

SCRAPIE: The Facts

The disease

- Scrapie is a fatal disease affecting sheep and goats. It causes neurological disorders within the brain and central nervous system.
- Despite decades of research scrapie is still not completely understood.
- There is currently no treatment for scrapie and the disease cannot be diagnosed in the live animal, this makes control of the disease extremely difficult.
- Scrapie is a member of a group of diseases called transmissible spongiform encephalopathy's (TSE's).

Recognising the disease in your flock

The symptoms of scrapie are extremely variable. The most common symptoms are listed below.

- Sheep biting / chewing themselves and rubbing or scratching against fences etc.
- Inco-ordination and weight loss.
- Loss of wool especially on the flanks.
- Muscular tremors, convulsions or staggering.
- Grinding teeth, salivation and 'star gazing'.

It is important not to confuse scrapie with other ailments such as those caused by ectoparasites e.g. sheep scab.

Prevention and control of the disease

- The disease does not induce an immune response within the host and therefore vaccination is not an option. It is impossible at present to diagnose scrapie in the live animal.
- The causative agent has not yet been isolated or identified, so getting rid of it is difficult.
- Scrapie has a very long incubation period, therefore carrier sheep may appear to be healthy but still be transmitting the disease.
- Scrapie became a notifiable disease in January 1993.

Breeding for resistance

- Different sheep show different levels of susceptibility to scrapie and some sheep are recognised as being totally resistant.

- A major breakthrough in the fight against scrapie is being able to identify resistant or susceptible sheep.
- Blood samples are taken from sheep and DNA is extracted and tested to identify the genotype of sheep.
- Variability in susceptibility to scrapie occurs on 3 sites (codons 136, 154 and 171) of the PrP gene. The PrP gene is the gene that codes for the PrP protein. Some breeds such as the Suffolk only show variability at 1 site on the gene (codon 171) and therefore breeding for resistance within these breeds is easier.
- The various DNA bases are read at each codon e.g. ARQ.
- All genes occur in pairs, 1 derived from each parent. And therefore a typical result may look like ARR/ARQ, this is known as the animal's genotype.

The 15 possible genotypes found in sheep are listed below:

ARR/ARR	TYPE 1 Sheep Genetically most resistant to scrapie. No restrictions for sale or breeding.
ARR/ARQ ARR/ARH ARR/AHQ	TYPE 2 Sheep with 1 copy of ARR show high levels of resistance to scrapie and have no restrictions for use under the NSP.
AHQ/AHQ AHQ/ARH ARH/ARH ARQ/ARH AHQ/ARQ ARQ/ARQ	TYPE 3 All restrictions on the sale and breeding form Type 3 animals that were originally stipulated by the NSP have been lifted since 2005.
ARR/VRQ AHQ/VRQ ARH/VRQ ARQ/VRQ VRQ/VRQ	Sheep that are highly susceptible to scrapie, and should be avoided. Any rams of these genotypes should be slaughtered or castrated.

- This provides valuable information for breeding purposes and the scrapie status of a flock can be improved by using sires that are identified as being more resistant.
- Benefits of genotyping Females. Knowledge of the ewes' scrapie status enables faster progression towards a resistant flock.

Example: crossing a ARQ/ARQ female with a ARR/ARR male. Offspring gets 1 half of its genotype from each parent. If the parent has 2 different halves, e.g. ARR/AHQ, then there is a 50% chance of which half they will pass to their offspring.

Offspring is in the 2nd group, which shows that the ewe of a poorer genotype can be used by selective breeding, and in the process we are improving the genotype of the offspring.

