Animal &
Grassland Research
and Innovation
Programme

Teagasc

Hill Sheep Conference 2022

24th February 2022
Clayton Hotel, Sligo

Teagasc
Agriculture and Food Development Authority

Teagasc National Hill Sheep Conference 2022

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Teagasc Hill Sheep Conference 2022

Programme

Thursday, 24th February 2022

Venue: Clayton Hotel, Sligo.

Chairperson: James Keane, Regional Manager.

19:00 **Conference Opening**
Prof. Frank O'Mara, Director, Teagasc.

19:10 **Developing innovative actions for High Nature Value Farming in the MacGillycuddy Reeks: solutions and challenges looking ahead**
Patricia Deane, Project Manager, MacGillycuddy Reeks, EIP.

19:40 **An overview of the work to date examining the effect of breed on the performance of hill sheep**
Frank Campion[1], Michael Diskin[1], Michael Gottstein[2], Noel Claffey[1].
[1]Teagasc, Animal & Grassland Research and Innovation Centre, Athenry, Co. Galway.
[2]Teagasc, Macroom, Co. Cork.

20:10 **Post-mortem findings in sheep submitted to Regional Veterinary Laboratories**
Shane McGettrick, Post-mortem findings in sheep submitted to Regional Veterinary Laboratories.

20:40 **Eye problems and Blindness in Sheep**
Seamus Campbell, Advisor, Teagasc Carndonagh, Co. Donegal
&
Gerald Roarty, MVB BA (TCD) MSc (Lon).

21:10 **Conference Closing.**
Damian Costello, Sheep Specialist, Teagasc Athenry, Co. Galway.

Foreword

The latest published sheep census statistics (Dec 2020) show that there were 35,592 flocks in Ireland, an increase of 2% from 2019. Sheep farming is a significant part of our agricultural industry with more than 1 in every 4 farms in Ireland involved in sheep production. The number of breeding ewes increased by 2.7% on 2019 figures to 2.64 million ewes. Sheep production is a significant contributor to the agricultural and national economy producing 64,000 tonnes of sheep meat, valued at €354 million to the national economy in 2020. Over the past decade we have witnessed greater market diversification, with over 40% of sheep meat shipments, by volume, destined for markets other than the traditional French and UK markets. Diversified, high value markets are becoming significant destinations for Irish sheep meat. In 2021, sheepmeat exports increased by 11% due to the increase in exports from Ireland to Asian, Japanese and middle eastern markets.

The Irish Hill Sheep sector plays an important role in the economic health of rural economies and the maintenance of the natural landscape in many of Ireland's most scenic areas. Low output and often depressed markets for male store hill lambs has resulted in low margins for this sector. Notwithstanding this, the Cheviot and Scottish Blackface hill ewes are very hardy and resilient breeds and are hugely responsive to improved nutrition. The hill ewe, irrespective of breed type, has a significant untapped potential both in the hill environment and as the dam of prolific cross bred ewes for the lowlands. This year, the Teagasc Hill Sheep Conference focusses on aspects of animal health and the impact of breed on the performance of hill ewes while a European Innovation Project (EIP) situated in the MacGillycuddy Reeks developing innovative actions for farming the uplands will be presented. Maintaining and improving the environmental and ecological condition of the uplands is crucial going forward with the MacGillycuddy Reeks EIP addressing the challenges and constructing potential solutions. Animal breed type significantly affects production performance. Frank Campion will outline results from Teagasc studies looking at effect of breed type on performance of hill ewes. Shane McGettrick from the regional veterinary laboratories will give us an overview of the primary post-mortem findings from their laboratories and some of the main causes of death on sheep farms including practical tips on how to reduce mortality in your flock. Finally, Seamus Campbell and Gerald Roarty will outline the most prevalent and problematic eye infections affecting sheep flocks while also summarising effective treatments and preventative measures.

I welcome the continued focus at this year's Teagasc Hill Sheep Conference on Take Home Messages. It's only when knowledge is applied at farm level that you will see the benefits in terms of efficiency, productivity and ultimately profitability. Over the years a significant amount of new information is presented at the Teagasc Hill Sheep Conference and this year is no different. Continuous generation of new information and reminding yourselves of best practices is critically important and the incorporation and application of this information into on-farm production systems must be the on-going aim of sheep farmers. This booklet collates and summarises a significant body of knowledge on technical issues in sheep production and should prove an invaluable reference to sheep producers. I would like to thank all of the speakers, the Teagasc staff who assisted with the organisation of the Hill Sheep Conferences and especially the organising committee without whose efforts this would not have been held.

Frank O'Mara

Director, Teagasc.

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Organising Committee: Teagasc Sheep Programme Team

Developing innovative actions for High Nature Value Farming in the MacGillycuddy Reeks: solutions and challenges looking ahead

Patricia Deane

Project Manager, MacGillycuddy Reeks EIP Project, South Kerry Development Partnership, The Old Barracks, Beaufort, Killarney, Co. Kerry.

Take Home Messages

- The MacGillycuddy Reeks EIP Project has been supporting farmers to improve the environmental and ecological condition of their land and to tackle the spread of bracken, rhododendron ponticum and scrub.
- Result-based habitat assessments play a central role in measuring improvements, however thought needs to be given on how to improve the condition of sites that are not being incentivized through the results-based payment model.
- Grazing levels are one of the most significant factors affecting the condition of the peatland habitats. Having the optimum grazing level, at the appropriate time, with the right breed of sheep is key to obtaining habitat improvements.
- Dual grazing is an important management tool for dealing with coarse vegetation and can greatly reduce the need for burning if targeted in the correct areas.
- The difficult mountainous terrain means there is no easy way to complete actions. Work is expensive, labour intensive and mostly undertaken by hand. The project supports farmers to fund the work and find help through the creation of collective groups and/ or the use of contractors.

Introduction

The MacGillycuddy Reeks Project is a European Innovation Partnership (EIP) Locally Led Scheme. The Project is funded by the Department of Agriculture, Food & the Marine as part of Ireland's Rural Development Programme 2014-2020, with South Kerry Development Partnership as the led partner.

The MacGillycuddy Reeks EIP Project aims to improve the sustainability and economic viability of farming in the MacGillycuddy Reeks. This is implemented through the development of practical, achievable actions and innovative solutions in order to improve the condition of the habitats in this unique Natura 2000 area, in close conjunction with the landowners/farmers in the area.

Landowners here face difficult challenges farming in the MacGillycuddy Reeks due to the terrain, climate, succession issues, economically unviable labour-intensive practices; and the rising pressures brought about by increasing recreational activities each year with visitors climbing Irelands highest mountain, Carrauntoohil.

The MacGillycuddy Reeks EIP Project came into being as a result of the work of The MacGillycuddy Reeks Mountain Access Forum, led by the Local Development Company - South Kerry Development Partnership and supported by the Department of Rural & Community Development. The Reeks Mountain Access Forum was established in May 2014 with the aim of protecting, managing and sustainably developing the

MacGillycuddy Reeks Mountain Range. The Forum members include landowner representatives, NPWS, local community groups, recreational users, commercial guides representative, SKDP, Department of Community & Rural Development, Kerry County Council and Fáilte Ireland. The collaborative approach of all interested parties having a voice, being listened to and aiming to resolve issues was essential in building relationships and developing trust when developing and rolling out the EIP project.

In 2021 The MacGillycuddy Reeks Forum and EIP Project had their efforts recognised when they were named as Runners Up in the International Mountain Protection Award for 2020-2021, overcoming stiff competition from some of the most well known mountain ranges around the world including The Alpine Club of Canada, The Alps Mountaineering Villages, The Himalayan Togetherness for the Sustainability of the Mountain Trails, the United Kingdom H20 Community Hub Scheme and The South American Clean Mountain Project.

The MacGillycuddy Reeks EIP Project Team consists of one full time Project Manager, one part-time Project Ecologist and one part-time Project Administrator, supported by an Operational Group.

Measures & Payments

The project has three different types of payments:

1. Results based habitat payments. These payments are made to farmers based on habitat quality scores earned at land parcel level, and are determined using an adapted peatland scorecard. The habitat quality relates to specific quantitative and qualitative environmental attributes. These reflect habitat condition, landscape value and the richness of biodiversity in the area, and are supported through controlled grazing.
2. Actions based payments. This is whereby the farmers aim to improve the environmental & agricultural condition of their farm holdings through the implementation of actions from agreed individual or commonage work plans. These include:
    a. Rhododendron Removal: We are working to control and eradicate rhododendron from all sites in the project area. This is undertaken as per the methodology developed in the adjoining Killarney National Park and the Irish Wildlife Manual, involving a combination of stem injection and or stump treating depending on the age, location and density of rhododendron.
    b. Bracken (fern) Removal: Following site specific assessments, a combination of one of the following is used: targeted spraying, re-introduction of suitable livestock for trampling and cutting.
3. Supporting actions payments. These site-specific actions are to take account of the high numbers of recreational visitors, (in excess of 130,000 annually) to the area who are having an impact on farming and the peatland habitats in the Reeks. These include:
    a. Landowner Ranger System: This action aims to increase awareness amongst recreational users on such topics as Leave no Trace, farming traditions, ecology and why dogs are not permitted etc., thereby increasing positive interactions between landowners and recreational users.
    b. Trail Maintenance and Definition: Recreational pressure is impacting on agricultural activities, having resulted in a loss of vegetation (affecting habitats & soils) and the outward spreading of a damaged or degraded zone within this sensitive upland environment. This action aims to maintain repaired existing paths to encourage walkers to continue using these paths.

Training is a critical part of the project. All participants attend annual habitat awareness & management training, and are shown how to use the peatland scorecards. Hand held pesticide application is mandatory for all participants carrying out rhododendron and bracken treatment. Talks and workshops have taken place on: Bracken Management, Gorse/furze management, and controlled burning to increase awareness of best practice, and allow for the sharing of information and skills. As part of the EIP. all participants are paid for their time to attend training events.

Annual plans

Each year the Project Ecologist devises site specific plans for both commonage and non-commonage land, in consultation with the participating farmers. These take an account of the site -specific issues pertaining to the land, the results-based habitat assessment and what actions are required to improve their habitat score, be it controlled grazing, introduction of cattle, treatment of rhododendron, management of bracken etc. All actions are agreed with NPWS, and all legislative requirements are carried out by the EIP Project Team.

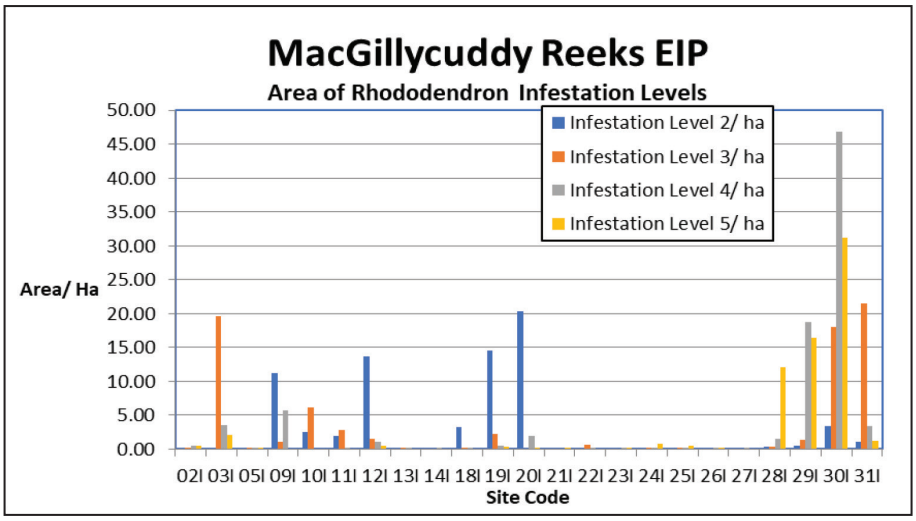

Figure 1. Baseline Area of Rhododendron by Infestation Level for Sites Assessed in Years 1, 2 and 3.

Collective approach

Being aware that many farmers depend on off farm employment as an income support, farmers do not have adequate time to carry out labour intensive work on the land, in conjunction with the fact that some of the work was too onerous for an individual were challenges initially for the project. However, this was overcome by building skills locally through the development of 'collective groups'. These collective groups are local farmers and local people who obtain the necessary training required to carry out work on behalf of participating farmers, as self-employed contractors, supervised by the project team while carrying out necessary work. This ensures that skills are developed locally and capacity is built upon. This is more sustainable in the long term and has resulted in a positive rural development from a strong economic and social return to people living in the area, not only the participants of the project.

Figure 2. Brash piles created from dense Rhododendron thickets.

Challenges looking ahead

The MacGillycuddy Reeks EIP Project Team have developed a good working relationship with the farmers in the area, encouraging them to carry out practical actions which have achieved noticeable improvements on the ground.

However, whether it is controlled grazing with sheep and cattle, or the treatment of invasive species such as bracken and rhododendron; several years are required to see measurable changes on the ground. While the Reeks EIP Project was welcome it is not a sufficient length of time to reach the desired goals for example: rhododendron treatment must be carried out in phases over a number of years to be successful; dense bracken takes 2-3 years of treatment/management to significantly impact its cover; and degraded vegetation requires a number of years to recover.

The breeds of sheep being used on some sites is resulting in unevenly distributed grazing with heavy concentrations on the lower ground. Herding and mineral licks were not effective in redistributing the sheep and the solution is most likely to be in using the correct breed of sheep for the mountain, in the right numbers. This is why we believe farmers in these areas should be paid for appropriate land management and associated eco-system services such as water quality, carbon storage etc. instead of focussing solely on production.

We fear that much of the good work which has been achieved could be undone in the coming years. Treated bracken and rhododendron areas, if left unmonitored and without active management, could become re-infested; and sites which are currently following controlled grazing regimes may revert to old ways in the absence of adequate financial incentives and the support and encouragement of the Project Team. In the absence of active site-specific management plans, the continued spread of bracken and rhododendron and inappropriate stocking levels are likely to be significant contributing factors in the decline of peatlands and loss of agricultural land in the coming years, as well as a significant shortage of young farmers who do not see hill/mountain farming as being economically viable.

Conclusion

The MacGillycuddy Reeks EIP Project has been successful in working with farmers, building relationships and trust and seeing positive quantifiable results on the ground using the results-based model. While the challenges looking ahead are concerning in the High Nature Value areas, we feel they can be overcome with continuation of the locally led approach, at a geographic scale that is appropriate.

Realistic financial incentives for young farmers that are adequate for the work effort required in these regions is critical to ensure landscape management into the future. We have proven in the Reeks EIP Project that with the support of a dedicated project team, motivation and sufficient funding real change is achievable.

An overview of the work to date examining the effect of breed on the performance of hill sheep

Frank Campion[1], Michael Diskin[1], Michael Gottstein[2,] Noel Claffey1.
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Take Home Messages

- The aim for any hill breeding programme needs to be a ewe that can graze the hill for the maximum amount of time possible during the year
- Differences between hill breeds and strains are generally small and overall insignificant
- Differences within individual breeds and strains appears more important and making improvements within breed is an easier way for producers to improve flock performance
- The hill sector needs to embrace and support the development of performance recording groups and sales to improve the performance and output within each of these breeds and strains

Introduction

Hill sheep farming plays a vital role in the economic health of rural economies and the maintenance of the natural landscape in many of Ireland's most scenic areas. In Ireland, hill breed ewes account for 29% of the national ewe flock with a further 18% of the national ewe flock being hill breed crosses (DAFM Sheep Census, 2020). Depending on what part of the country you are in, different breeds or strains predominate the hills. Along the western seaboard, in Waterford and in the Cooley Peninsula the Scottish Blackface (SBF) ewe dominates with different strains of the Scottish Blackface, namely; Mayo-Connemara, Lanark, Perth, Tírconnell, and the Dingle Scotch having gained popularity in different parts of the country and with different producers. The Cheviot, as a pure breed, is the most popular hill breed found in Wicklow but is also used by producers in other parts of the country including Donegal.

In recent years, there has been an increased interest in returning ewes to hills vacated or neglected previously. This is a vitally important development for not only the Irish sheep industry but also for ensuring our most scenic areas are maintained in good environmental condition by not becoming overgrown. While there is a list of issues and challenges to this, one of the questions that arises is what sheep breeds are best suited to hill farming systems. This paper will attempt to summarise the data available to date from the Teagasc research programme comparing the different hill breeds/strains.

What are we looking for in a hill ewe?

The ultimate aim of any hill sheep farmer should be to have a flock of hill ewes that graze on the hill for the maximum amount of time without overgrazing with the only constraints being to bring sheep down for mating and lambing. Hill sheep are very typically resilient breeds and can survive on terrain and forage that other breeds simply couldn't. As a result of this they are hugely responsive to improved nutrition which is an advantage when looking to finish/sell these lambs for store lamb finishing systems but it can also leads to a temptation to hold ewes off the hill and keep them on green ground or improved ground. This will increase the cost of keeping these ewes and means that the hills are not grazed.

The productivity of hill sheep is typically measured in terms of the number of lambs weaned per ewe joined. Unlike some other systems the aim here is not to necessarily push the ewe to its maximum capability every year but to ensure she goes in lamb every year and maintain a weaning rate of approximately 1 lamb weaned per ewe mated. This rate will vary significantly and the data available over the years shows that it can range from 0.7 to over 1.2 lambs per ewe joined. This variation can be attributed to the harshness of the hill environments, the amount of green or improved land available but also to the health and management of the flock.

Are there differences between breeds?

One of the first areas to look at when talking about breed comparisons is how the ewe performs and how her lambs perform to weaning time. This is a difficult thing to measure in a controlled setting due to the challenges of getting ewes to graze hills they are un-hefted to and the need for detailed data recording to compare breed differences. A study by Annet et al. (2011a) looked at the performance of 5 different crosses when they were bred with purebred Lanark type SBF ewes. The crossing sires used were SBF, North Country Cheviot, Swaledale, Lleyn and Texel. When the performance of the daughters from these crosses was examined the authors concluded that age of the ewe had a bigger effect on her performance than her breed. A companion study by Annet et al. (2011b) reported that the cumulative number and weight of lambs weaned per ewe over five successive matings was higher for crossbred ewes compared with pure SBF ewes which would be expected. However, when lifetime output was analysed there were no differences between the different crossbred ewes studied.

In November 2017 and 2018 on a Co. Cork Teagasc BETTER sheep farm, two Lanark rams, a Swaledale ram and a Dingle Scotch ram were mated to a flock of purebred SBF ewes. The same rams were used both years. The rams were released in single sire mating groups for 17 days (first cycle) with the groups then collapsed. All these lambs were born and grazed on the same farm until weaning time and ewes were randomly selected at mating time. As presented in Table 1. the performance of the single born and reared lambs from rams across the two years was similar between the breeds and while there was significant differences between the Lanark sired lambs ate birth and weaning these were small with there being less than a 1kg difference in weaning weight.

	Birth Weight (kg)	Weaning Weight (kg)	ADG Birth to Weaning (g/day)
Dingle Scotch	5.2	23.2	184
Lanark	5.1	22.4	176
Swaledale	5.2	23.1	183

Table 1. Comparison of lamb performance of single born lambs from 3 different SBF strains of sheep over 2 years

Similarly when the daughters of each of these rams who were selected for breeding were mated as hoggets the difference in performance between the breeds was small and for the most part insignificant as presented in Table 2. Despite the Lanark SBF hogget ewes having a 3.4kg heavier mating weight and having a slightly higher litter size these differences are biologically insignificant and as seen previously the performance of the single lambs to weaning was unaffected by breed.

Table 2. Comparison of hogget ewe performance from 3 different SBF strains of sheep over 2 years in the same hill flock

	Mating Weight (kg)	Mating BCS	Litter Size
Dingle Scotch	41.4	2.8	1.10
Lanark	44.8	2.9	1.22
Swaledale	43.3	2.7	1.15

Effect of breed type on finishing lamb performance

In recent years a large body of work has been carried by Teagasc at the research centre in Athenry examining and developing systems for finishing hill bred store lambs. Over the course of these experiments, different breeds and SBF strains were finished to factory specifications on ad-lib concentrate diets. These lambs were purebred lambs brought from hill areas after they were weaned and the results are presented in Table 3 below.

As can be seen the performance of the Cheviot lambs, measured as ADG, was significantly higher than the 3 SBF breed types which were all similar. The Mayo-Connemara SBF had a similar kill out percentage (KO %) to the Cheviot lambs. However, both Cheviot and Mayo-Connemara SBF lamb types had significantly higher KO% than that of the Lanark Perth SBF types. The Mayo-Connemara SBF breed type tended to be fatter and have poorer conformation that the other three breed types which were all similar. However, despite these differences the important message from this was that all lambs were deemed suitable for the market specification and were suitable for finishing in store lamb finishing systems, once again highlighting that the differences between breeds appears to be small.

Table 3. Comparative performance of Cheviot, Mayo-Connemara, Lanark and Perth type males lambs on an all-concentrate diet.

	Cheviot	Mayo-Connemara	Lanark	Perth
Start wt (kg)	29.5	29.9	29.0	28.9
Days on diet	62	62	62	62
ADG (g/day)	226	191	200	202
Final wt (kg)	42.6	40.9	41.4	41.5
Carcass wt (kg)	19.2	18.3	17.8	17.5
KO%	45.0	44.7	43.0	42.5
Conf. Score	2.5	2.2	2.5	2.5
Fat score	3.0	3.3	2.9	2.8

Within breed differences

In any group of sheep there is going to be a mixture of low and high performing animals and a significant feature of other studies examining differences between breeds has shown that the variation within breed is often greater than the variation between breeds (O'Brien et al., 2017). If we look again at the previous example of the performance of lambs from the Dingle Scotch, Lanark and Swaledale rams the differences between the breeds for lamb weaning weight was insignificant but the variation within each breed was similar to that between the breeds. The coefficient of variation between each of the breeds was

14 compared to 16, 13 and 12 for Dingle Scotch, Lanark and Swaledale respectively. This data highlights the importance of selecting the best performing sheep within a breed as opposed to focusing on the differences between breeds.

In order to do this it is important for the hill sheep industry to develop and support performance recording groups where hill rams are available for purchase not just on physical specification but also with performance recorded figures to go with them (e.g. Sheep Ireland Eurostars). A previous study on one of the Teagasc BETTER sheep farms demonstrated the differences that exist within breeds. As presented in Table 4. where three Lanark rams were used over four years there were only minor differences in weaning weight but substantial differences in lamb mortality. There was a 6.5 percentage point difference in lamb mortality recorded between the rams. On the face of it all of these rams were physically correct and their lambs that lived performed well. However, the availability of performance-recorded information would allow for the rams with the higher lamb survivability rates to be selected helping to reduce lamb mortality.

Table 4. Progeny performance during the 2014, 2015, 2016 and 2017 production year from four rams

Ram	No. of Progeny	Birth Weight	Weaning Weight	Mortality[1]
		(kg)	(kg)	(%)
Lanark 1	161	4.13	25.6	8.1
Lanark 2	141	3.99	25.5	11.3
Lanark 3	130	4.31	26.0	14.6

[1] Combination of mortality at birth and lambs not presented at weighing's

Source: Campion et al. 2018

Conclusion

The breed and type of hill sheep used by different producers is often discussed and debated but the differences between the breeds is often small and not as important as the difference within breeds and strains. Ultimately it is up to the individual to pick the breed or strain that suits their hill best but the hill sector needs to embrace and support the development of performance recording groups and sales to improve the performance and output within each of these breeds and strains.

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Post Mortem findings in sheep submitted to Regional Veterinary Laboratories

Shane McGettrick
Sligo Regional Veterinary Laboratory, Department of Agriculture Food and the Marine.

Take Home Messages

- Regional Veterinary laboratories provide disease surveillance by providing diagnostic testing and necropsy examination of fallen animals.
- Ovine abortion has significant economic impact and can be minimised by correct diagnosis and appropriate vaccination.
- Correct nutrition in late pregnancy and control of chronic disease is essential to preventing ewe deaths around lambing time.
- Parasite control is essential to maintaining ewe health and maximising production in growing lambs.
- Clostridial disease causes sudden death in growing lambs and can be controlled by appropriate vaccination and early diagnosis.

Introduction

Regional veterinary laboratories (RVLs) based in Athlone, Cork, Dublin, Kilkenny, Limerick and Sligo provide animal disease surveillance information to the Department of Agriculture, Food and the Marine. RVLs receive animal carcase and other samples directly from farmers on advice from their veterinary surgeons when a post mortem examination or further laboratory tests are required to make a diagnosis. The findings and advice provided by the RVL is often essential to preventing further disease on farm through implementation of appropriate evidence based treatment and control plans.

In 2020, RVLs carried out necropsy examinations on 527 lambs and 444 adult sheep. In addition, the RVLS examined foetal material from 391 cases of ovine abortion.

Analysis of data produced by RVLs provides an insight into trends of disease incidence and causes of mortality on Irish farms, thereby informing decision-making relevant to disease control at a national level. Data is derived from voluntary submissions of material (carcasses and clinical samples) to RVLs by farmers through their private veterinary practitioners. Therefore, it should be noted that data reflects only those cases where the veterinary practitioner or farmer considered it appropriate to request a laboratory investigation and the herdowner was motivated to deliver the carcass to an RVL. The cooperation of farmers and vets with RVLs is therefore essential to monitoring disease in all farming sectors but is particularly important in management systems such as hill sheep production where the numbers of farmers is relatively small and geographical location may not be adjacent to laboratory facilities.

Ovine Abortion

Veterinarians describing abortion usually mean the spontaneous death and expulsion of the developing embryo or foetus from the uterus. Spontaneous abortion can occur in sheep when there are genetic anomalies in the developing lambs. These probably make up a significant portion of the cases seen in the RVLs, but they are difficult to diagnose.

The main focus of laboratory investigations when presented with aborted lambs is to determine if any of the infectious agents known to cause abortion in sheep are present and to discover any new agents that might be involved. The laboratories rely on gross and histopathological examination of submitted material to check for the presence of lesions. In addition, a wide range of biological and molecular tests are used to identify infectious agents.

The most prevalent causes of foetal death can be attributed to *Toxoplasma gondii* and *Chlamydophila abortus*. These agents were detected in about two fifths of submissions. *Chlamydophila abortus* and *Toxoplasma gondii* are both zoonotic pathogens which can pose a risk to humans. Pregnant women should avoid all contact with sheep, especially at lambing time. It should be noted that more than one agent may be involved in any particular flock. When submitting material to an RVL for investigation it is recommended that the placenta be included if possible.

Practical tips for when abortions are occurring include:

- Isolating aborting ewes from the rest of the flock until lambing is complete.
- Removing bedding for destruction and disinfecting lambing pens between ewes.
- Appropriate veterinary advice and diagnosis as early as possible in the outbreak
- Only fostering male lambs onto aborted ewes.
- Include placenta and a ewe blood sample if submitting diagnostic material to a laboratory.

Disease in Ewes		
	Total	***Percentage***
Septicemia	33	7%
Poisoning	25	5%
Metabolic conditions	30	7%
Clostridial diseases	16	4%
Enteric conditions	46	10%
CNS conditions	32	7%
Respiratory diseases	66	15%
Parasitic diseases	57	13%
Other conditions	131	29%
No diagnosis	19	4%

Figure 1. Diagnoses in sheep older than 1 year submitted to DAFM RVLs in 2020

Spring time of the year is the busiest time for RVLs. A large proportion of sheep carcases submitted to RVLS at this time of year are pregnant ewes in late gestation. Twin lamb disease is a common diagnosis as is hypocalcaemia. The correct nutrition of the pregnant ewe is crucial and this can be very difficult to get right if ewes are not scanned in lamb and feed management is not altered appropriately in the days approaching lambing.

Frequently deaths are seen to occur in ewes around lambing that have underlying chronic illness. Liver fluke disease and chronic pneumonia are the most common findings that occur concurrently with metabolic disease in pregnant sheep.

Dystocia and post-natal infections in the ewe are frequent. In many cases excessive force or delay in intervention at lambing can result in ewe deaths in the days following lambing.

Liver fluke disease remains a serious problem in sheep. Death due to chronic and acute fluke is a common diagnosis in sheep from the west of Ireland. Cases often present to laboratories as a sudden death or increased sudden mortality in a flock. The impact of acute fluke can be particularly severe on a flock level where there has been a breakdown in fluke control due to mistimed treatments or variations in weather conditions leading to presence of sufficient infective doses on the pasture to cause severe liver damage during the migration phase of fluke larval development.

Practical tips for managing preventing disease in Ewes at lambing:

- Appropriate nutrition of ewes with emphasis on determining the number of lambs each ewe is carrying.
- Awareness of chronic disease in the flock and removal of sick or underperforming ewes that may have chronic disease before they are put out to the ram
- Parasite and pneumonia control during pregnancy
- Supervision of lambing with gentle intervention if necessary

The health status of the ewe flock also affects the potential for antimicrobial and anthelmintic resistance. Health issues in ewes which have a big effect on productivity of sheep farming include parasites (internal and external), lameness, mastitis, teeth problems and the "iceberg diseases" (slow onset diseases which cause chronic wasting). Ovine pulmonary adenocarcinoma (OPA), Maedi Visna (MV), Caseous Lymphadenitis (CLA) and Johnes disease (JD) have been diagnosed in Ireland.

A mortality study of Irish flocks (n= 31) was carried out by DAFM laboratories in 2016 (Murray et al. 2016). The median overall submission rate of dead sheep of all ages from sentinel lowland flocks of 13.8 per cent is in line with other international studies. Similar mortality data is not available for hill sheep farms in Ireland.

Clostridial disease is the most frequently diagnosed condition in lambs under one year old. The majority of these cases are due to Pulpy Kidney disease and there is a consistent seasonal spike in April when there is waning maternal antibody protection and delayed vaccination of younger lambs. Another peak in Pulpy kidney disease may occur later in the year in more mature lambs at weaning or when concentrate feeding is being increased. Multivalent clostridial vaccines (vaccines which cover the animal against a range of clostridial diseases) are available for both cattle and sheep. Although vaccination failure in individual animals is reported, these vaccines are very effective at herd or flock level when stored and used properly.

Lamb disease		
	Total	***Percentage***
Septicemia	68	13%
Poisoning	10	2%
Metabolic conditions	4	1%
Clostridial diseases	126	24%
Enteric conditions	46	9%
CNS conditions	29	6%
Respiratory diseases	80	16%
Parasitic diseases	50	10%
Other conditions	77	15%
No diagnosis	26	5%

Figure 2: Most frequent diagnoses in lambs under one year old submitted to DAFM RVLs in 2020

Enteritis, septicaemia and diarrhoea in young lambs may occur in early life for various reasons however *E coli* infection in the first weeks of life remains the most important cause of losses at flock level. Frequent contributing causes for enteritis in young lambs are poor lambing hygiene, inadequate colostrum intake, mismothering, severe weather and concurrent chronic disease in ewes.

As lambs grow at pasture, coccidia and parasites such as *trichostrongyles* and *nematodirus* become significant agents involved in outbreaks of enteric disease. Variations in weather conditions throughout the year can have a major impact on the severity of these outbreaks.

RVLs frequently diagnose plant poisonings in young growing sheep especially when they are grazing new pasture or due to dumping of garden clippings in surrounding fields where sheep have access. Poisoning due to ingestion of yew tree or pieris clippings remains relatively common and often result in sudden death of large numbers of weaned lambs.

Acidosis in mature lambs entering feedlots or finishing houses is an increasingly emerging disease seen by RVLs. The sudden introduction of ad-lib concentrate diets to lambs results in rapid decrease of rumen pH and sudden death. In many instances, lambs are assembled from various sources and are provided with a concentrate diet without regard to previous management and often without adequate access to roughage.

Pneumonia in mature lambs is most severe in the autumn and winter months. Congregation at feed troughs, housing and movement are all significant risk factors facilitating an outbreak. Pneumonia in sheep due to *Mannheimia haemolytica, Pasteurella multocida, Bibersteinia trehalosi* and *Mycoplasma ovipneumoniae* are most frequently diagnosed. Losses often occur as acute outbreaks of disease and mortality rates in individual groups can be high. Management is based on vaccination, reduction of stress factors and prompt diagnosis and treatment.

Tick borne disease in sheep is of particular interest to hill sheep farmers. A variety of diseases are identified

by RVLs where the presence of ticks in an area are a key factor in spreading and initiating an outbreak. Tick borne fever due to Anaplasma phagocytophilum may cause disease and immunosuppression. RVLs are currently involved in a research project with UCD looking at comorbidity of disease with tick borne fever. Louping ill is another serious tick borne disease present in hill flocks and is increasingly diagnosed in Sligo RVL. Louping ill virus may cause sudden deaths in sheep of all ages with and without nervous signs.

Practical tips for preventing disease in lambs:

- Clostridial disease vaccination programme in ewes and lambs
- Good hygiene at lambing
- A colostrum management plan including storage of spare colostrum for use in neonatal lambs where mothers have insufficient milk.
- Gradual introduction of concentrates to growing lambs at pasture and if being finished indoors
- A parasite control programme suitable for the management peculiarities of a particular farm and adjusted to account for climate variations throughout the grazing season.
- Stress reduction by minimising mixing of groups, provision of extra trough space, good ventilation and avoid overcrowding if sheep are housed.
- Tick control in areas where tick borne disease is endemic

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http://www.animalhealthsurveillance.agriculture.gov.ie/media/animalhealthsurveillance/content/labreports/SurveillanceReport2020.pdf

Eye problems and blindness in sheep

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Take Home Messages

- When an eye problem is detected, isolate the sheep for the duration of the treatment process
- Seek veterinary advice regarding diagnosis and treatment
- Treat eye conditions immediately upon detection
- Provide adequate space at troughs, barriers and ring feeders when feeding animals
- Aim to have a biosecurity protocol on your farm whereby all bought in sheep are quarantined for 4 weeks from arrival

Introduction

There are five common eye conditions of sheep seen on Irish farms. Three of an infectious origin; keratoconjunctivitis (pink eye), anterior uveitis (silage eye) and periorbital eczema; all of which can be minimised by good flock management and biosecurity. The two of a non-infectious origin are equally important, entropion and ingrown horns, both of which respond well to early intervention and treatment, where necessary.

Infectious eye conditions:

1. *Keratoconjunctivitis* (also known as Pink Eye)

Infectious keratoconjunctivitis or 'pink eye' as it is more commonly known, is often initiated by trauma from dust from poor quality hay, or rarely from mechanical irritation from driving snow or gales. Any source of trauma to the eye allows the bacterial source to set up an infection. The first signs are increased tear stains, a partially closed eye (as seen in Figure 1 below) and a reddening of the conjunctiva – the pink tissue around the eyeball.

Figure 1. Early signs of pink eye: a closed eye and tear staining of the cheek

Infectious keratoconjunctivitis tends to spread rapidly within a flock if animals are housed or being fed over winter in proximity. Appetite will be depressed because of ocular discomfort and visual disturbance will occur with a resultant inability to locate food. The disease progresses from mild conjunctivitis to ulceration and potentially permanent loss of the eye with temporary or permanent blindness. A few causative agents have been suggested which are all bacterial. One bacteria, Mycoplasma conjunctivae, is considered the major primary cause, but several other bacterial species are suggested as causative agents. This disease can be difficult to treat and control both at an animal and flock level, so best practice is to isolate any cases as soon as they are identified and treat affected animals immediately.

Disease recurrence in individual animals' post-treatment is common, principally because the most common bacterial cause, Mycoplasma conjunctivae, is known to persist in the conjunctival sac of the eye post-treatment, resulting in recurrence of the infection in individuals and continued spread of infection to other sheep.

Figure 2. Brick red conjunctiva in an animal infected with pink eye

Treatment of pink eye

The challenge in treating pink eye is delivering an antibiotic that can achieve the necessary bactericidal concentrations, sufficient to actually kill the bacteria rather than just stop it growing in the eye for a sufficient time to achieve bacteriological cure. It is difficult to achieve the minimum inhibitory concentration (the killer dosage) of an antibiotic for a sufficient period of time in the lacrimal fluid (tears) to eliminate the bacteria causing the disease.

There are four commonly used methods of administration of antibiotics for this condition: intramuscular injection, subconjunctival injection, topical cream, or ointment. When administering ointments use new or fresh gloves for each animal, evert the lower eyelid and instil a steady flow of ointment into the lower conjunctival sac avoiding touching the tube off the eye to avoid contamination of the tube and the contents. Topical applications should be applied as often as possible and ideally at least three times a day to be effective which is not practical in most flocks. Furthermore, the limitation of ointments licensed as eye preparations are that most solely contain cloxacillin which is not active against mycoplasma species. However, Oxytetracycline antibiotic as an injection is effective against mycoplasma. Treatment with a long-acting injectable oxytetracycline may result in a clinical cure without eliminating the bacteria, hence, if possible, animals that seem cured from the infection should be sent directly for the meat trade rather than being retained for breeding or sold through marts given their risk of becoming carriers.

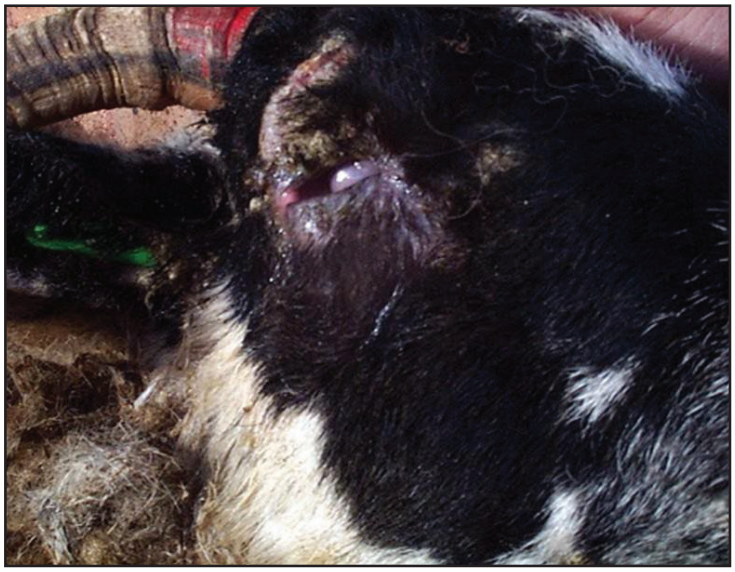

Figure 3. Rupture of the cornea requiring veterinary treatment to perform third eyelid surgery

If treatment is not sufficient, the disease may progress to continued active ulceration, which may cause corneal rupture, vets in practice report anecdotally excellent results in practice from suturing across the third eye lid particularly in sheep at risk of losing their eye from ulceration. The use of a non-steroidal may be warranted under veterinary supervision for pain relief on welfare grounds.

Separation of infected animals is recommended where possible. Temporary isolation is a basic biosecurity measure and is indicated to minimise the spread of this condition. Gloves and protective clothing should be worn and then disinfected or disposed of between animals when affected individuals are being handled.

2. Anterior Uveitis (also known as silage eye)

"Silage eye" is a condition most often linked to feeding poor quality silage particularly big bale silage to sheep. Unlike Pink eye we know exactly which bacteria causes the condition, namely Listeria Monocytogenes. Signs of infection include cloudy eyes in sheep and a watery discharge; however it can be difficult to differentiate from pink eye in the early stages.

Listeria is ubiquitous in nature in other words it is found everywhere but it is particularly prevalent in silage which has been poorly preserved, contaminated with soil or in bales of silage opened for more than three days. The condition is common when sheep are pushing their heads into the bale of silage (as shown in Figure 6). Basic principles of good silage feed management will reduce this condition, thus removing spoiled and mouldy silage and ensuring that eye contact is minimised with the silage itself. Again, treatment options are as for pinkeye, topical antibiotics in ointment form or intramuscular antibiotics. A combination of 1cc of a non-steroidal anti-inflammatory with 1cc of oxytetracycline given into the sub conjunctiva is much more effective than antibiotics on its own for silage eye. Differentiation between silage eye and pink eye is important as antibiotics on their own can be of limited value with steroids required, the history of silage feeding and a more blue - white clouding of the entire surface of the eye indicates it is more likely to be silage eye.

Figure 4. Early uveitis cloudiness on cornea

If in doubt of a definite diagnosis always contact your vet. The new provision for telemedicine by the veterinary council enables a flock owner to send photographs of affected animals to their vet in order to obtain help from them in achieving the correct differential diagnosis. Listeria Monocytogenes can cause silage eye on its own as a clinical condition, while it can also cause a condition affecting the brain or be the causative agent of abortion or scour in sheep.

Figure 5. Cornea of the eye has become blue leading to blindness in this eye

Listeriosis causing encephalitis in the brain which occurs primarily in the winter-spring period and is largely a disease of housed sheep. The less acidic pH of spoiled silage enhances multiplication of Listeria Monocytogenes with outbreaks typically occurring around ten days after feeding poor-quality silage. Listeria is a zoonosis causing disease in humans where mortality can reach 50% in infected cases. This reinforces the need for fresh gloves, disposable aprons, good cross infection control and the use of disinfectants when treating eye conditions in sheep, or indeed lambing ewes.

3. Periorbital Eczema

The third most important infectious eye condition in sheep is Periorbital Eczema which occurs when the skin around the eye is damaged allowing for entry of Staphylococcus aureus. This occurs when there is not adequate room allowed for at troughs or ring feeders with trauma between heads a precursor allowing for the infection to occur. It can result in swollen eyes and limited vision due to swelling and lesions forming around the eyes. It responds very well to broad spectrum intramuscular antibiotics such as amoxicillin or oxytetracycline. Sheep with both eyes affected will be blind with consequential limitations in locating feed or water.

Basic Treatment principals for all infectious eye conditions

As soon as any staining of the cheek from the eye or tear flow is detected in a sheep do not wait for progression of the disease, isolate the animal(s) to prevent the spread of the infection and contact your vet. In most cases, administration of a long-acting injection of oxytetracycline will be considered. Lack of response to early treatment using an oxytetracycline injection or a blue cloudy cornea will tend to indicate it is silage eye and a sub conjunctival steroid injection is then needed. Whilst unlicenced the use of a non-steroidal anti- inflammatory is justified and indicated to alleviate pain on welfare grounds if administered under veterinary supervision. It can be defended legally under the "cascade system," in that there is no product licenced, and you the flock owner have a legal and ethical duty to alleviate pain in your animals.

Animals don't thrive when in pain and eye conditions are exceedingly painful – think of the last time you had a bit of dust in your eye. Separation of infected animals as soon as possible to prevent spread is indicated. Gloves and protective clothing should be worn and then disinfected or disposed of between animals when affected individuals are being handled. Continued temporary isolation is a basic biosecurity measure and is indicated to minimise the spread of infection. In the interest of minimising antibiotic resistance there is no justification in using any of the more complex antibiotics unless prescribed following culture and sensitivity of an organism by your vet.

General Prevention Principals for infectious eye conditions

Simple prevention as discussed above involves biosecurity, ensuring adequate feed space, ventilation and correct preservation and management of silage and hay to reduce the risk on farm.

- In all three conditions above adequate space for feeding i.e., 45 cm for most adult
- Sheep, 60 cm for heavier in lamb lowland crosses will minimise spread of these conditions.
- Early detection, isolation and treatment of affected animals will prevent what can otherwise, be rapid spread through the flock affecting feed intake and predisposing to other disease.
- Good lighting with housed sheep to detect the early tell tail signs of excess tears and partially closed eyes are vital over the winter.
- Monitor animals daily for signs of all disease bearing in mind the stress of transport and stress during the late pregnancy period will reduce an immune response to disease.

Figure 6. A classic cause of silage eye

- Eye conditions are particularly problematic for ewes in late pregnancy, where an eye condition can lead to blindness and ongoing pain with reluctance and difficulty in eating leading to metabolic disorders, loss of body condition and low milk yield.

In summary for all infectious eye conditions in sheep early identification and treatment is essential to minimise pain and suffering and reduce spread within a flock.

Non-Infectious Eye conditions

Entropion

Entropion is an inward rolling of the eyelid with the eyelashes traumatising the cornea (the outer part of the eyeball) leading to infection and ulceration. It is a defect in sheep having a genetic association, most commonly affecting the lower eyelid. The hairs of the eyelid irritate the corneal surface with staining appearing down the cheek. It is often associated with one ram and once detected the flock owner should be very vigilant for other cases and consider not breeding from affected sheep.

Figure 7. Entropion in a Lamb

Treatment of entropion

There is a good response to treatment, in simple cases the lower eyelid is everted by rolling down the skin immediately below the lower eyelid. A topical antibiotic can be in an ophthalmic ointment which is applied to the cornea to control potential secondary bacterial infection. In addition, this also lubricates movement of the lower eyelid thereby reducing the likelihood of inversion. If eyelid inversion recurs after rolling out the lower eyelid, subcutaneous injection of 0.5mls of antibiotic, e.g., penicillin, into the lower eyelid can be performed. The lamb needs to be securely held, and a 21-gauge, 15 mm needle introduced through the skin of the lower eyelid staying parallel to, and approximately 1 to 2cm below, the lower eyelid. This method of injecting the lower eyelid with 0.5cc of a long-acting antibiotic will physically unroll the eyelid out and set up a mild inflammatory response keeping the lower eyelid turgid while also leaking some antibiotic onto the surface of the eye dealing with any infection. Again, an injection of a non-steroidal anti-inflammatory is indicated for pain relief under veterinary supervision.

An ingrown Horn

This occurs most commonly in aged rams and intervention should be part of the pre breeding exam of any ram ensuring there is adequate space between the horn and the skull for a further year's growth. The tip of a sheep's horn lacks innervation and lacks communication with the frontal sinus and can be safely trimmed back with embryotomy wire without requiring local anaesthetic. Anything further than that will need local anaesthesia and cautery.

References / Sources

Images courtesy of Phoebe McCarter, BVSC MRCVS and Phil Scott DVM&S BVM&S CertCHP DSHP DipECBHM FRCVS, NADIS http://www.nadis.org.uk/

Meet the speakers

Patricia Deane

Trisha is a proud Kerry woman, living in the Sliabh Mish Mountain on the Dingle Peninsula where her father is a semi-retired hill sheep farmer. Growing up Trisha helped with work on the farm, everything from milking a small herd of cows to managing pigs, hens and occasionally turkeys and geese. She believes this background has been hugely beneficial in working with and understanding the needs of farmers in the rural areas in the country. Working with the Local Development Company South Kerry Development Partnership as a Rural Development Officer and Rural Recreation Officer this has allowed her to help develop the successful The MacGillycuddy Reeks Mountain Access Forum, a collaboration project focussing on managing recreation in the Reeks in close partnership with the farmers, NPWS, local communities, the local authority, recreational guides etc. This then led onto the development of the pilot MacGillycuddy Reeks European Innovation Partnership Project of which Trisha is Project Manager.

Frank Campion

Frank works as a research officer for Teagasc and is based at the Animal & Grassland Research & Innovation Centre in Athenry. His research interests are focused around store lamb finishing systems, animal nutrition and on farm technology adaptation. Frank graduated with a B. Agr. Sc. from University College Dublin in 2012 and in 2016 graduated with a PhD Degree which was funded by the Teagasc Walsh Fellowship Programme and in conjunction with University College Dublin. Frank hails from Co. Kilkenny and runs a sheep enterprise on his home farm in his spare time.

Shane McGettrick

Shane lives on his family farm in Co. Sligo and is employed by DAFM as a Senior Research Officer and Laboratory manager in Sligo Regional Veterinary Laboratory. He graduated as a Veterinary Surgeon from University College Dublin and worked in mixed farm animal veterinary practice throughout Ireland before joining DAFM. He is a certified Veterinary Pathologist specialising in farm animal Pathology and has been admitted as a Fellow of the Royal College of Veterinary Pathology. He is heavily involved in farm animal disease surveillance and diagnosis. He is particularly interested in improved diagnosis and awareness of endemic disease to improve sustainability of Irish farms.

Seamus Campbell

My name is Seamus Campbell and I am an Agricultural Advisor with Teagasc based in Inishowen, Co Donegal for over 20years. I was brought up on a hill farm near Glenties in Co Donegal and studied Agricultural Science in UCD. Following this I completed a Higher Diploma in Education in UCG. I work closely with a lot of hill farmers in Donegal, farming organisations and breeding groups at trying to improve farm income. I also work closely with Leader, Donegal County Council, Loughs Agency, NPWS and other groups working on various hill farm projects and farm diversification.

Gerald Roarty

Gerald Roarty has studied or lectured at UCD,Trinity, LYIT, Glasgow University and the Royal veterinary school London. He has worked in veterinary practices in America, Australia, New Zealand, Egypt, Zimbabwe, Saudi Arabia and throughout Britain; eventually ending up in Donegal. He is now semiretired where he farms Galloway cattle and Herdwick sheep in the Bluestacks and attends gaelic football and hurling matches regularly.

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