BBSRC-funded NI Sheep Scab Project FINAL REPORT

AHWNI

Contents

1 Executive Summary

Sheep scab has become a significant burden for the Northern Ireland (NI) sheep industry in recent years. It is a highly contagious disease and there is a need for concerted action to control the spread and impact of infection. The control of scab will improve animal health and welfare, reduce the need for treatments, reduce environmental and sustainability concerns, reduce farmer costs and decrease selection pressure for anthelmintic resistance. Eradication of sheep scab by 2031 is a Ruminant Health and Welfare Group target.

This report details the results of the BBSRC NI Sheep Scab Project which ran from August 2022 to October 2023. The aims of the project were to assist in sheep scab control in NI at the farm level working in partnership with private vets, to identify the extent of the disease geographically and within flocks, to explore how stakeholder cooperation could be achieved in dealing with the disease and to investigate the barriers to progress.

The project provided an engagement incentive in the form of a free veterinary visit to participating farms, free diagnosis and treatment, thereby aiming to connect with sheep farmers. Veterinary oversight of the use of OP dips and injectables was a feature of the initiative, allowing tailored treatments to be prescribed and advice to be given. The project also aimed to improve general farmer knowledge and awareness of the disease.

In summary, 155 sheep farmers were engaged with the project initially and of those 105 went on to participate. Of the participating flocks, 32 grazed one area of commonage and had been contacted as a pilot study of scab incidence in that area following detection of several positive cases.

There were 39 veterinary practices or branches involved and 110 veterinary visits were carried out. Blood sampling was conducted in sheep from 95 flocks and 60 flocks returned positive results either by blood testing, skin scraping or both. Sheep scab was detected in 70% of the self-nominating (suspicious) flocks and was detected in 28% of the pilot (non-suspicious) common grazing area flocks.

All flocks in the common grazing area were offered sheep dip following the veterinary visit and blood sampling. Overall, dipping was the treatment of choice in 72 flocks; injectable Macrocyclic Lactones were used in 16 positive flocks (5 of these required subsequent dipping).

Feedback from the project was gathered using an electronic questionnaire that was distributed to 108 flock owners. Of the 52 responses gained, 33 had had positive scab results. Overall 81% would be willing to coordinate the timing of scab treatments with their neighbours. To control sheep scab in the future, 65% would use dip and 12% would use an injectable without blood testing, and 12% would blood test before treating. Every respondent thought that a programme dedicated to the control of sheep scab in NI would be useful in the future and should either be funded through the NI Assembly/ DAERA (67%) or through shared government and industry contributions (33%).

In summary, the project has demonstrated a significant level of interest in dealing with sheep scab and the widespread geographical location of the disease across NI. Farmers willingly engaged with the project to avail of the knowledge exchange opportunities and veterinary involvement. Tailored treatments were prescribed and repeated blood sampling carried out where necessary, with successful outcomes. Farmer feedback received following the project was highly favourable.

2 Introduction

Sheep scab is a highly contagious disease of sheep which is present in NI and can result in significant health and welfare issues, and significantly impacts the physical and mental health of farmers whose stock are affected. It has been identified as a disease amenable for control and eradication, thanks to the availability of diagnostic tools and effective treatments through a collaborative approach.

Following the decision of NI sheep industry stakeholders in spring 2019 to consider the need for a national, industry-led scheme to control and eradicate sheep scab, a BBSRC grant was received to allow a research project to operate, in order to provide information that would influence and shape any future scheme.

The NI Sheep Scab Project, which was run by a project team comprising representatives of the NI Sheep Scab Group, the Moredun Institute, AFBI and AHWNI, aimed to address this issue through a pilot study engaging with 100 flock owners on testing and treatment for Sheep Scab. Project implementation was managed by AHWNI with governance carried out through project team reporting and internal audits.

This report contains a summary of the project, in terms of its uptake, diagnostic outcomes, treatment selection, clinical outcomes and lessons learned for the future that will help to control and eradicate sheep scab in NI.

3 Background

According to the Agricultural Census in NI 2020, there are 1.99 million sheep in NI, of which 946,000 are breeding ewes. Of these sheep, 1.58 million are found in Less Favoured Areas. In total, there are 9,710 sheep farms. [https://www.daerani.gov.uk/publications/agricultural-census-northern-ireland-2020] Farms with more than 500 sheep on 1st June 2020 account for 40 per cent of the total sheep population, while 50% sheep are found in flocks of 100-499 sheep.

The output of the NI sheep meat sector is valuable for NI agriculture: in 2016, sales of lamb cuts were worth £59.2 million, lamb carcases had a value of £10 million and edible lamb offal was worth £2.1 million.

Previous NI and UK scab eradication programmes have not had a sustained effect and success. It is notable that deregulation in 1992 led to an substantial increase in the incidence of sheep scab in the UK.

While the exact prevalence of the disease has not been assessed directly in NI, best estimates are based on a postal survey that was carried out in GB in 2003/2004 which found that overall 9% of sheep farmers reported having at least one outbreak of scab in their flocks[1]. There is little data available on the costs of sheep scab in NI or the ROI, however a study in GB in 2005[2] reckoned costs to be £8.3 million per year, including £0.8 million in reduced animal performance.

4 Aim

The aim of the pilot study was to engage and follow through with 100 flock owners on a testing and treatment programme for Sheep Scab, in order to gather information to inform future research, to increase awareness of the importance of biosecurity and the purchase of sheep from safe sources, to evaluate the costs and consequences of this notifiable disease, and to demonstrate the effectiveness of industry and community-led approaches in tackling sheep scab.

5 Materials and Methods

A series of six Knowledge Exchange meetings (one for veterinary surgeons and five for farmers) were facilitated by AHWNI across NI in August 2022. The proposed scheme was described at the meetings and also advertised in communications through the press and stakeholder organisations. Surveys were advertised, issued to participants at the point of entry to the scheme, and returned, where completed, to AFBI.

After expressing an interest in the scheme, those who agreed to participate were offered on-farm consultations, sample collection and analysis, and treatment support.

On-farm consultations

Following a farmer reporting to their local vet or the scheme that they might have a scab infestation in their flock, a private vet from the farmer's practice visited the farm with one hour allocated for the visit. The vet obtained a history for the affected animals including details, such as any recent movements onto the farm and recent treatments that the affected sheep might have received. A conversation also took place regarding treatment protocols that should be followed if the results of testing were to suggest scab was present in the flock.

Farm biosecurity was reviewed by the veterinary surgeon during the initial visit, to consider the general risks to flock health and the opportunity was provided to discuss veterinary intervention to improve welfare and productivity, and to improve the stewardship of medications used on the farm. A sheep scab Risk Assessment form was returned to the project by the veterinary surgeon.

Sample collection and analysis

A clinical examination of affected sheep was carried out. If the veterinary surgeon had a high suspicion that scab was present and found fresh, typical lesions, skin scraping was undertaken from the edges of active lesions. Wool samples could also be taken from the most pruritic (itchy) sheep in the flock, or those with discoloured or wet fleeces. (Where the diagnosis was lice and not scab, the flock keeper was informed by their vet and the proper treatment advice given.) The presence of a live mite provided a positive diagnosis of sheep scab. However the presence of dead mites did not indicate active infection in either the individual animal or the associated flock. The use of microscopic examination is available at most veterinary practices and Dr Stewart Burgess of Moredun Laboratories was willing to provide a backup service.

In addition, a representative sample of 12 sheep, including pruritic sheep, were blood tested (and identified to allow retesting several weeks later if necessary) and the blood submitted for sheep scab antibody testing to Biobest Laboratories, Edinburgh. The sheep scab ELISA test, used as a flock test, can detect antibodies (to a unique protein found in the mite) from 2 weeks after infestation, so it can

be useful in identifying infection before the development of clinical signs or in cases where mite numbers are low. A single positive result was sufficient to indicate infestation with the mite.

The results of the ELISA testing were considered in conjunction with veterinary findings by Dr Burgess, and an interpretation provided and returned to the veterinary practice and AHWNI. An Optical Density (OD) of >50 was interpreted as a positive result, with an OD of 40-50 being borderline, however the final flock level interpretation considered the flock's treatment history and assessed the risks, so that the best advice could be given. Where a 'positive' result was returned, a recommendation was made to treat flock, preferably using an OP plunge dip if possible.

An interpretation of 'Monitor' was returned where there was a single or small number of low positive animals in a flock, no signs of disease and no recent treatments. Advice was given that if clinical signs appeared in the future, then a follow-up blood test could be provided.

An interpretation of 'Suspicious' was returned where the sheep scab ELISA results were negative, where there were no recent treatments and where clinical scab was suspected, but any skin scrape taken at the time was negative. Given that the ELISA can detect scab within a couple of weeks of an infestation, in a negative results scenario, the infestation could be at an early stage and the animals yet to seroconvert. In this type of case, a recommendation was made to treat the flock, preferably using an OP plunge dip if possible.

Private vets followed up with their clients and AHWNI also contacted scheme participants about the results and to discuss further action under the scheme.

Notification of disease

Sheep scab is notifiable in NI under the Sheep Scab (NI) Order 1970 and any suspicious signs should be reported to the local DAERA Direct office. When sheep scab was suspected or confirmed, a sheep scab notification was instigated with DAERA by the flock owner's private vet. Agreement had previously been reached with DAERA that, given the involvement of private vets and other project personnel, communications with flock owners should be by telephone to offer advice about the restriction and derestriction process and explain the provision to send animals directly to slaughter. Following confirmation of treatment by a private vet to DAERA, flock restrictions were lifted.

Treatment support

A treatment plan was developed for affected flocks in line with the scheme guidelines. Where a positive diagnosis of sheep scab was made, a volume of sheep dip for treatment of up to approximately 500 head was offered. The dip was prescribed by a veterinary member of the technical team and delivered to a nominated and certified dipper. Dipping using a contractor was the preferred method of treating sheep scab on all farm premises with a diagnosed scab outbreak.

When a farmer chose a treatment that was not preferred within the scheme guidelines, subsidised treatment costs were capped at the rate of the guideline treatment. Administration of a suitable Macrocyclic Lactone (ML) was approved if dipping was not deemed to be suitable (for example due to heavily pregnant ewes requiring dipping). This was prescribed through the project and follow up blood testing was recommended.

Treatment failures
After two weeks following treatment, if it was reported that sheep were still itchy, a further vet visit was funded and blood sampling and possible skin scraping were repeated.

Hot spot identification
On identification of a hot spot, discussions took place between project team members, local vets and affected local sheep farmers. AHWNI made efforts to engage with sheep farmers in the area to encourage participation in the project, so as to identify flocks infected with the scab mite through blood testing with the follow up aim of treating all sheep in the affected area within a tight timeframe.

The trustees of a common grazing area in the Mournes (Mourne Mountains West), Co Down, were contacted following the emergence of several infected flocks. A meeting was held in conjunction with a local DAERA Business Development Group which included some of the graziers. The trustees of the common grazing area held a vote at their AGM which was successful in introducing the requirement that all sheep going on to the common grazing from the 2023 season onwards would have to be dipped in a short window before movement. From this point, AHWNI contacted the potential graziers on the Mourne Mountains West (based on allocation of rights and grazing history) to offer the veterinary visit, skin scrapes where appropriate, blood testing and subsidised provision of dip.

6 Results

Scheme Uptake

When it became evident that several flocks grazing one area of common grazing (Mourne Mountains West) were suspected of having scab, a decision was taken to expand the pilot scheme to include one such area and as a result 49 common graziers were also contacted.

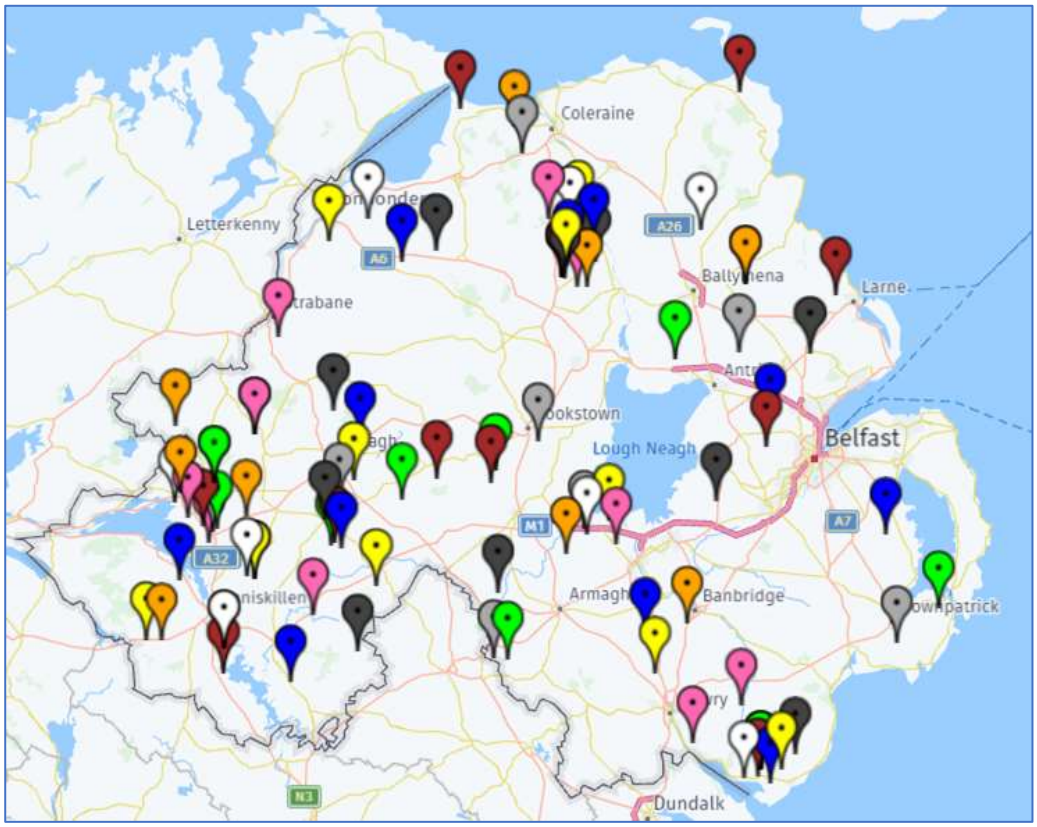
All named graziers on Mourne Mountains West were contacted; all agreed to dip their sheep, either through the project or separately.

	Initial contacts	Not taken further	Final participants
Individual cases	106*	33	73*
Selected common grazing area	49	17	32
TOTAL	**155**	**50**	**105**

*including 5 flocks from Mourne Mountains West that reported concerns individually and in advance of the common grazing area recruitment drive.

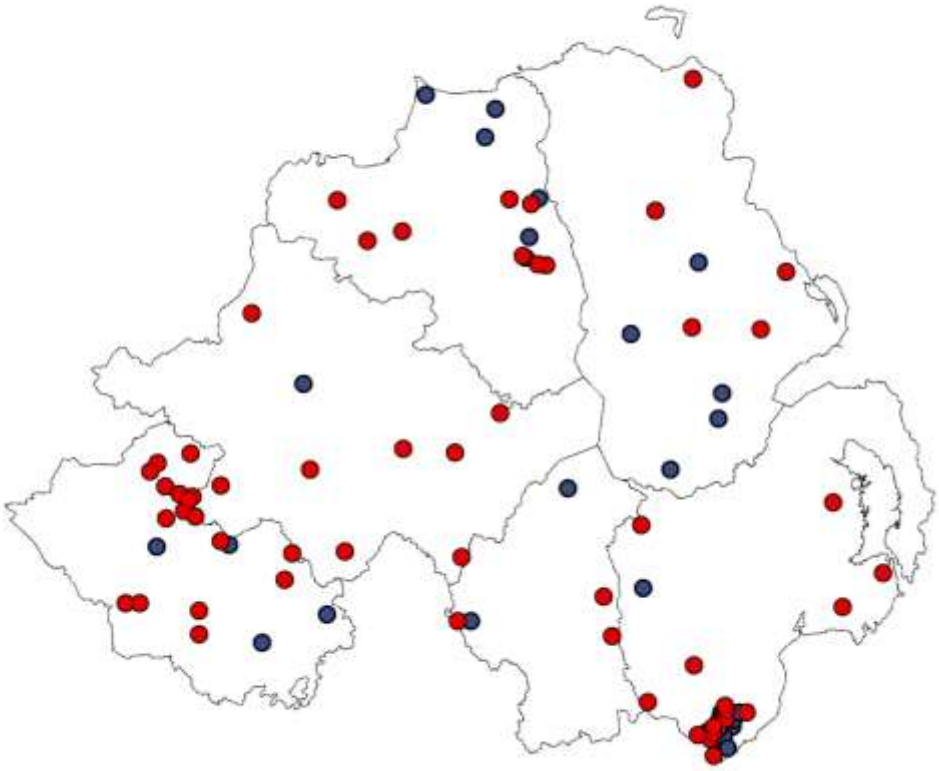
Farmers who expressed an interest the scheme were widely distributed geographically across the six counties of NI (see Map 1).

Map 1: Map showing location by postcode of initial farmer contacts who expressed interest in the scheme, excluding common grazier component



Map 2: Map showing showing geographical location of participating farmers, including common graziers

Key:
Red dots – scab positive flocks
Blue dots – no confirmation of scab



Summary of clinical signs initially reported

	Yes	No	Not known
Sheep scratching	100	46	9
Wool removal	93	52	10
Unsettled behaviour	81	65	9

In 41 flocks, no clinical signs were reported: the 41 owners were all common graziers (39 grazed Mourne Mountains West).

Veterinary practice involvement

There were 39 vet practices or practice branches involved.
In total, 110 veterinary visits to 105 flocks were carried out.

Diagnostic outcomes

- **95** flocks blood tested with scab ELISA
- **54** skin scrape samples taken for microscopy

- **23** negative flocks on microscopy
- **60** positive flocks (either by scrape/blood test or both)
    - **51** positive flocks had been individually reported (70%)
    - **9** positive flocks were identified in the common grazing area (28%)
- **31** flocks positive on blood test results alone
- **20** flocks positive on skin scrape and blood test
- **9** flocks positive on microscopy

- **4** suspicious flocks
- **3** monitor flocks

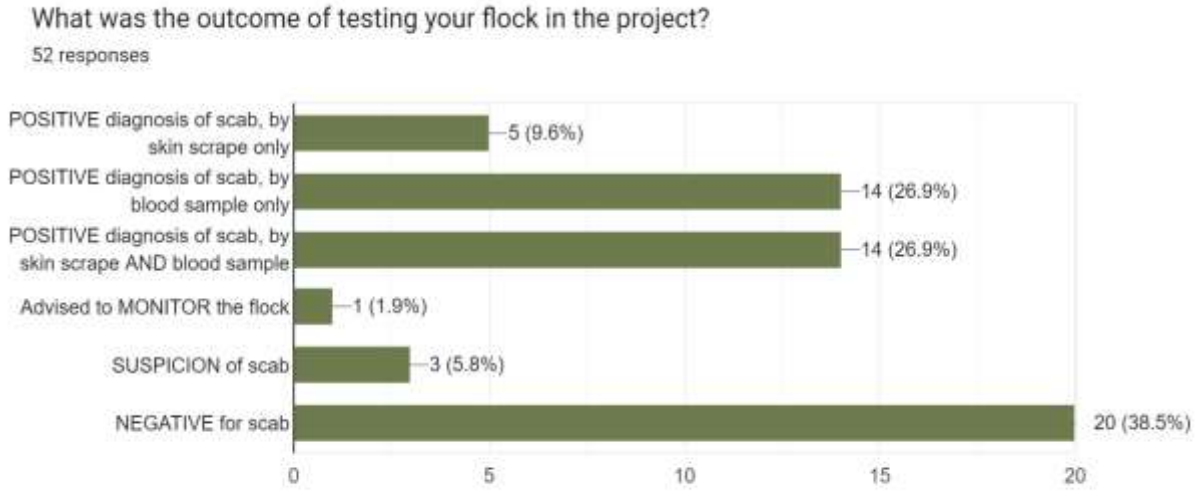
Treatment selection

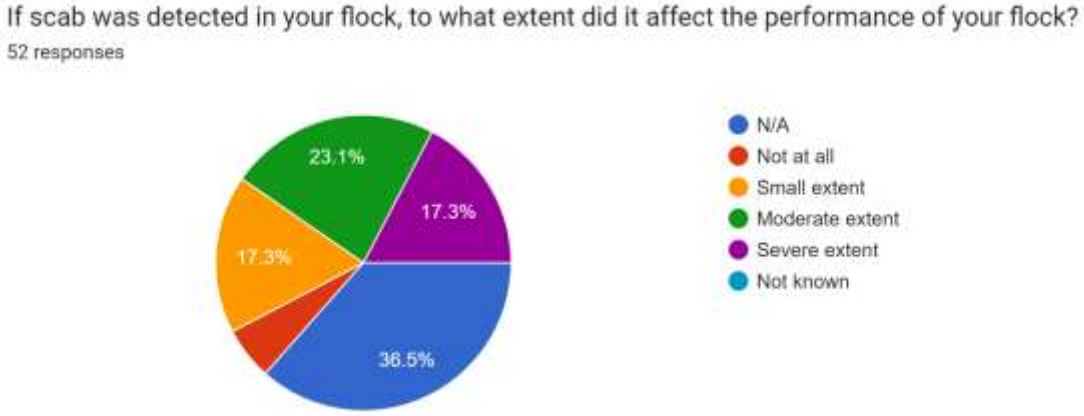
- **16** flocks treated with injectable MLs
    - 4 of which required subsequent dipping through the scheme, and
    - 1 of which was dipped by the flock owner outside the scheme.

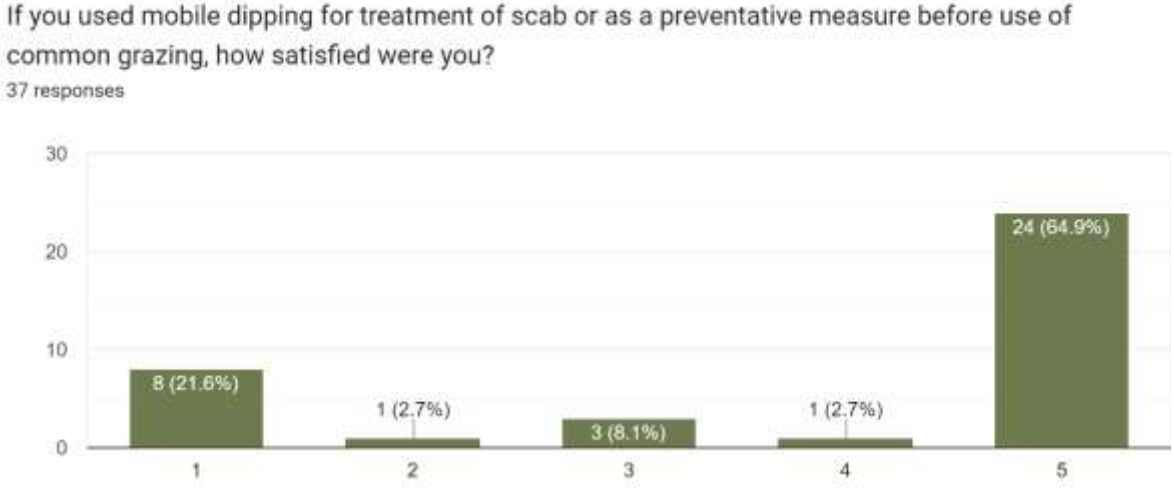
- **72** flocks dipped
    - 45 individually reported flocks
    - 27 common grazing flocks on Mourne Mountains West
    - A further **3** flocks dip in the autumn as their sheep traditionally go on to Mourne Mountains West grazing during October.

Follow up questionnaires

There were 108 follow up questionnaires distributed by AHWNI during August/ September 2023 using a link in a text message sent to mobile phone numbers. A total of 52 surveys (48%) were returned. Results are summarised below:



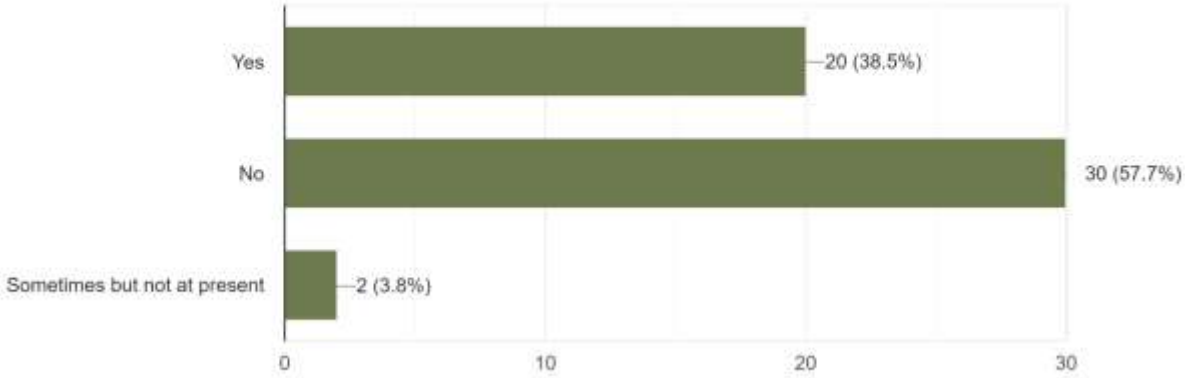




Where 1 = very unsatisfied, 5 = very satisfied

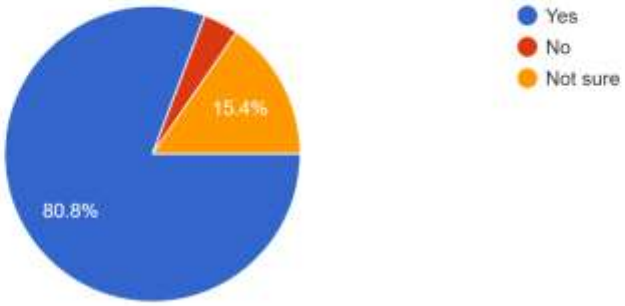
Do you use common grazing?

52 responses



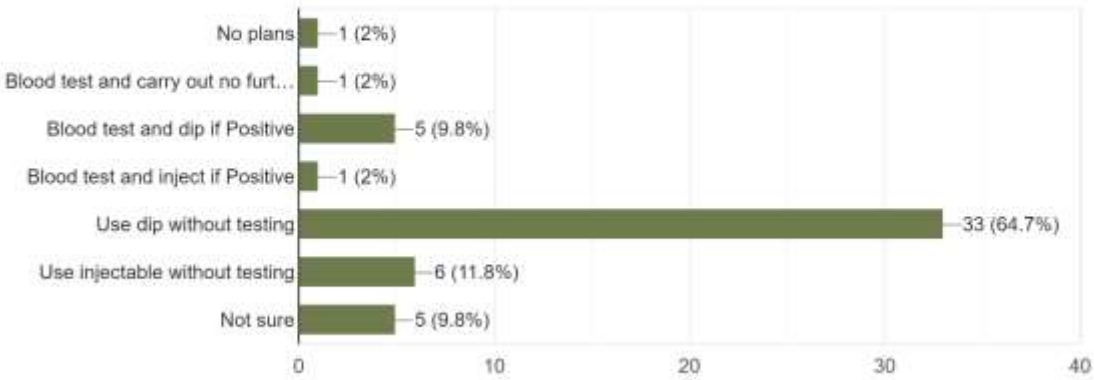
Would you be willing to coordinate the timing of scab treatments with your neighbours in future?

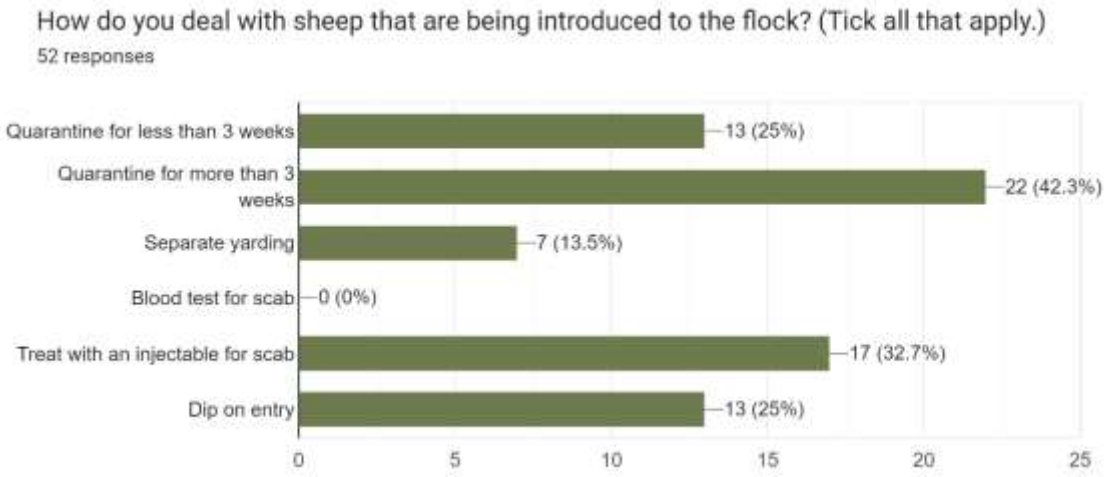
52 responses

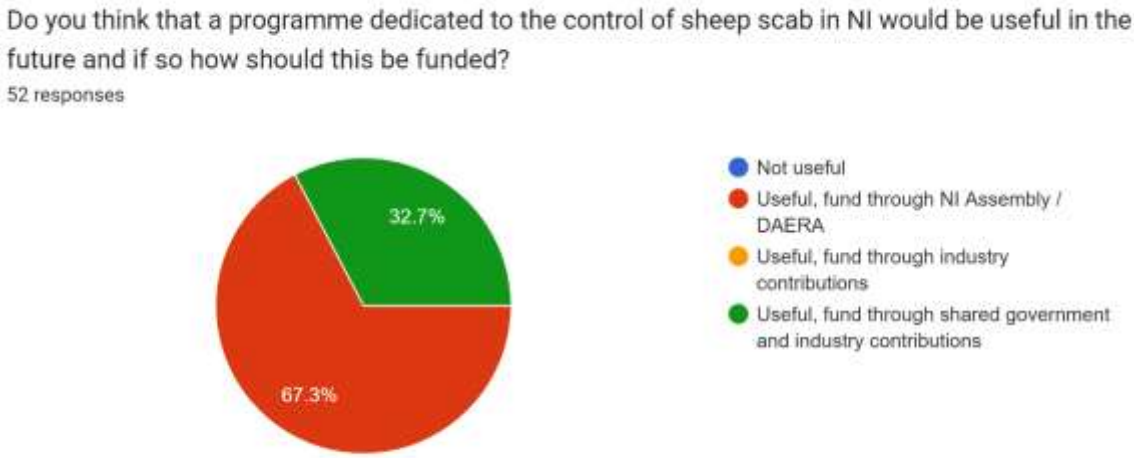


How do you plan to control sheep scab in future in your flock?

51 responses







Free text verbatim responses to the following queries are available in Appendix 1.

1. Regarding communications, the veterinary visit, testing for scab, flock restriction/ derestriction and treatment, what aspects of the project delivery worked well and what could be improved?
2. How has the project affected the control of scab in your area?
3. What could industry do better or differently if working on a national control programme for sheep scab?

Overall and in line with the responses above, the feedback was useful, positive and supportive of the scheme and potential future actions on sheep scab.

7 Issues

Issues to note affecting Project Management

Factor	Issue	Possible mitigations
Farmer engagement	Reluctance of some farmers to join scheme due to DAERA notification requirements	Publicity around short restriction windows
	Not seeing Sheep Scab as a problem to be dealt with urgently, therefore delays in treatment	Educational materials/ knowledge transfer (farmers)
Veterinary visit and follow up	Resource/ prioritisation issues - veterinary workforce: - visit delays - visit report form completion delays	Develop app for on-farm completion by vet
	Identification of individual sheep requiring follow up sampling	Mark sheep at initial sampling
	Microscopy	Develop reference materials for vets
Diagnostic process and results	Royal Mail strikes impact on sample delivery times	Use of alternative courier
	Results/clinical picture mismatch	Communicate test efficacy data to vets
	Delay in return of results	Laboratory issue
	Sub-optimal sampling strategy: Occasional sampling of 2-3 sheep per batch to get a total of 12 across flock, although each batch had not run together, impacting the ability of the test to detect scab.	Knowledge transfer (vets)
Treatment	Multiple locations due to winter grazing, therefore risk of reservoirs of infection Potential high levels of movements Risks presented by neighbouring flocks	Comms strategy to advise all flock owners of risks
	Reluctance to dip as lambing approaches	Effective knowledge transfer to ensure optimal timing of dipping

	Farmer withdrawal from treatment programme in part due to his confidence in the Negative result returned	Need to positively encourage farmer commitment through an individual agreement
	Farmer need to ensure that sheep are in dipper/ mobile dipper for correct length of time	Random visits to view/ QA dipping
	Need for process to ensure prompt return of information from mobile dippers	Review release of dipping prescriptions to nominated dippers if delayed feedback on flocks/ numbers/ dates dipped
	Inability to access dipping courses	Need for more supervisors/ courses in NI
	Waiting time for mobile dipper in busy season	More farmers trained in dipping; increased mobile dipper availability
	Length of time for NIEA groundwater licence approval	NIEA process issue
Derestriction	Delayed action on notifications to DAERA	Need for DAERA to find pathway to ensure that notifications are acted on and to notify Project that derestriction has taken place eg note of receipt
	Varying degrees of follow up in different DVOs	Need for a consistent approach by DAERA
Project Comms	Lack of map references	Data Sharing Agreement
	Call log functionality	Process development

8 Discussion

Overall, participation in the project was very good, with 68% (105 out of 155) of those farmers who made initial contact going on to take part. This was similar to the level of uptake (65%) noted in the common grazing pilot area. Some non-participants indicated their concern that their flock would be restricted by DAERA and were willing to forfeit the free service.

The distribution of participants was widespread with all counties of NI reflected. Several hotspot areas were identified, and discussions between the project team and practitioners took place in these areas to ensure that appropriate follow up was offered.

There were 39 veterinary practices or branches involved and 110 veterinary visits were carried out, demonstrating a high level of commitment from the veterinary professions. In total, 60 flocks (57%) returned positive results either by blood testing, skin scraping or both. Sheep scab was detected in 70% of the self-nominating (suspicious) flocks and was detected in 28% of the pilot (non-suspicious) common grazing area flocks. These results demonstrate that sheep scab is a substantially greater problem than previous notifiable disease reports would have suggested.

All flocks in the common grazing area were offered sheep dip following the veterinary visit and blood sampling. Overall in both self-nominated and common grazing area flocks, dipping was the treatment of choice in 72 flocks; injectable Macrocyclic Lactones (MLs) were used in 16 positive flocks (4 of these required subsequent dipping through the scheme and 1 flock owner carried out follow up dipping independently). There was an evident willingness to use sheep dip; use of MLs was commonly predicated on the fear of the handling of pregnant ewes leading to abortions or stillbirths. Access to dipping courses was extremely limited according to several farmers, particularly in the common grazing area, leading to frustration, as some individuals would have liked to have been able to use their own dipping facilities but were hampered due to lack of course provision. It has been difficult to ascertain who is responsible for ensuring that this need is met, with no obvious progress being made during the lifetime of the project.

The feedback from the project gathered using an electronic questionnaire that was distributed to 108 flock owners, with 52 questionnaires being completed, illustrated a significant willingness among respondents (81%) to coordinate sheep scab treatments with neighbours, providing proof that sheep farmers are keen to cooperate in order to stamp out sheep scab. The project was a catalyst to allow the timing of dipping to be optimised in the common grazing cases.

To control sheep scab in the future, 65% would use dip and 12% would use an injectable without blood testing, and 12% would blood test before treating. The turnaround time and cost of blood sampling is likely to present a major barrier to farmer-driven sampling unless incentives are provided.

Every respondent thought that a programme dedicated to the control of sheep scab in NI would be useful in the future and should either be funded through the NI Assembly/ DAERA (67%) or through shared government and industry contributions (33%). Every farmer believed that there should be an element of government funding to support the eradication of sheep scab.

Summary of barriers to eradication

In dealing with farmers affected by sheep scab, barriers to dealing with the disease became apparent. These included the cost of treatment, time taken to gather, test and treat sheep, lack of awareness of the economic impact of the disease, lack of physical help on farms, convenience of ML use, concern

over NIEA requirements, lack of sheep dip safety course provision in NI, lengthy withdrawal periods, DAERA restrictions, infection on neighbouring farms, unwillingness to report neighbours and a noted lack of enforcement action in markets and abattoirs.

In summary, the project has demonstrated a significant level of interest in dealing with sheep scab and the widespread geographical location of the disease across NI. Farmers willingly engaged with the project to avail of the knowledge exchange opportunities and veterinary involvement. Tailored treatments were prescribed and repeated blood sampling carried out where necessary, with successful outcomes. Farmer feedback received following the project was highly favourable.

9 Conclusion

The project has allowed lessons to be learned for the future that will help to control sheep scab in NI. Outcomes from the Project have involved contributions to reducing anthelmintic resistance and also to more efficient and sustainable livestock production through improving flock health. Sheep scab has become a significant burden for the NI sheep industry and it risks affecting animal welfare and the reputation of the industry. There is a need for concerted action to control the spread and impact of infection. It is an RHWG target to eradicate scab by 2031.

For regional control to be developed, the NI sheep industry will need to work in a co-ordinated way with multiple stakeholders. Given cost issues, economic incentives, such as subsidising the cost of dips or introducing penalties, would be required to foster commitment to a control plan. A coordinated plan can generate success if there is farmer cooperation with control measures in a particular period of time, for example, in the autumn after substantial movements have taken place and before the mating season, or prior to movements to common grazing. Ultimately sheep scab control in NI needs to have simultaneous involvement of and cooperation between farmers in affected cluster areas as part of a regional control plan.

10 Appendix

References

1 Bisdorff et al, 2006. Prevalence and regional distribution of scab: lice and blowfly strike in Great Britain. *Vet. Rec.* 2006; **158**: 749–752.

2 Nieuwohf and Bishop, 2005. Costs of the major endemic diseases of sheep in Great Britain and the potential benefits of reduction in disease impact. *Anim. Sci.* 2005; **81**:23–29.

AHWNI Nov 2023
Published March 2024