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Surveillance report into free ectoparasite examination for sheep scab in Wales

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Background

Sheep scab, caused by the highly contagious *Psoroptes ovis* mite, can have a significant adverse effect on animal welfare and the economics of the sheep industry. Currently endemic in the UK, sheep scab is a notifiable disease in Scotland, while for England and Wales, it is a legal requirement to treat infected animals and all others in the flock. In Wales, [The Sheep Scab Order 1997](#) is the relevant legislation.

Clinical signs of sheep scab include pruritus (often displayed as rubbing against objects, nibbling and head tossing), dermatitis, wool staining and wool loss. Severe infections can reduce feed intakes and rapid loss of body condition can occur. Some sheep can carry live mites without showing clinical signs, or may develop clinical signs very slowly. These sub-clinically infected animals are still able to infect others during this time, and in some flocks 90% of the sheep can be infected before clinical signs develop. This can make diagnosis and control of the disease challenging.

Examination of skin scrape samples from sheep showing suspect clinical signs of sheep scab was offered free of charge in Wales, between the beginning of November 2020 and the end of March 2021. This initiative was funded by the Welsh Government. It followed a similar project which ran between December 2017 and March 2018, the full report of which can be read [here](#).

Its aims were to support accurate diagnosis of pruritic sheep in order to promote correct treatment and successful control of sheep scab. This is a priority of the [Wales Animal Health and Welfare Framework](#).

Material and methods

The project launched on 2nd November 2020 and was promoted by information to Welsh farmers and veterinary surgeons through direct communication with veterinary practices, APHA newsletters and social media. The first samples were received on 4th November 2020 and the last samples were received on 1st April 2021 (but were posted in March).

Testing was undertaken at APHA Carmarthen Veterinary Investigation Centre, which is also the Centre of Expertise for disease surveillance of Extensively Managed Livestock (COEEML). Information about the COEEML can be found at <http://apha.defra.gov.uk/vet-gateway/surveillance/experts/exten-man-livestock.htm>

The skin scrape and/or wool samples were submitted in the usual way via a farmer's veterinary surgeon, either using a general submission form or via the online portal (ADTS). Information including submitter, farm and animal details, and a clinical history were requested to be provided when submitting samples.

Samples were examined following APHA standard operating procedures (SOP). This is a third party (UKAS) accredited test. If no ectoparasites were seen on direct examination, a potassium hydroxide (KOH) digest was prepared and examined.

Results

109 submissions were received. Some submissions had several separate samples submitted so 144 individual examinations were carried out in this project.

Table 1 - Diagnoses made and the number of submissions involved

Sheep scab due to <i>Psoroptes ovis</i>	52 (47.7%)
Ectoparasitic disease due to lice	13 (11.9%)
Ectoparasitic disease due to <i>Chorioptes sp.</i>	1 (0.9%)
Submissions diagnosed with both <i>Psoroptes ovis</i> and another ectoparasite*	2 (1.8%)
No ectoparasites detected	41 (37.6%)
Total submissions	109

* One submission had concurrent *Psoroptes ovis* and lice (*Bovicola sp.*) and one submission had concurrent *Psoroptes ovis* and *Sarcoptes scabiei*

Ectoparasites were detected in 68 (62.4%) submissions. No other tests were carried out for other potential skin pathogens (e.g. *Dermatophilus congolensis*, ringworm).

In total 97 different holdings submitted samples to this project, with *Psoroptes ovis* being detected on 51 holdings. Sheep scab had previously been isolated on 11 of these 51 affected holdings, with it being diagnosed in multiple years on 6 of these 11 farms. Of the 97 holdings that submitted to the project, 11 (11.3%) had not previously submitted samples to APHA. Five of these 11 submissions from new submitters to APHA were positive for *Psoroptes ovis* mites.

The majority of sheep scab positive submissions were from adult sheep, which is in accordance with positive sheep scab diagnoses on the VIDA database from 2002 to 2021, across England, Wales and Scotland (Table 2).

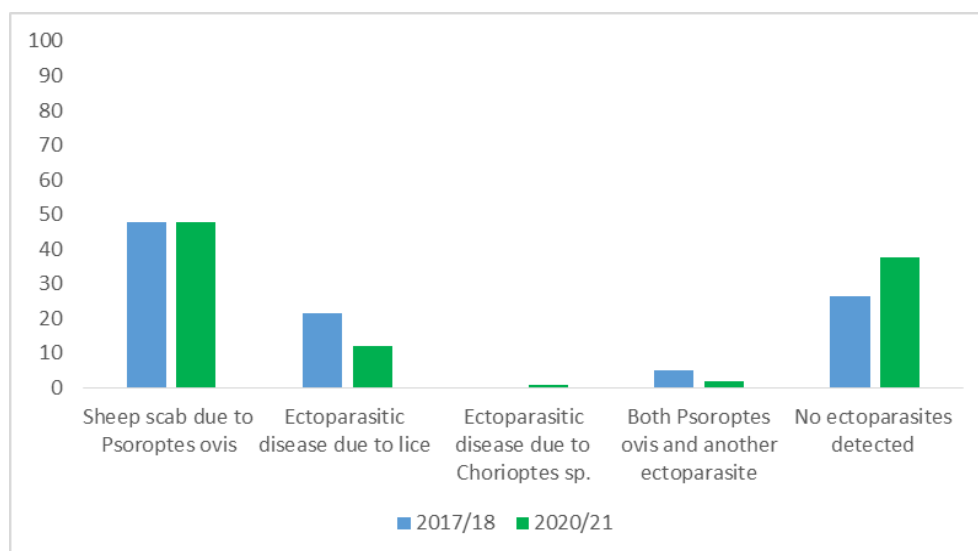
Table 2 - Age category of positive sheep scab diagnoses in the VIDA database from 2002 to 2021 across England, Wales and Scotland

Age Category	No. of diagnoses
Adult	1239
Mixed	214
Postwean	336
Prewean	50
Unknown/other	923

In the majority of cases sheep scab was detected in lowland animals, closely followed by hill sheep. However, this disease can affect all purposes of sheep, and in this project *Psoroptes ovis* was also detected in finishers and pet sheep.

Sheep scab due to *Psoroptes ovis* was the predominate diagnosis (in 52 submissions) with a further one submission where both *P. ovis* and lice were detected, and one submission where both *P. ovis* and *Sarcoptes scabiei* mites were identified. *P. ovis* mites were therefore detected in 49.5% of submissions to this project. This figure is comparable to results from the previous project which offered free ectoparasite examination of samples from sheep in Wales over the winter of 2017-2018, when *P. ovis* mites were detected in 52.4% of total submissions (Figure 1).

Figure 1 - Comparison of diagnoses made as a % of total submissions during free ectoparasite examination in Wales schemes over winter 2017/18 and 2020/21



Sarcoptes scabiei mite infestation of sheep is rare in the UK. Typically, these burrowing mites affect the head, face, axillae and groin of the animal and cause intense pruritus, hyperkeratosis and alopecia. In this project, there was one sample in which one dead *Sarcoptes scabiei* mite was identified at KOH digest, concurrently with dead *Psoroptes ovis* mites also at KOH digest.

Sample quality

It was noted by the laboratory staff undertaking the ectoparasite examinations that the quality of samples received in some submissions was poor, and may have limited the diagnostic value of these samples. The main problem was large samples of relatively clean wool with little to no scab material being submitted. The following information note highlights the importance of accurate diagnosis in suspect sheep scab cases [Mitchell, S. and Carson, A. \(2019\), Sheep scab – the importance of accurate diagnosis. Veterinary Record, 185: 105-106.](#)

Further information about diagnosing sheep scab (including the use of the ELISA blood test alongside skin scraping), sampling guidance, and resistance to macrocyclic lactones (MLs) can be found at the following sources:

- [OV Instructions on APHA Vet Gateway](#)
- [Sheep Veterinary Society - Sheep Scab guidance for vets](#)
- [APHA Information note on Sheep Scab resistance \(English\), \(Welsh\)](#)

Discussion

There was a good uptake in this free testing initiative. In the same period the previous year there were 40 submissions from sheep holdings in Wales to APHA for ectoparasite examination. This free initiative resulted in approximately a 2.7 fold increase in submissions.

However, the total number of submissions received (109 submissions, 144 individual samples) was lower than the number received during the previous free ectoparasite examination scheme for sheep in Wales over the winter of 2017-2018, when 164 submissions (262 individual samples) were submitted. This was despite that scheme running for approximately one month shorter than the current one (2nd November 2020 – 31st March 2021, compared to December 2017 – 31st March).

Sheep scab due to *Psoroptes ovis* was the predominate diagnosis (in 52 submissions) with a further two submissions where both *P. ovis* and another ectoparasite were detected. *P. ovis* mites were therefore detected in 49.5% of submissions to this project. Results from this project indicate that *P. ovis* mites are the major cause of ectoparasitic disease in sheep on Welsh farms.

It is known that private veterinary practices undertake 'in-house' testing to diagnose sheep scab for their clients using microscopy. This may have reduced the number of submissions we received. Caution must therefore be used when interpreting results, in particular when looking at the geographical distribution of positive scab cases. For example, if a veterinary practice covers a wide geographical area and chooses to do their sheep scab testing in-house, rather than sending to APHA, then positive cases in their client catchment area will not be represented on maps which may subsequently be produced using results from this

project. This initiative offered free testing of samples from sheep with clinical signs of sheep scab. The project has therefore only identified flocks with clinical signs, and won't have identified flocks where there is subclinical disease.

As well as examination of skin scrapes as a diagnostic test, there is also a blood ELISA test that has high sensitivity and specificity and can detect infestation as early as two weeks post infestation. Recent research into the uptake of diagnostic tests by livestock farmers ([Mohr and others 2020](#)) looked specifically at the blood ELISA test which can be used to detect sheep scab infestation in sub-clinically infected animals. A game-theoretic model was applied to examine the outcome of strategic interactions between neighbouring farms, surrounding decisions to adopt a diagnostic test. The model was used to assess whether farmers are likely to adopt the new *P. ovis* diagnostic ELISA test for subclinical sheep scab and how this decision depends on whether a farmer considers their farm at high-, medium- or low-risk of infestation as well the costs and benefits of adopting the new test. Their findings provide strong support for the new diagnostic test whilst also indicating that further benefits could be accrued through flock health schemes that encourage and facilitate cooperation between farmers. Another key finding was that adopting the new diagnostic ELISA test for subclinical sheep scab could significantly reduce prevalence of sheep scab and improve animal welfare in a cost-neutral way to the industry.

Treatment options for sheep scab are limited to either injectable MLs or organophosphate plunge dipping (containing diazinon). Since the first evidence of resistance to moxidectin in *Psoroptes ovis* sheep scab mites in the UK (Doherty and others 2018), multiple resistance to MLs has been demonstrated (Sturgess-Osborne and others 2019). Investigating suspect cases of ML resistance was outside the scope of this project. All cases of suspected lack of efficacy should be reported to the Marketing Authorisation Holder (MAH) or VMD at www.gov.uk/report-veterinary-medicine-problem. MLs are also used to kill endoparasites in sheep, therefore care has to be taken when using this class of drug to treat sheep scab, to avoid developing anthelmintic resistance in gastrointestinal parasites.

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