

Nutritional control of parasites

Background

Grazing sheep gradually build up immunity to gastrointestinal nematode parasites, but the immunity breaks down during the periparturient period. This results in an increased excretion of nematode eggs onto the pasture, which highly contributes to pasture infectivity.



Parasitized ewes are a major source of infection for their lambs

A nutritional basis for the breakdown of immunity to parasites?

Periparturient breakdown of immunity to parasites has long been recognized, but it remains unclear why it occurs and how it can be controlled. Research has shown that it is not necessarily associated with lambing *per se*, time of the year, or hormonal changes.

We have suggested that breakdown of immunity to parasites may be a consequence of limited protein supply (a situation that often occurs during the periparturient period). This could be the case because the available protein would be prioritised to lamb growth (i.e. milk production) over maintenance of immunity. If such a nutritional basis exists, then this opens the possibility to use nutritional management to reduce the degree of periparturient breakdown of immunity to parasites, and its consequences on pasture infectivity.

Achievements

Recent research at SAC has shown that:

- Scarce protein supply is indeed directed towards milk production rather than to immunity to nematode parasites
- Twin-rearing ewes excrete more nematode eggs than their single-rearing counterparts
- Increased protein supply to twin-rearing ewes increases milk production and reduces nematode egg excretion within a matter of days
- The presence of body protein reserves reduces nematode egg excretion at times of limited protein supply from the diet.

The results of these studies support the view that breakdown of immunity to parasites has indeed a nutritional basis, and indicate that it is mainly the poorly conditioned, twin-rearing ewe that contributes to contamination of the pasture with parasite eggs.

Likely benefits

Improving protein nutrition of poorly conditioned, twin-rearing ewes would not only result in faster growing lambs (more milk) but could also form part of a sustainable parasite control strategy. This would reduce our dependency on anthelmintic drugs, which contributes to reducing the rate of development of anthelmintic resistance.

Work in progress: effects of nutrition on underlying immune responses

It is anticipated that effects of nutrition on gastrointestinal parasitism are mediated through involvement of host immune responses within the gastrointestinal tract. However, to date, we have limited insight in such nutrition-immunity interactions. Elucidating the immune effector responses that underlay nutritional control of parasites forms a focus of current research.

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