



Animal &
Plant Health
Agency

Sheep scab - resistance

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Background

Sheep scab due to the *Psoroptes ovis* mite is an important cause of health and welfare problems in the national flock and has a significant cost to the sheep farming industry of the UK.

In 2017, APHA scanning surveillance identified cases where sheep affected by sheep scab mites (*Psoroptes ovis*) had not responded to treatments with an injectable product containing the active ingredient of the macrocyclic lactone (ML) moxidectin.

Mites were collected from four flocks and a collaboration between APHA and the University of Bristol was established with the University undertaking research and *in vitro* tests comparing mites from these farms with a known fully susceptible strain held at Moredun Research Institute to determine if the mites had developed resistance to the injectable product used. The results of this study were published in the *Veterinary Record* First evidence of resistance to macrocyclic lactones, in *Psoroptes ovis* sheep scab mites in the UK (Doherty and others 2018). University of Bristol, APHA and the Moredun Research Institute investigated further cases of apparent treatment failure and subsequently resistance to other injectable MLs was demonstrated - Multiple resistance to macrocyclic lactones in the sheep scab mite *Psoroptes ovis* (Sturgess-Osborne and others 2019).

This raises major concerns:

1. Increasing failure of treatment and control of sheep scab due to the presence of ML resistant mites.
2. Increasing incidents and spread of sheep scab.
3. There is evidence that the overuse of preventive treatments (MLs) for sheep scab whether successful or not, can lead to increased resistance of gut worms to these products.

Diagnosis

Itchy sheep may be infested with the chewing louse, *Bovicola ovis*, or the sheep scab mite *Psoroptes ovis* or BOTH at the same time. Therefore in cases of itching sheep with wool loss it is important to get an accurate diagnosis.

There are two available methods, the skin scrape and a relatively new *Psoroptes ovis* ELISA test.

Following infection with *Psoroptes ovis* mites, it can take a number of weeks before affected sheep start to scratch and rub. This allows time for the mites to spread to other sheep.

In some cases it may be difficult to find mites on skin scrapings and some flocks show little or no clinical signs of sheep scab, particularly if it has been established in the flock for some time and it is in these situations that this ELISA test can be useful. The *Psoroptes ovis*

ELISA test can detect antibodies to scab mites in serum from 2 weeks after infestation, so can be useful to indicate exposure before the development of clinical signs or in other situations where mite numbers are low. At least 12 animals should be tested from a suspected infected group and should include the itchy animals.

Veterinary interpretation of ELISA results is essential as it needs to take account of treatment history and assess risk factors. A paper describing the use of the ELISA test has been published (Hamer and others 2019).

Treatment

There are only two types of treatment available for sheep scab in the UK, the injectable macrocyclic lactones (MLs) and diazinon organophosphate (OP) dips and it has become very important to recognise that resistance in *Psoroptes ovis* mites in the UK to injectable treatments is now present/confirmed and possibly increasing.

Since scab is not the only cause of itchy sheep it is important to get the diagnosis confirmed to allow treatment with the right product. Pour on synthetic pyrethroids will not kill sheep scab mites and injections of 3ML wormers (e.g. Ivomec, Dectomax, Cydectin) will not kill lice.

Dipping with an OP dip however will kill both sheep scab mites and lice. Many farms may not have dipping facilities but there are an increasing number of contractors who can provide a mobile dipping service.

If resistance is present in mites on the farm, and the mite is eradicated by correct alternative treatment, any resistant mites remaining in the environment in tags of wool for example would not survive for a long period (a maximum of approximately 17 days). This is in contrast to the situation in gastro-intestinal worm resistance where resistant worms will survive in the environment for years.

Summary

- Take sheep scab seriously and encourage flock owners to do so.
- When investigating suspect cases, take skin scrapes and blood samples from the group to help in the diagnosis.
- Optimise skin scrape sampling by inspecting the group of animals and select the most pruritic animals. Look for discoloured or wet fleece. The mites will normally be located around the moist edge of the lesion.
- Blood sample a minimum of 12 animals of the affected group, including the pruritic animals, ideally identifying the animals sampled to allow retesting if necessary.
- Recommend testing rather than routine prophylactic sheep scab treatment and only treating correctly quarantined new sheep if infestation is confirmed.

- Remember the potential for infestation without clinical signs where use of the blood test will be essential. This might include animals grazing on common land but also where there have been local reports of sheep scab and the potential for animals to become infested via infected neighbouring sheep or shared facilities.
- Encourage collaboration between graziers to coordinate treatments.
- Investigate possible inefficacious treatment and report concerns to the VMD.
<https://www.gov.uk/report-veterinary-medicine-problem>
- More information is available on the Sheep Veterinary Society website
https://www.sheepvetsoc.org.uk/sites/default/files/SVS%20Sheep%20scab%20guidance%20for%20vets%202018_0.pdf
- More information on the ELISA test can be found here
http://www.biobest.co.uk/assets/files/forms/Sheep%20scab%20FAQs_website_version_1_June18.pdf

If you have suspicions that a flock is not responding to sheep scab treatment then please contact an APHA Veterinary Investigation Centre to discuss further investigation.

Contact details for APHA VI Centres in England and Wales can be found on the APHA Vet Gateway, with other information about the surveillance network:

<http://apha.defra.gov.uk/vet-gateway/surveillance/diagnostic/national-network.htm>

References

DOHERTY, E., BURGESS, S., MITCHELL, S. & WALL, R. (2018) First evidence of resistance to macrocyclic lactones in *Psoroptes ovis* sheep scab mites in the UK. *Veterinary Record*

HAMER, K., BURGESS, S., BUSIN, V. & SARGISON, N. D. (2019) Performance of the *Psoroptes ovis* antibody enzyme-linked immunosorbent assay in the face of low-level mite infestation. *Veterinary Record* 185, 107-107

STURGESS-OSBORNE, C., BURGESS, S., MITCHELL, S. & WALL, R. (2019) Multiple resistance to macrocyclic lactones in the sheep scab mite *Psoroptes ovis*. *Vet Parasitol* 272, 79-82



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