



Scrapie & Genotyping

With increased discussion and confusion surrounding scrapie genotyping within the Valais Blacknose Sheep breed we would like to draw your attention to a few main points.

What is Scrapie?

Scrapie is an infectious wasting disease affecting the nervous system of adult sheep and is very difficult to control. It has been a notifiable disease in the UK since 1993 and is one of the transmissible spongiform encephalopathies (TSEs). The causal agent is resistant to normal disinfection procedures and the disease has a long incubation period. There is no cure, no vaccine, the condition is fatal, and animals pass on their genetic susceptibility to the next generation.

Purpose of Scrapie Genotype Testing

Testing enables breeders to select sheep with inherited resistance to classical Scrapie for both breeding purposes and potential export of sheep.

It is important to note that the Scrapie genotype of a sheep can only be used to define its relative susceptibility to the disease of Scrapie, it must not be confused with an alternative definition of what a “good” sheep is. Phenotypic breed characteristics or “type” are what we usually understand to be the definition of sheep quality. Therefore, a sheep’s arbitrary quality is not defined by its scrapie genotype. Animals can be tested at any age using a blood or semen sample. Testing is usually limited to stud rams, ram lambs retained for breeding and ewes being selected for embryo transfer.

Scrapie genotyping is not a test for the presence of the disease but does reveal if the animal were to be exposed to the disease, what chance it has of contracting it.

Scrapie genotype

Scrapie genotype in sheep is stated as a pair of three letter alleles (xxx/xxx). Each letter in the allele relates to a codon position in the relevant DNA. The three codons tested in the UK and the resulting five alleles are:

136	154	171
A	R	R
A	H	Q
A	R	H
A	R	Q
V	R	Q

Key: Amino acids: A = alanine; H = histidine; Q = glutamine; R = arginine; and V = valine

Scrapie genotype falls into one of 5 types, called Type / R 1 to 5. (Also known as G1 to G5 in some European countries).

The most common combinations relating to Valais Blacknose Sheep here in the UK are:

- ARR/ARR (genotype) – Type 1 or Group 1 (G1)
Sheep that are genetically most resistant to scrapie.
- ARR/ARQ (genotype) - Type 2 or Group 2 (G2)
Sheep that are genetically resistant to scrapie but will need careful selection when used for further breeding.
- ARQ/ARQ (genotype) - Type 3 or Group 3 (G3)
Sheep that genetically have little resistance to scrapie and will need careful selection when used for further breeding.

What you need to know:

- Type 1 - Predominantly used to enhance scrapie resistance and required for export purposes. Note that genotype is not the only requirement for export – additional tests are required in line with import/export regulations for each country.
- Genetics tend to descend from Dutch/Austrian and Hungarian bloodlines sometimes bred in combination with Swiss bloodlines.
- Type 2 - Can be used to enhance scrapie resistance and for export purposes to some countries. Note that genotype is not the only requirement for export – additional tests are required in line with import/export regulations for each country. Genetics come from Dutch/Austrian/Hungarian/Swiss bloodlines.
- Type 2 & 3 - Are the most common types found here in the UK which originate from the foundation flocks imported from Valais in Switzerland.

There are many common misconceptions surrounding the various types, some are deemed to be superior and more valuable over others, in truth there are benefits to all but equally there are also clear physical differences when it comes to overall appearance, conformation and fleece. Decisions surrounding genotypes and bloodlines should be thoroughly researched and ultimately based on breed standards, quality, flock purpose and personal preferences.

For further reading you might be interested in reading The National Scrapie Plan for Great Britain:

http://adlib.everysite.co.uk/resources/.../063/NSP_english.pdf