'flow' of alleles can thus be followed through extended pedigrees of sheep.

The test allows you to identify sheep that carry mutant (M) alleles.

Breeding for dermatosparaxis free sheep

This gene test allows breeders and ram-buyers to monitor whether their sheep are carriers of the mutant allele (M) and, therefore, whether they might produce affected lambs when mated to another carrier.

It is effectively a management tool, as carrier sheep do not necessarily need to be culled, but instead their genetics can be managed to insure that progeny do not inherit two mutant forms of the ADAMTS2 gene and, therefore, suffer from dermatosparaxis.

Whilst eradicating the mutant form of ADAMTS2 would be the most desirable outcome across all the world's sheep, that will require time and concerted effort by sheep breeders.

Disclaimer

Lincoln University and the Lincoln University Gene-Marker Laboratory cannot be held responsible for the outcome of any decisions made by breeders in the breeding of sheep using this DNA-typing technology. The genetic information supplied to breeders may only be used by them on the assumption that they assume responsibility for any loss, damage or consequence resulting directly or indirectly from the use of that information. The liability of Lincoln University and the Lincoln University Gene-Marker Laboratory is limited to re-testing individual sheep where an error has been made at some stage of the DNA testing process.

We recommend the following approach when using this technology:

- That breeders place their main emphasis on testing breeding stock, especially rams, as they typically have the most impact on a flock genetically
- That breeders keep precise pedigree records of all genetic testing to be able to follow the mutant form of the gene in their flock
- That the test is used conservatively in the context of the 'golden rule' of genetics, whereby selection for multiple traits limits genetic gain for any given trait. In this context care needs to be taken in culling carrier sheep as they may have genetic merit for other traits. Breeders should always be cautious about overly narrowing their genetic base, as this will reduce diversity and may reduce their ability to make genetic gain in other traits
- That carrier sheep should be removed from breeding programmes at the first practical opportunity. For example, ewes that are known to be carriers could be put to terminal sires.

Getting your sheep tested

Contact the Lincoln University Gene-Marker Laboratory at the numbers listed. We will send out special cards for collecting small blood samples, along with instructions on how to safely and easily collect blood from sheep. Only when your samples are received by the Laboratory can typing be undertaken. If you are outside of New Zealand, an import certificate will be supplied. Multiple tests can be done from the same blood sample, so please have sufficient blood on the card.



Testing costs

A schedule of prices is available on request. Discounts are available for large volumes or multiple tests. For overseas clients we price test and invoice in your currency.



Find out more at
research.lincoln.ac.nz/testing-analytical-services/gene-marker-lab

Freeman Fang

Laboratory Manager
P: + 64 3 423 0680
E: freeman.fang@lincoln.ac.nz

Professor Jon GH Hickford

Gene-Marker Test Director
P: + 64 3 423 0665
M: + 64 27 280 1285
E: jon.hickford@lincoln.ac.nz

Faculty of Agriculture and Life Sciences
PO Box 85084, Lincoln University,
Lincoln 7647, New Zealand

John Bates

Sheep Industry Consultant
P: + 64 3 448 8349
M: + 64 21 995 278
E: johnbates076@gmail.com

25 Glencarron Street, Alexandra, 9320,
Otago, New Zealand