



Breeding for worm resistance in hill sheep

Research has identified genetic differences between sheep in the strength of their acquired resistance to internal worm parasites.

If these differences can be identified by measurements in sheep, this trait can be incorporated into genetic evaluations and improved through selective breeding.

Understanding the benefits

In lowland flocks that have selected for enhanced resistance, lambs have a lower faecal egg count (FEC) and lower worm burden. Ewes show a lower increase in FEC during the peri-parturient rise and their lambs benefit as a result of less worm eggs being deposited on the pasture.

In Autumn 2022 ten performance recorded hill flocks measured their lambs, assessing both individual FECs (for Strongyles and Nematodirus) and an immune response to worm challenge that is measured via blood samples, referred to as IgA. Measures were taken by farmers and vet and then assessed by Techion (for FEC) and Biobest (for IgA).

These two traits appear to tell us different things about the sheep's ability to deal with a worm challenge and many flocks will select sheep that excel for both attributes.

Measurements are now included in Signet's National Hill Sheep Breeding Evaluation, which has generated Estimated Breeding Values (EBVs) for FEC S (Strongyles), FEC N (Nematodirus) and IgA. EBVs indicate an animal's genetic superiority or inferiority for a specific trait;

- For FEC S and FEC N EBVs, negative values are preferred as these indicate animals that put less eggs onto the pasture.
- For IgA EBVs, positive figures indicate sheep that are superior at mounting an immune challenge to infection.

When using worm resistance EBVs it is important to remember;

- These traits should not be looked at in isolation as there is occasionally a biological cost to animals mounting an immune response, which can result in a reduction in overall performance. Select for resistance in conjunction with other performance traits, such as growth rate, carcase quality and maternal ability.
- The greatest benefits arise in closed flocks where replacements are retained. Ewes sired by rams that are more resistant to worms will cause less pasture contamination, which will benefit their lambs. Breeders are therefore advised to either breed their own tested rams or buy rams from breeders who are also selecting for resistance.



Advice to ram breeders

Flocks considering sampling their flocks are advised to take a mob sample and ensure lambs are experiencing a challenge. Only when mob samples are over 300 eggs per gramme should individual lambs be sampled.

To ensure that meaningful FEC measurements are collected

- Lambs should have grazed 'dirty' pastures for at least the last 4 weeks.
- The lambs must not have been treated for worms within at least the last 4 weeks and don't sample lambs given 'long-acting' or 'persistent' drenches.
- Ensure lambs have been under the same management throughout their life.
- Samples shouldn't be sent until lambs are over 18 weeks of age.

How many lambs should I sample?

- The most accurate breeding values will be obtained in flocks that sample lots of lambs.
- Flocks sampling a subset of their lambs should consider sampling one sex and an absolute minimum of 30 lambs. Ideally at least 5 lambs should be sampled by each sire.
- Sample a cross section of the flock, not just the best lambs.

Where can I find genetically resistant rams?

All published breeding values can be seen on the Signet website.

General points when looking for a ram with these traits

- Find a flock actively recording both FEC and IgA.
- Use the Accuracy Values published alongside each EBV as a guide to the degree of recording taking place on the animal and in the flock.
- Remember for FEC EBVs, a negative value (less eggs) is a positive attribute. For IgA EBVs, positive values are beneficial.
- Use "EBV Search" on the Signet website, to generate lists showing those sheep with superior breeding values for FEC and IgA.