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a Phlanhigion



## Surveillance report into free ectoparasite examination for sheep scab in Wales

1<sup>st</sup> April 2022 to 31<sup>st</sup> March 2023



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# Contents

Executive Summary .....	1
Background .....	2
Material and methods.....	2
Sample quality and diagnosis of scab .....	3
Results .....	4
Geographical distribution.....	5
Discussion .....	6

## Executive Summary

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. Examination of skin scrape samples from sheep showing suspect clinical signs of sheep scab was offered free of charge in Wales, between 1<sup>st</sup> April 2022 and 31<sup>st</sup> March 2023. This initiative was funded by the Welsh Government. Seventy eight submissions were received for ectoparasite examination. Ectoparasites were detected in 48 (61.5%) submissions. Sheep scab due to *Psoroptes ovis* was the predominate diagnosis being detected in 53.8% (n=42) of submissions to this project. The only other ectoparasite diagnosed was the louse *Bovicola ovis* being detected in 7.7% (n=6) of submissions. There were no submissions where *P. ovis* was identified concurrently with another ectoparasite. There were no ectoparasites detected in 38.5% (n=30) of submissions. Of the 42 submissions where sheep scab was diagnosed, *P. ovis* mites were detected by direct microscopy in 18 submissions (42.9%), and only identified after potassium hydroxide (KOH) digest in 24 submissions (57.1%). This demonstrates the importance of using KOH digest if ectoparasites are not detected by direct microscopy, to avoid the risk of false negative results. Location mapping of positive results from this latest free testing project demonstrates that sheep scab is distributed across south and mid Wales, with only a small number of submissions, including positives, being received from north Wales.

## 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. Many 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, 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 1<sup>st</sup> April 2022 and 31<sup>st</sup> March 2023. This initiative was funded by the Welsh Government. This all-year-round free testing follows similar projects which ran over the winters of 2017/18, 2020/21, and 2021/22 the full reports of which can be read here:

- [Report into free ectoparasite examination for sheep in Wales, December 2017 to March 2018](#)
- [Surveillance report into free ectoparasite examination for sheep scab in Wales, November 2020 to March 2021](#)
- [Surveillance report into free ectoparasite examination for sheep scab in Wales, December 2021 to March 2022](#)

The aims of this project 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

Free testing was promoted through direct communication with veterinary practices and Welsh farmers, APHA newsletters and social media. Communications were provided in Welsh and English. This report is for submissions received between 1<sup>st</sup> April 2022 and 31<sup>st</sup> March 2023.

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>

Skin scrape and/or wool samples were submitted to APHA Carmarthen Veterinary Investigation Centre via a farmer's private veterinary surgeon (PVS), either using the APHA small ruminant submission form (<http://apha.defra.gov.uk/documents/surveillance/forms/form-apha3-sr.pdf>) 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.

During the previous project over winter 2021-22, it was asked that an epidemiological questionnaire specific for sheep scab was completed and submitted alongside the samples. Submissions which were not accompanied by a fully completed questionnaire did not qualify for free testing. The requirement to complete this epidemiological questionnaire was removed from 1<sup>st</sup> April 2022, and only a submission form was needed to accompany the 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. The KOH digest helps to detect mites if present in low numbers or in a large amount of debris, thereby increasing the sensitivity of the test.

The geographical distribution of the farms which submitted samples to this project was analysed using the county parish holding number or the postcode of the affected farms.

## Sample quality and diagnosis of scab

The quality of the sample submitted can affect the diagnostic value. Skin scrapes and / or small amounts of wool with lots of scab material adhered are the best sample type. 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:

- [Diagnosing sheep scab using skin scrapes - APHA YouTube Channel](#)
- [OV Instructions on APHA Vet Gateway](#)
- [Sheep Veterinary Society - Sheep Scab guidance for vets](#)
- [APHA Information note on Sheep Scab resistance \(English\), \(Welsh\)](#)

# Results

## Ectoparasite examination

During the period 1<sup>st</sup> April 2022 until 31<sup>st</sup> March 2023, 78 submissions were received which were eligible for ectoparasite examination under the project. Some submissions had multiple separate samples submitted so 97 individual examinations were carried out in this project. Testing for ringworm and *Dermatophilus congolensis* was not performed.

**Table 1 - Diagnoses made and the number of submissions involved**

Sheep scab due to <i>Psoroptes ovis</i>	42 (53.8%)
Ectoparasitic disease due to lice	6 (7.7%)
No ectoparasites detected	30 (38.5%)
Total submissions	78

Ectoparasites were detected in 48 (61.5%) submissions. Sheep scab due to *Psoroptes ovis* was the predominate diagnosis being detected in 53.8% (n=42) of submissions to this project. The only other ectoparasite diagnosed was the louse *Bovicola ovis* being detected in 7.7% (n=6) of submissions. There were no submissions where *P. ovis* was identified concurrently with another ectoparasite which differed from previous years. There were no ectoparasites detected in 38.5% (n=30) of submissions.

Of the 42 submissions where sheep scab was diagnosed, *P. ovis* mites were detected by direct microscopy in 18 submissions (42.9%), and only identified after potassium hydroxide (KOH) digest in 24 submissions (57.1%).

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 2022, across England, Wales and Scotland (Table 2).

**Table 2 - Age category of positive sheep scab diagnoses in the VIDA database from 2002 to 2023 across England, Wales and Scotland**

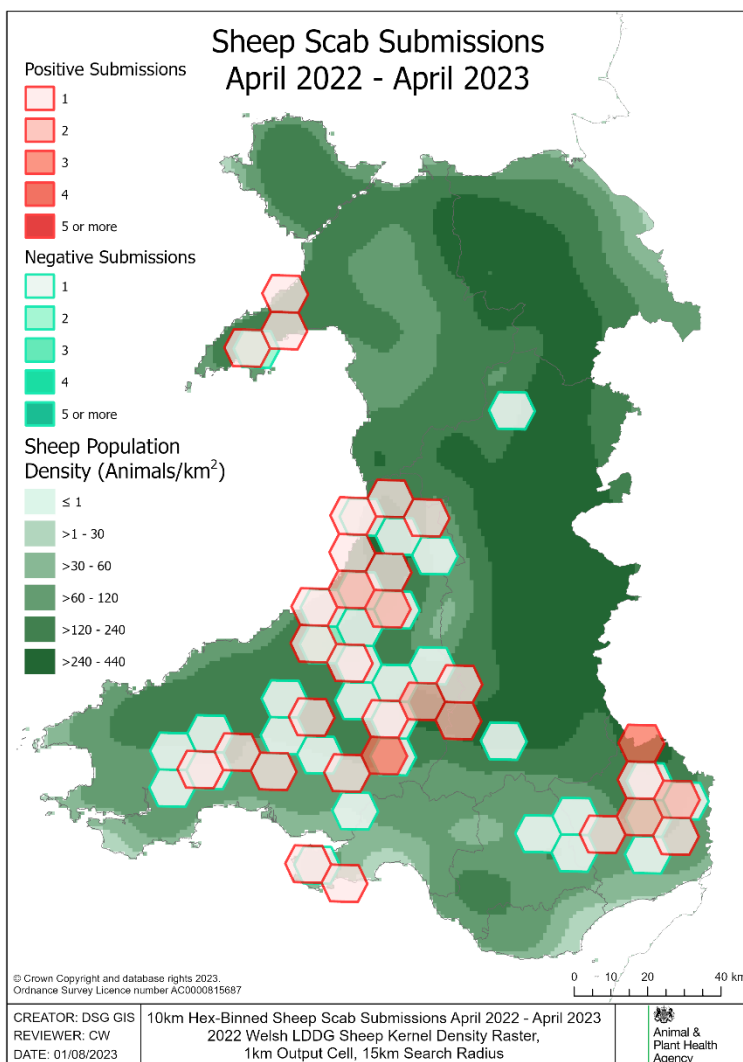
Age Category	No. of diagnoses
Adult	1305
Mixed	224
Postwean	359
Prewean	52
Unknown/other	959

In total 74 different holdings submitted samples to this project, with *Psoroptes ovis* being detected on 40 holdings. A diagnosis of sheep scab had previously been recorded on the

VIDA database for seven of these 40 affected holdings. Of the 40 scab-positive holdings that submitted to the project, seven (17.5%) had not previously submitted samples to APHA.

## Geographical distribution

The following map displays the approximate location of submissions to the project, both positive and negative for sheep scab, overlaid over sheep density. The colour grading within hexagons gets darker as the number of unique positive or negative submissions increases within one hexagon (10km).



**Figure 1 - Sheep scab results for submissions received for ectoparasite examination between 1<sup>st</sup> April 2022 – 31<sup>st</sup> March 2023**



## Discussion

### Uptake of the project

The uptake of this free testing initiative was higher compared to the year before, but still not as high as the number of submissions received during similar projects in 2020-21 and 2017-18 (Table 3). This was despite the project running for 12 months as opposed to previous years when free testing was only offered for approximately four months over the winter period.

**Table 3 – Number of submissions and individual samples received into free ectoparasite examination projects for sheep in Wales.**

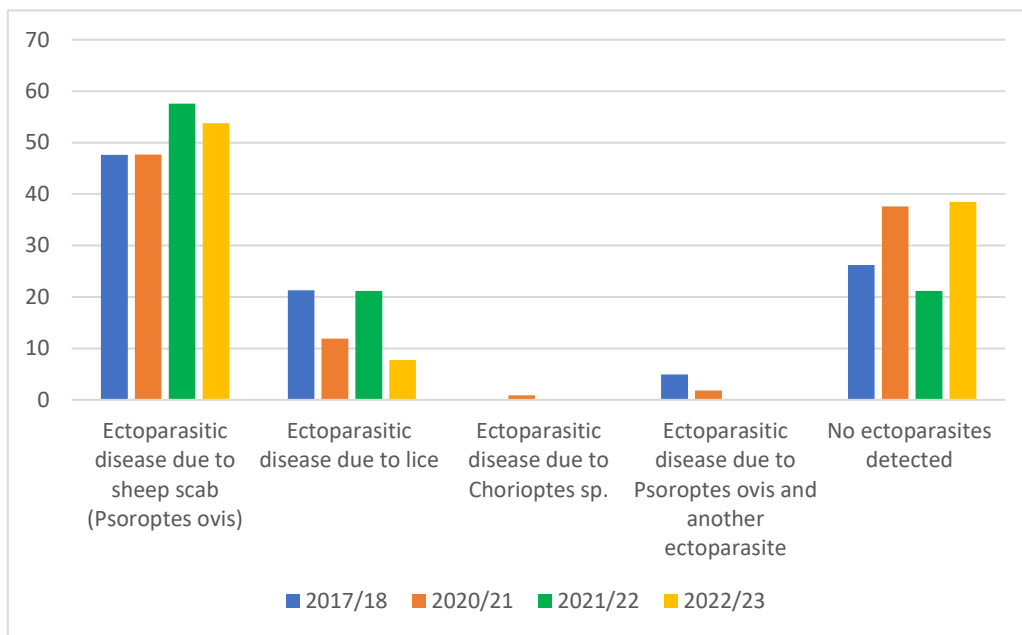
Project timeframe	No. of submissions	No. of individual samples
1 <sup>st</sup> April 2022 – 31 <sup>st</sup> March 2023	78	97
13 <sup>th</sup> December 2021 – 31 <sup>st</sup> March 2022	33	43
2 <sup>nd</sup> November 2020 – 31 <sup>st</sup> March 2021	109	144
December 2017 – 31 <sup>st</sup> March 2018	164	262

It should be noted that private veterinary labs, and some private veterinary practices, undertake testing for sheep scab, which may have reduced the number of submissions under this project. This may add bias, 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, then positive cases in their client catchment area will not be represented on maps produced using results from this project.

Furthermore, 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 but not subclinical disease. Being able to identify sub-clinically infected flocks is an important area which needs to be addressed when designing control strategies for this disease.

### Ectoparasite examination

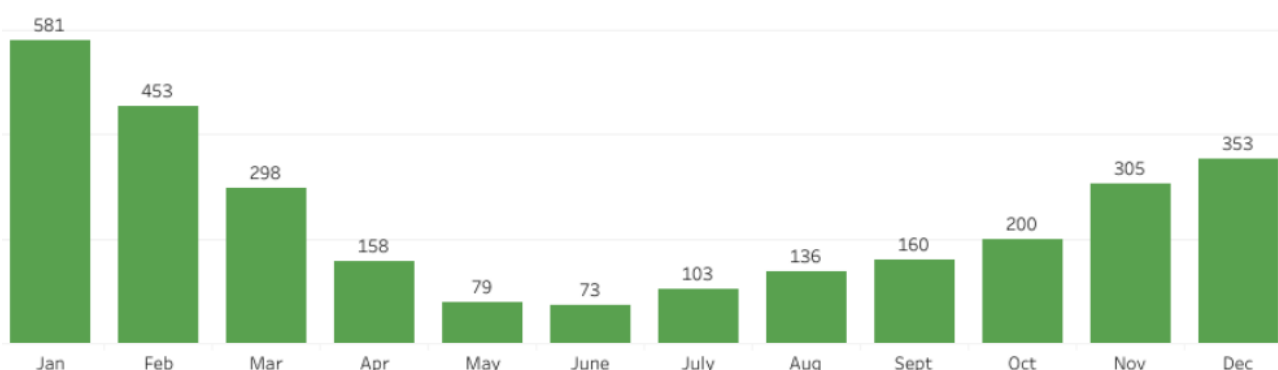
Sheep scab due to *Psoroptes ovis* was the predominate diagnosis being detected in 53.8% of submissions to this project (42 submissions). This is similar to previous years with *P. ovis* being the most frequently detected ectoparasite (Figure 2).



**Figure 2 - Comparison of diagnoses made as a % of total submissions during free ectoparasite examination in Wales schemes over winter 2017/18, 2020/21, 2021/22 and Apr 22 – Apr 23.**

The relatively high proportion of samples that were positive only after KOH digest demonstrates the risk of getting false negative results from skin scrapes if only direct microscopy is used. APHA would encourage the use of KOH digest on skin scrape samples if ectoparasites are not identified by direct microscopy.

The results from this project are in accordance with the VIDA database that indicate *P. ovis* mites as the major cause of ectoparasitic disease in sheep on Welsh farms. Between January 2002 and May 2023 there were 2897 VIDA diagnoses made of sheep scab in Great Britain, 1482 of these were in Wales. The free testing initiatives over the last few years has likely resulted in a higher proportion of diagnoses being made in Wales compared to England and Scotland. The disease is more commonly identified during the winter months (Figure 3).



**Figure 3 – Seasonality of VIDA diagnoses of Sheep scab made in Great Britain between Jan 2002 – July 2023**

## Geographical distribution

Location mapping of positive results from this latest free testing project (Figure 1) demonstrates that sheep scab is distributed across south and mid Wales, with only a small number of samples, some of which positive, being received from north Wales. As the approximate locations of the submissions have been overlaid over sheep density on the map, it can be seen that the majority of submissions were received from moderate to highly sheep dense areas. Interestingly, there were very few submissions from the very highly sheep dense area (darkest green shading) in the east of Wales which spans about two-thirds of the country from north to south. As this was scanning (passive) surveillance, and not all sheep in certain areas were tested, it is not possible to make any interpretations regarding the prevalence of sheep scab in Wales, nor to accurately identify 'clusters' of positive cases.

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