Animal & Grassland Research and Innovation Centre

Athenry

Sheep Open Day

Thursday, 6 June 2013 1pm - 7pm

teagasc
Agriculture and Food Development Authority

KEPAK GROUP

MSD Animal Health

Table of Contents

Foreword

On behalf of Teagasc we welcome you to this Sheep Openday at Mellows Campus, Athenry. The past few months have been very challenging for the sheep sector in Ireland with none more so that the last few months..

Sheep production is a significant contributor to the agricultural and national economy with an output valued at 180 million in 2011. This is despite the national ewe flock declining from a peak of more than 4 million ewes to a current flock of 2.5m ewes. The 32,580 flocks produce a high quality product, with almost 80% of this exported. Significant employment is provided in both the primary production and processing sectors. In the Teagasc 2012 National Farm Survey, the top one third of flocks generates a gross margin of 790/ha, compared with 216 for flocks in the bottom third. This would indicate that there is significant scope to increase this by improving technical efficiency at farm level. This is further substantiated by the results emerging from the newly established Research Demonstration flock at Athenry and from the financial performance of flocks in the Teagasc BETTER farm programme.

Major long-term challenges are to improve ewe prolificacy, increase stocking rate, and to manage the challenge of increasing resistance to anthelmintics. Grass must be the basis of profitable sheep production. There is tremendous scope to grow more grass on farms, use it more efficiently, thus allowing increased stocking rates, better animal performance and lower costs. Nationally, the number of lambs reared per ewe joined is 1.25 and has remained at this level for years. This is low by UK standards (1.5) and there is therefore significant scope to improve output.

As stated earlier, this spring has been most challenging for the entire livestock sector in Ireland. Many producers are now faced with many challenges as a consequence of the wet weather and very poor grass growth over the past few months. As part of this Openday, Teagasc have set up a specific information stand to help address the immediate and medium term concerns of farmers regarding grass supply, poor animal performance, provision of winter feeds and cash flow. You are strongly advised to visit this stand.

At this Openday a significant body of new knowledge is presented to the Sheep industry. To remain completive the sheep sector needs to embrace new technologies and practices. The clear message from the BETTER Sheep Farm Programme is that modest changes in key drivers of profitability such as increasing litter size, improving soil fertility, growing more grass and improving the efficiency of grass utilisation, closely alignment of lambing date with spring grass supply have profound positive impacts on output and profitability. The adoption of new relevant technologies is also a key focus of the STAP and Teagasc Discussion Group programmes.

We wish to welcome the participation of The Regional Veterinary Laboratories of The Department of Agriculture, Food and the Marine, Sheep Ireland, Faculty of Agriculture in UCD at this Openday. Teagasc are committed to working closely with these organisations to ensure the continuous generation and delivery of new information and technologies to the agriculture sector.

We thank all of our colleagues in Teagasc for their commitment and efforts in preparing for and presenting this Openday. Finally, we thank MSD, Animal Health and Kepak for their generous sponsorship,

Michael G Diskin
Sheep Enterprise Leader, Athenry.

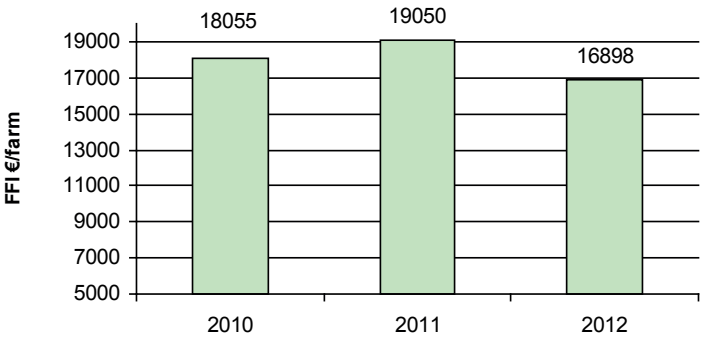
Michael Gottstein
Head of Sheep Programme

Financial Overview of Sheep Farm Systems 2012

Anne Kinsella,
Teagasc, National Farm Survey, Mellows Campus, Athenry, Co. Galway.

Total Farm Situation

In the 2012 Teagasc National Farm Survey preliminary estimates, there are approximately 12,580 Sheep farms represented, having an average Family Farm Income (FFI) of €16,898. This represents a 11% decline on 2011 farm income. Sheep production is the predominant system on these farms, although they may operate a number of other farm enterprises.



Income on Sheep farms declined by 11% in 2012

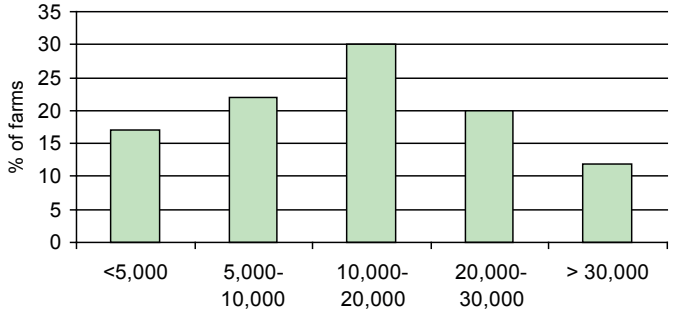
Figure 1: Family Farm Income - Sheep farms 2010 - 2012

Gross output value declined by 6% due to lower lamb prices, which declined by 7% on average, while total production costs increased by 8%. This increase in input expenditure was almost entirely due to feed cost increases, with concentrate feed expenditure increasing by 20% in 2012.

Table 1: Sheep Farms – Average for farms 2012

The "Average" Sheep Farm 2012	
Farm Size (ha)	49.7
Total Ewes	142
Livestock units/ha	1.08
Single Farm Payment (€/ha)	244
Age of Farmer	59
Farmer Employed off farm (%)	28

Direct payment comprised 118% of farm income for the sheep farms, averaging €19,961 in 2012. The Single Farm Payment (SFP) alone contributes to 72% of income on this farm system, with an average SFP per hectare of €244, the lowest of all the farm systems. Sheep farmers average age is 59 years compared to national average of 57, while on 28% of these farms the farmer has an off farms job. Just 12% of Sheep farms produced a family farm income of €30,000 or greater in 2012, equating to just over 1,500 farmers. As can be seen from Figure 2, the vast majority of sheep farmers had income in the range €5,000 to €10,000, with 22% of farms in this category, while just over 17% had a farm income less than €5,000.



17% of farms had a farm income of less than 5,000 in 2012

12% of farms had an income of greater than 30,000

Figure 2: Distribution of Family Farm Income on Sheep farms 2012

The average sheep farm is operated with just over one unpaid labour unit so that on a per labour unit supplied 19% of these farms produce an income per labour unit of €5,000 or less.

Enterprise Analysis – Midseason Lamb enterprise

The commentary in this section focuses entirely on farms that are classified as mid-season lamb producers. Mid season lamb is the predominant lowland sheep system in Ireland and only sheep enterprises with more than 20 ewes are included in this analysis. In 2012 52% of Mid season lamb producers in the National Farm survey farm are on very good soils thus giving them a natural advantage.

Technical performance 2012

Between 2011 and 2012 the average stocking rate per hectare remained unchanged, while the weaning rate declined to just over 1.22 lambs per ewe, on average. As a result the lamb carcass produced per hectare declined by 8% in 2012.

Table 2: Technical performance indicators – 2011 verses 2012*

Mid-season lamb producers - 2012			
	Average 2011	Average 2012 *	% change
Stocking rate (ewes/ha)	7.0	7.0	-
Weaning rate (lambs per ewe)	1.29	1.22	-5%
Ewes to ram	105	104	-1%
Lamb mortality	0.07	0.07	-
Lamb carcass (kg) per hectare	190	175	-8%

*Preliminary enterprise analysis 2012

Financial performance

Overall on the mid season farms, gross output per hectare declined by 6% from 2011 to 2012. This resulted from a decline in average lamb prices in 2012. coupled with the adverse impact of the weather on the technical performance indicators as detailed above, especially the weaning rates.

Table 3: Average gross and net margin per hectare - 2011 verses 2012*

Mid-season lamb producers - 2012			
	Average 2011	Average 2012 *	% change
% of farms on very good soils	60	52	
Gross Output (/hectare)	1077	1013	-6%
Concentrates (€/ha)	148	174	+18%
Pasture and Forage (€/ha)	129	128	-1%
Other direct costs (€ha)	95	105	+11
Total Direct costs (€/ha)	372	406	+9
Gross Margin (€/ha)	705	607	-14
Net Margin (€/ha)	268	165	-38%

*Preliminary enterprise analysis 2012

The inclement weather impacted all farm systems but in particular the livestock farms where production costs, especially feed costs, increased significantly. Total direct costs on mid season farms increased by 9% with the most significant contribution to these costs being concentrate feed expenditure, up 18% on average in 2012.

Gross margin per hectare declined by 14% in 2012 to €607 per hectare. Total fixed costs per hectare remained relatively unchanged between the two years, resulting in a decline of 38% in Net margin to €165/ha in 2012 on the mid season farms.

Technical and financial performance indicators – Top, Middle and Bottom one-third of mid- season lamb producers 2012

The data in Table 4 ranks flocks on the basis of gross margin per hectare and splits the sample into thirds i.e top, middle and bottom.

The gross output per hectare varies considerably across the three groups, for the top one third of mid season lamb producers it is almost 1.5 times that of the bottom one third. This difference in gross output is mainly due to variation in stocking and weaning rates with the top group having an extra four ewes to the hectare compared to the bottom group, while weaning rate for the middle group is the highest at 1.31 compared to an average of 1.08 for the bottom group.

There is a less significant difference in direct costs per hectare between the three groups, with the middle group having the lowest total direct costs and in particular the lowest concentrate feed costs of any group. When total direct costs are factored in then the top one third earn a gross margin per hectare that is over 4.5 times that of the bottom group. This is consistent with previous years analysis.

Table 4: Variation in output and margin: Top, middle and bottom one third of mid-season lamb producers – 2012*

Mid-season lamb producers – 2012				
	Top	**Middle**	**Bottom**	**Average**
Stocking rate (ewes/ha)	9	7	5	7
Weaning rate (lambs per ewe)	1.26	1.31	1.08	1.22
% of farms on very good soils	75%	45%	37%	52%
Gross Output (/hectare)	1447	1009	598	1013
Total Direct costs (€/ha)	457	381	383	406
Gross Margin (€/ha)	990	627	216	607

*Preliminary enterprise analysis

The gross margin/ ha for the top 1/3 of Mid season lamb producers is over 4.5 times that of the bottom 1/3

For 2012, 75% of the top producers were farming on very good soils giving them a natural advantage, compared to only 37% on very good soils in the bottom group.

Summarise key messages in bullet point format

- Income on sheep system declined on average by 11% in 2012
- Just over 1,500 (or 12%) of Sheep farms had a family farm income of €30,000 or greater in 2012, while 17% had farm income less than €5,000
- Average lamb prices declined by 7%
- Direct payment comprised 118% of farm income for the sheep farms, averaging €19,961 in 2012. Sheep farms remain heavily reliant on direct payments
- The average Single Farm Payment per hectare in 2012 was €244, the lowest of all the farm systems (national average for all systems €312 per hectare)

Mid-season Lamb enterprise analysis -2012

- Gross output per hectare varies considerably across the three groups. Gross output on the top one third of mid season lamb producers is almost 1.5 times that of the bottom one third
- Difference in gross output driven by technical performance indicators - mainly due to variation in stocking and weaning rates
- Lamb carcass produced per hectare declined by 8% in 2012 due mainly to decline in the weaning rate
- Less significant difference in direct costs per hectare between the three groups
- Weather adversely impacted all farm systems in 2012 but in particular the livestock farms where production costs, especially feed costs, increased significantly
- Total direct costs on mid season farms increased by 9% with the most significant contribution to these costs being concentrate feed expenditure, up 18% on average in 2012.
- For 2012, 75% of the top producers were farming on very good soils giving them a natural advantage
- Top one third earn a gross margin per hectare that is over 4.5 times that of the bottom group. This is consistent with previous years analysis

Summary and Recommendations from this analysis

Mid season lamb is the predominant lowland sheep system in Ireland and in 2012 the top one third of producers earn a gross margin that is over 4.5 times that of the bottom group. The large differences in gross margin earned per hectare reflect differences in intensity of production and technical performance indicators. There was little difference in direct costs per hectare between the three groups in 2012 as all farm groups were impacted by the inclement weather with concentrate feed costs up 18% on average. The large differences in the profitability of sheep farms operating the mid season lamb system is consistent with previous years analysis.

Higher levels of technical performance are reflected in the average carcass output per hectare, which declined in 2012 resulting from lower weaning rate, while stocking rate remained constant from 2011 to 2012. This analysis highlights the importance, as always, of high weaning rates and high stocking rates in achieving improved returns per hectare. A high weaning and stocking rate, as well as control of costs per hectare are essential in achieving higher returns, most particularly in a year where feed and other costs are rising. Farmer have little or no control over these external factors, including inclement weather, that erode away income so that they should continue to focus on the component of their profit equation that they can control. From analysis of the 2012 results and previous years it is evident that if sound technical performance indicators are adhered to then suc
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Athenry Research Demonstration Farm

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The Research/Demonstration unit at Athenry was established in 2011 with the objective of developing profitable and sustainable grass-based systems of sheep production and the factors affecting the success of such systems. Research studies will seek to optimise grass production and utilisation within a sheep system through the use of optimal technical efficiency in relation to grassland and other management practices, for the purposes of dissemination to Irish lowland sheep producers.

The ongoing study is focusing on the effect of stocking rate and level of prolificacy on the sustainability and profitability of lowland sheep grassland systems. In this study there are three different stocking rates of 10, 12 and 14 ewes/ha. There are two levels of prolificacy, a medium prolificacy system aiming to wean 1.5 lambs/ewe and a high prolificacy system aiming to wean 1.8 lambs/ewe. Valuable information is being gathered across these contrasting systems on:

- grass supply and demand
- lamb growth rates
- drafting patterns
- Carcass output from grass per unit area - the main output from lowland sheep systems.

Taking the whole system into account detailed economic assessments is being made to quantify system profitability and sustainability. Data presented today includes results from the first year of the current stocking rate and prolificacy study. While presented for your information it must be remembered that this is only one year's results from young establishing flocks captured during 2012.

Key messages from year 1

- Stocking rate and prolificacy are both key drivers of output in grassland lamb production systems
- High levels of output are achievable from mainly grass-based diets
- While high stocking rates combined with high weaning rates do maximise lamb out/ha, this does not necessarily result in the highest gross margin/ha. The levelling off of gross margin achieved as we move from a medium stocking rate to a high stocking rate is due to the necessity to finish a higher proportion of these lambs on concentrates at the end of the year due to slower growth rates and less grass available within the system.
- The long term sustainability/ self sufficiency of the various systems will be a key measure of their success or failure. This is the reason such studies need to run for 4-5 years before definitive conclusions can be made.

Note:

Carcase out/ha represents all lambs finished within the systems including lambs that were finished with concentrates at the end of the year. Costs associated with this have been included in the calculation of the gross margin/ha figures presented. Also included within these calculations are higher than average reseeding and veterinary costs associated with establishing this farm.

2013 to date

Spring 2013 has been challenging to say the least. Grass growth rates on this farm were 70% and 50% below normal for March and April respectively. As a result management plans had to be adapted with all ewes supplemented at grass during late March and April. Total supplementation level per ewe post lambing was approximately 20kg. While this supplementation comes at a cost it allowed us stretch out what available grass we did have and helped reduce a drop in milk yield and lamb performance. It also allowed us to start building grass covers again relatively quickly once growing conditions did begin to improve. The importance of soil fertility and grazing infrastructure (paddocks) were never more apparent as the focus now turns to utilising as much grass as possible and conserving adequate levels of winter feed from within the systems. Regular updates on the latest results from the ongoing study are available monthly in the Teagasc Sheep newsletter and at *http://www.teagasc.ie/sheep/research_demonstration_farm*.

Athenry Sheep Research Demonstration Flock

Objective

Investigate the effects of stocking rate and ewe prolificacy on ;

- Lamb output/ewe and /ha
- Feed requirement and budgets
- Pasture growth and utilisation
- Overall system profitability

Closed system study

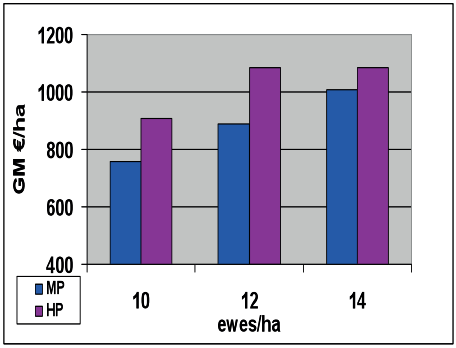
Carcass output/ha (kg) 2012

	Prolificacy	
SR	Medium (1.68 lambs/ewe)	High (1.8 lambs/ewe)
10 ewes/ha	321	351
12 ewe/ha	386	421
14 ewes/ha	448	489

•SR: Each 2 ewe/ha increase=65kg/ha increase in carcase output
•+Prolificacy: +35kg
Potential +100kg/carcase/ha

2012 performance (Year 1)

Gross margin/ha (€)



•Top 1/3 farms ePM last 3 years= €837/ha
•Higher Reseeding and Veterinary costs included

Key points (Year 1)

1)Stocking rate and prolificacy both key drivers of output

2)High levels of output are achievable from mainly grass based diets

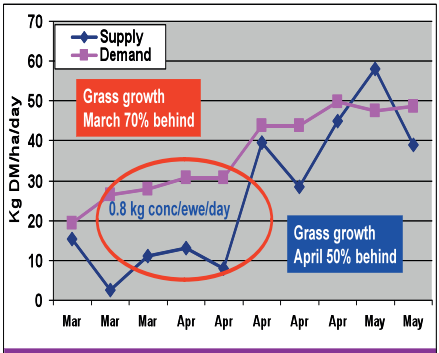
3)May be a limit to profitable increases in output

4)Sustainability/self sufficiency of systems in longer term important

5)Only one year- need to run over a number of years

2013 to date

Grassland Spring 2013



Supplementation required - ~20kg/ewe, €7.20/ewe
- Stretch available grass
- Maintain performance

Lamb performance

System	GR g/day 0-6 weeks	GR g/day 6-9 weeks
10 ewe/ha	272	326
12 ewe/ha	272	302
14 ewe/ha	265	270
Med Prolificacy	276	302
High Prolificacy	262	296

Key Issues Affecting Lamb Performance from Pasture

Tim Keady[1] and Gerry Murphy[2]
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Introduction

Ireland is the largest net exporter of lamb in Europe with exports accounting for 78% of lamb production. Prime lamb production in Ireland is grass-based and seasonal, with lambing normally targeted to coincide with the start of the grass growth in spring.

Factors contributing to lamb performance from pasture

In intensive systems of mid-season prime lamb production grazed grass accounts for 86% of total dry matter intake. For singles, twins and triplets target pre-weaning liveweight gains from birth to weaning are 340, 295 and 290 g/day, and target post weaning daily liveweight gains are 200, 195 and 175 g/day, respectively. Factors affecting lamb performance from pasture are discussed in this paper.

1. Lamb birth weight

Studies at Athenry have shown that each 0.5 kg increase in lamb birth weight increases subsequent weaning weight by 1.6 kg. Lamb birth weight is influenced by many factors including management and nutrition during mid and late pregnancy. Shearing ewes at housing (mid December) increased lamb birth weight by 0.6 kg. Relative to housed unshorn ewes, ewes that were extended grazed during mid pregnancy, late pregnancy or throughout pregnancy produced lambs which were 0.18, 0.37 and 0.59 kg heavier at birth. Ewes that are housed during mid and late pregnancy are normally offered grass silage supplemented with concentrates in late pregnancy. Each 5 percentage unit increase in silage DMD increases lamb birth weight and ewe weight post lambing by 0.26 kg and 6.5 kg, respectively. The response to concentrate feed level in late pregnancy is dependent on forage feed value. For example, increasing the quantity of concentrate offered in late pregnancy from 15 to 25 kg for grass silages with DMD's of 69% and 75% increased lamb birth weight by 0.5 and 0.1 kg, respectively. Replacing rapeseed, maize distillers and maize gluten with soyabean meal as the protein source increased lamb birth weight by 0.36 kg, equivalent to the response of increasing the feed level of the non-soya-based concentrate from 16 to 28 kg during late pregnancy.

2. Grassland management

To achieve optimum levels of lamb performance from grazed grass, pasture must be managed to maximise the proportion of leaf in the sward canopy, thus maintaining herbage digestibility and intake potential. Sward height measurement is the easiest and most effective way of managing pasture. Target post-grazing sward heights for rotational grazing systems, are 3.5–4, 4.5–5, and 5.5–6 cm for April, May and June, respectively

3. Male lamb management

Previous studies at Athenry have shown that castration reduced lamb weaning weight by 1.8 kg whilst increasing the age at slaughter by 16 days, consequently reducing the price received per kilogram carcass as carcass price normally declines as the season progresses. Meanwhile, for the loss of revenue the producer has not produced a product of superior meat quality. An extensive review of the literature has concluded that "where male lambs are reared on an all-grass diet and slaughtered by the end of the grazing season, leaving male lambs entire has no negative effect on meat quality, whether assessment is laboratory based or through in-home consumer tasting".

4. Concentrate (creep) feeding to lambs at pasture

The lamb performance response to concentrate feeding depends on grass supply and digestibility, and on the level of concentrate offered. A four year study at Athenry involved evaluating the effect of grass supply and concentrate feed level on lamb performance (Table 1.) The data clearly show that high levels of lamb performance were achieved from grass as the sole diet in a set-stocked grazing system. Increasing concentrate creep feed level increased lamb performance and reduced the age at slaughter, regardless of sward height.

Table 1. The effects of concentrate feed levels and grass availability on lamb performance

	Concentrate feed (g/lamb per day)					
	Low sward height (5cm)			High sward height (6 cm)		
	0	300	600	0	300	600
Weaning weight (kg)	31.4	34.3	36.9	33.7	36.7	37.5
Drafted at weaning (%)	7.3	20.7	42.8	20.4	41.2	53.7
Age at sale (days)	167	140	125	154	126	118
Concentrate intake (kg)	0	32.5	52.9	0	27.5	46.0

Lambs offered a maximum of 300 g or 600 g concentrate/day consumed 30 kg and 50 kg concentrate, respectively, from birth to slaughter. Feeding 300 g concentrate per lamb daily on the low sward resulted in the same level of lamb performance pre-weaning as lambs grazing the high sward without concentrate supplementation. Therefore, concentrate feeding replaced good grassland management. Concentrate feeding reduced the age to slaughter by 28 days. However, increasing grass height from 5 cm to 6 cm reduced the age at slaughter by 13 days, equivalent to feeding 16.3 kg concentrate per lamb from birth to slaughter. Previous studies at Athenry have shown that shearing ewes at housing increased subsequent lamb weaning weight by 2.2 kg, which is equivalent to the response to feeding 22 kg concentrate per lamb from birth to weaning. The data clearly shows that creep feeding at pasture increases lamb performance, and that the magnitude of the response is dependent grass supply.

To determine the potential financial implication of feeding concentrate it is essential to include the drafting information and individual carcass weight data for all lambs for the entire flock. The drafting data from a commercial mid-season prime lamb producing flock for 2008 to 2012 were collated and analysed. No concentrate was offered to lambs reared as singles or twins whilst lambs reared as triplets received up to 300 g concentrate daily, until weaning. Carcass value actually received and the carcass value that would have been realised had the lambs been offered concentrate (based on selling 4 weeks earlier) were collated to estimate the effect on financial returns. The analysis clearly showed that feeding concentrate increased the price received per kilogram (by between 11 and 79 c/kg depending on year) of lamb carcass for the first draft of lambs. However, when the increased price which would have been received due to earlier drafting as a result of concentrate feeding is calculated for the whole flock the increase in average carcass price was 2, 10, 22, 11 and 11 c/kg in 2008, 2009, 2010, 2011 and 2012, respectively. This clearly illustrates that whilst concentrate feeding reduced the age of slaughter by 28 days it had relatively marginal effects on the average price received per kilogram of lamb carcass for the whole flock. Lambs offered concentrate up to a maximum of 300 g per day consume 30 kg of concentrate prior to slaughter. The cost of concentrate consumed by lambs prior to slaughter is 9, 10.50 and 12 when concentrate costs are 300, 350 and 400/t respectively. In order for the extra carcass price to cover the cost of concentrate consumed by the flock, the concentrate would need to have been purchased for 14.5/t, 70/t, 144/t, 83/t and 87/t, respectively, in 2008 to 2012. In the costing exercise no value was attributed to the grass that was not consumed due to earlier sale of lambs offered concentrate because the opportunity value of the grass on a sheep farm in the summer is relatively low. However no cost has been included for the price of the feeders or the labour required to feed the concentrate daily. This

analysis shows that under the market conditions that prevailed from 2008 to 2012, the extra carcass value received due to concentrate feeding at pasture in mid-season prime lamb producing flocks did not even come close to covering the cost of concentrate offered. Therefore, to improve financial margins the majority of producers should focus on improving grassland management which is low cost, rather than trying to replace poor grassland management with concentrate which is an expensive solution.

5. Have alternative forages a role in finishing lambs?

The effects of tyfon and chicory, grazed either as pure stands or in combination with perennial ryegrass, on lamb performance post-weaning were evaluated in a grazing study at Athenry. The following five treatments were evaluated: perennial ryegrass (PRG), chicory plus PRG, tyfon plus PRG, chicory and tyfon. The performance of lambs grazing old permanent pasture (sixth treatment) was the benchmark to determine the benefits from reseeding per se. It is perceived by some producers that including alternative crops such as tyfon results in high rates of live-weight gain during the first weeks of grazing. This was not evident in this study (Table 2). High levels of lamb performance (overall average 217 g/day) were achieved throughout the study. Lambs grazing the old permanent pasture produced essentially the same daily live-weight gain as the lambs on the new perennial ryegrass sward or the other treatments. Relative to the new perennial ryegrass sward, including chicory in the seed mixture reduced live-weight gain by 36 g/day, though kill-out percentage was increased by 1.2% units. Including tyfon in the seed mixture had no effect on lamb performance. Grazing pure stands of tyfon or chicory did not affect performance relative to lambs grazing the new perennial ryegrass pasture or the old permanent pasture. Lambs that grazed the old permanent pasture, the new perennial ryegrass sward or the tyfon plus perennial ryegrass sward had similar drafting patterns.

Table 2. Effect of sward type on lamb performance

	Sward type					
	Perennial ryegrass (PRG)	Tyfon + PRG	Tyfon only	Chicory + PRG	Chicory only	Old permanent pasture
Live-weight gain (g/day)						
- weeks 1-3	308	244	184	240	167	284
- start to finish	226	220	213	190	226	219
Carcass weight (kg)	19.0	18.9	19.0	19.6	19.8	19.0
Kill out (%)	42.1	42.6	42.9	43.2	43.4	42.1

Sward type had a major impact on stock carrying capacity, and therefore on live-weight gain per hectare. The tyfon/ryegrass, chicory/ryegrass, tyfon and chicory swards sustained 90, 87, 93 and 58% of the liveweight gain produced from the perennial ryegrass reseeded sward, respectively. The results of this study show that there was no benefit from re-seeding, or from the inclusion of either tyfon or chicory in the seed mixture, on lamb performance post-weaning. Also re-seeding with the objective of producing tyfon for lambs post-weaning involves removing paddocks from the grazing cycle at the time of peak herbage demand one month prior to weaning. At this time of the year the objective should be to conserve winter forage supplies whilst at the same time maintaining lamb growth rate during the last 4 to 6 weeks prior to weaning by providing a continuous supply of high feed value grass to the flock. Whilst re-seeding showed no benefit in lamb performance, newly re-seeded pastures have been shown to increase herbage production, particularly at the beginning and end of the grazing season. On moderately stocked farms improving grassland management provides a cheaper alternative to improving lamb performance from pasture than reseeding. If re-seeding is to be undertaken, the ideal time is late July or August (when grass demand is reduced); this subsequently provides high feed value grass for finishing lambs in September and for preparing the ewe flock for the breeding.

Effect of weaning weight on drafting pattern

Increasing lamb performance pre weaning enables lambs to be drafted for slaughter at a younger age. Drafting data were collated for the Athenry flock from 2006 to 2012 inclusive. Based on these data each 1 kg increase in weaning weight reduced age at which 50% and 75% of lambs were drafted for sale by 7.1 and 6.6 days, respectively.

Conclusions

1. Each 1 kg increase in weaning weight reduces age at slaughter by 6 to 7 days.
2. To achieve high levels and lamb performance from grazed pasture:
    (a) Increase lamb birth weight - each 0.5 kg increase in lamb birth weight increases weaning weight by 1.6 kg and reduces days to slaughter by 12 days.
    (b) Leave male lambs entire.
    (c) Close paddocks from early November in rotation -post grazing sward height of 4 cm.

(d) For a rotational grazing system target post-grazing sward heights are 3.5, 4.5 and 5.5 cm for April, May and June respectively.
(e) Remove paddocks from the grazing system when there is an estimated 12- 15 days grass supply ahead of the flock.
(f) Allocate the highest feed value pasture to lambs post-weaning, i.e., aftergrass or graze lambs in a leader-follower system – the lambs as leaders ahead of the ewes.
(g) When grass supply is scarce in April, grazing to a post-grazing sward height of <3 cm for 2 weeks does not require concentrate supplementation for the ewes.

3. Concentrate feeding lambs at pasture:
   (a) As grass supply and concentre feed level increase, response to concentrate, as determined by lamb live-weight gain per kilogram concentrate, decreases.
   (b) For the majority of mid-season prime lamb producers feeding concentrate is not financially justifiable.
   (c) Sheep producers should invest in good grassland management, rather than concentrates. This will increase financial margins and reduce labour requirements.

4. Alternative forages:
   (a) Do not increase lamb performance relative to well-managed old permanent pasture.
   (b) When growing alternative forages the emphasis/focus of the producer may change from increasing flock productivity to growing the alternative forage crop.
   (c) On moderately stocked farms (i.e., < 9 ewes/ha) emphasis should be on managing existing swards rather than re-seeding.
   (d) On a sheep farm re-seeding should occur in early autumn when herbage demand is relatively low as the lambs are weaned /sold and winter forage has been conserved.

Prime lamb production from grazed grass

- Each 0.5 kg increase in lamb birth weight increases weaning weight by 1.6 kg

Factors affecting lamb birth weight

Factor	Increase in birth weight (kg)
Shearing at housing	0.6
Silage DMD – (per 5% unit increase)	0.26
Concentrate feed level (per 10 kg)	0 to 0.5
Concentrate protein source soya	0.36
Extended grazing - all pregnancy	0.59

Effect of creep feed on lamb weaning weight

Sward height (cm)	Creep feed (g/d)		
	0	300	600
5	31.4	33.7	36.7
6	34.3	36.9	37.5

- Creep feeding reduces age at slaughter by
  - 28 days if offered 300 g/day (consume 30 kg)
  - 39 days if offered 600 g/day (consume 50 kg)

Effect of concentrate cost on economics of creep feeding

Cost (€/t)	Cost per lamb (€)		Price rise required (c/kg)	
	300g/d	600g/d	300g/d	600g/d
350	10.5	17.5	50	83
400	12.0	20.0	57	95
450	13.5	22.5	64	107
500	15.0	25.0	71	119

- **For the majority of mid-season prime lamb producers feeding concentrate is not financially justifiable**

Have alternative forages a role to play?

- Interest in the use of alternative forages to increase lamb performance post weaning
- Options include tyfon or chicory mixed with grass seed at sowing in May

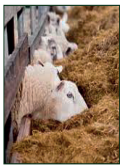
Effect of alternative forage on lamb performance

	Liveweight gain (g/day)		Kill out (%)	Grazing days (relative to grass)
	Weeks 1-3	Start to finish		
Reseeded grass	308	226	42.1	100
Tyfon + grass	244	220	42.6	94
Tyfon	184	213	42.9	92
Chicory + grass	240	190	43.2	99
Chicory	167	226	43.4	56
Permanent pasture	284	219	42.1	-

- Permanent pasture - same level of performance as reseeded pasture
- Alternative forages - did not increase lamb performance but reduced stock carrying capacity
- On moderately stocked farms - improve grazing management of existing swards
- If reseeding, reseed in late July, August because
  - herbage demand is reduced
  - provide high feed value herbage to finish lambs in autumn

Producing high feed value grass silage

- Major variation in feed value of silage produced on farms
  - DMD varies from 52%-82%
- Concentrate supplementation depends on silage feed value
- Each 5 unit increase in DMD increases:
  - lamb birth weight by 0.25 kg
  - ewe weight at lambing by 6.5 kg
  - finishing lamb carcass weight by 3.3 kg over 70 days
- Each one week delay in harvest is equivalent to15 kg concentrate /ewe
- Apply adequate fertilizer
  - nitrogen
  - P + K - base on soil analysis



Factors affecting silage digestibility

- Harvest date
  - DMD declines by 3.3 percentage units per 1 week delay
  - same for the first and second harvests
- Sward type
  - old permanent pasture can produce high DMD silage
- Sward heading date
  - harvest late heading varieties 8 days later than intermediate heading varieties
  - do not base harvest date on heading date alone
- Wilting
  - reduces DMD by up to 2% units per 24 hours
- Silage fermentation
  - poor fermentation reduces DMD

Aim to produce high feed value silage with a DMD of 75%

BETTER Farm Sheep Programme - Results To-Date

Ciaran Lynch[1], Michael Diskin[1] & John Cannon[2]
[1]Animal and Grassland Research and Innovation Centre, Teagasc, Mellows Campus, Athenry, Co. Galway. [2]Teagasc, Letterkenny, Co. Donegal.

The main objective of the Teagasc BETTER Farm Sheep programme is to provide focal points to facilitate the improvement of technology adoption at farm level. The Programme began with the recruitment of 3 hill flocks in the Autumn of 2008 with lowland flocks recruited thereafter. Currently, there are 6 Lowland flocks in counties Donegal, Roscommon, Offaly, Kilkenny, Wicklow, Wexford and Kerry and 3 Hill flocks in counties Donegal, Sligo and Mayo involved in the programme. While each of the farms operated under different constraints, the focus on each of the farms was the same: highlight how productivity, efficiency and ultimately profitability could be improved though adopting technology.

A 3 to 5 year plan was developed on each of these farms with the help of the farmer, local adviser, sheep specialist and research staff. The plan identified key areas where improvements could be made and highlighted how the use of certain technologies could facilitate this. The areas addressed are equally applicable to any commercial farm. Many of theses technologies and messages presented today relate to: flock size and stocking rate, breeding policy, breeding management, ewe management, grassland management, lamb performance, parasitic gastro-enteritis (PGE) control.

To quantify the progress made on the farms a comprehensive account of animal and financial performance on each farm was maintained. To date, relative to the first year of the project the 2008/09 season the number of lambs weaned per ewe joined in the lowland flocks has increased by 0.27, due to an increased litter size (+0.22) and increasing the percentage of ewes lambed (+4.4%) as summarised in Table1.

Table 1. Lowland Flock Performance

	Season				
Variable	**2008/09**	**2009/10**	**2010/11**	**2011/12***	**Target**
Litter size	1.71	1.77	1.86	1.93	1.9
Ewes lambed per ewe joined (%)	90.2	93.8	97.3	94.6	>94
Lambs reared per ewe joined	1.43	1.53	1.66	1.70	>1.6

* Original 4 lowland farms only

Similarly, for the hill flocks, the number of lambs weaned/ewe joined has increased by 0.14, due to a combination of increased litter size (+0.17) and a substantial improvement in percentage of ewes that lambed (+5.3%) as summarised in Table 2.

Table 2. Hill Flock Performance

Variable	2008/09	2009/10	2010/11	2010/11	Target
Litter size	1.18	1.29	1.32	1.35	1.3
Ewes lambed per ewe joined (%)	88.2	79.5	95.9	93.5	>92
Lambs reared per ewe joined	0.96	0.92	1.1	1.1	1.1

The aim for the flocks was to improve lamb performance from a grass based diet and reduce the reliance on concentrate supplementation. For both the lowland and hill flocks lamb performance improved substantially during the first 3 seasons (Tables 3 & 4).

Table 3. Lamb weaning weight (kg) in Lowland flocks

Birth type	2008/09	2009/10	2010/11	2011/12	Target
Single	36.5	37.2	37.7	35.6	>38
Twin	31.7	32.5	32.8	30.3	>33
Triplet	30.5	31	32	29.8	>32

However, the 2012 grazing season proved extremely difficult and as a result there was a reduction in performance. Despite this setback the farms were still able to maintain high levels of output due to improvements in management gained during the period.

Table 4. Lamb weaning weight (kg) in Hill flocks

Birth type	2008/09	2009/10	2010/11	2011/12	Target
Single	23.9	28	27.6	26.8	> 25
Twin	20.9	24.1	24.4	21.9	> 21

Each of the flocks completes an E-Profit monitor each year. A number of the key financial variables for the Lowland flocks and Hill flocks is presented in Table 5, also included is the chance relative to the first year in the programme. Despite a difficult season in 2012 the financial gain relative to the first year of the programme is substantial and reinforces the benefits of implementing a farm plan.

Table 5. Financial performance of the flocks

	Lowland flocks (per hectare)		Hill flocks (per ewe)	
	2012	Change (%)	2012	Change (%)
Gross output	1314	+ 53	53.35	+ 25
Variable costs	644	+ 13	19.68	- 14
Gross margin	670	+ 131	33.66	+ 70

Take home message

- Real gains in productivity and profitability have been made in the BETTER Farm Sheep Programme.
- Every sheep enterprise has the potential to improve productivity and financial margins.
- Every farmer should adopt a targeted 3 to 5 year plan focusing on 4 key areas: Ewe productivity (litter size), grassland management, stocking rate, and parasite control.
- Make use of BETTER Farms to see the benefits of adopting technology first hand.

BETTER Farm Sheep Programme

Hill Flocks

1 David Mc Laughlin
2 Colm O'Donnell
3 James Lally

Lowland Flocks

1 David Mc Laughlin
4 John Curley
5 Brendan O'Sullivan
6 John Kelly
7 Brian Nicholson
8 John Doyle
9 Andrew Maloney

Farm Plan

Aim to increase the productivity and profitability of the sheep enterprise

Developed a 3 to 5 year plan focusing on key areas:

- Flock size
- Breeding policy
- Grassland management
- Parasite control
- Winter management
- Farm Layout

Increases in Productivity and Profitability of BETTER Farm flocks

Flock Productivity

Lowland Flock Performance

Variable	Season 2008/09	2009/10	2010/11	2011/12	Target
Litter size	1.71	1.77	1.86	1.93	1.9
Ewes lambed per ewe joined (%)	90.2	93.8	97.3	94.6	>94
Lambs reared per ewe joined	1.43	1.53	1.66	1.7	>1.6

Hill Flock Performance

Variable	Season 2008/09	2009/10	2010/11	2011/12	Target
Litter size	1.18	1.29	1.32	1.35	1.3
Ewes lambed / ewe joined (%)	88.2	79.5	95.9	93.5	>92
Lambs reared / ewe joined	0.96	0.92	1.1	1.1	1.1

Breeding policy

- Consistent policy to meet flock demand
- Exploit genetic improvements
- Exploit crossbreeding in hill flocks

Sustainable parasite control

- Establish althelminthic status of Farm
- Use Fec counts to aid dosing decisions
- Adopt best practice strategies

Grassland management

- Match Lambing date to grass supply
- Managing grass supply
- Exploit benefits of reseeding

Take Home Message

Lowland flocks: Financial performance (€ per hectare)

	2009	2010	2011	2012
Gross Output	857	1051	1271	1314
Total Variable Costs	567	520	540	644
Gross Margin	290	531	731	670

- Gross output has increased by 53%
- Variable costs have increased by 13%
- Gross margin has increased by 131%

Hill flocks: Financial performance (€ per ewe)

	2009	2010	2011	2012
Gross Output	42.71	45.02	72.31	53.35
Total Variable Costs	22.88	20.91	15.24	19.68
Gross Margin	19.83	24.11	57.04	33.66

- Gross output has increased by 25%
- Variable costs have decreased by 14%
- Gross margin has increased by 70%

- Significant gains can be achieved through adopting Technology
- Put a 3 to 5 year plan in place for your farm

Adopting Technology pays €€€

Sheep Breeding

Noirin McHugh[1] and Michael Gottstein[2]

[1] *Animal & Bioscience Research Department, Animal & Grassland Research and Innovation Centre, Teagasc, Moorepark, Fermoy,Co. Cork*

[2] *Teagasc, Cleeney, Killarney, Co. Kerry*

What is it and why use it?

Sheep breeding is a selection tool that involves the use of genetic information on individual animals to rank animals based on their genetic potential. It is well established that approximately half of the production gains achieved in animal performance is attributable to genetics. Genetic improvement is cumulative and permanent so that if you were to use animals with "good genes" then the effects of these "good" genes will remain in the flock. On the downside the reverse is also true, if an animal of low genetic merit is used within the flock then these bad genes are there to stay. It is also difficulty for management to compensate for poor genetics. Therefore, it is critical to ensure that you select animals of good genetic merit to become parents of the next generation.

How does it work?

Sheep breeding allows for the ranking of animals based on their genetic merit for a given trait. The genetic merit of animals is calculated based on pedigree information on the animals and farmer recorded information from several sources (i.e., information on the animals on performance, information on the performance of an animal's relatives and information on the animal's progeny) but also accounts for the for environmental (i.e., level of feeding, managements, disease, climate, etc) differences between flocks. In Ireland the genetic merit of animals is calculated by Sheep Ireland and animals are ranked based on the Sheep Value Index.

Sheep Value Index

The overall Sheep Value Index is based on the uro-star system which acts as an indicator of the profitability that can be obtained from the animal's progeny. The uro-stars are scored on a scale of 1 to 5 and compares all animals within each breed; a 1 star indicates that the animal lies within the bottom 20% of ranked animals for the given trait and a 5 star corresponds to the top 20% of animals.

Sheep Value Index – this is the overall index for each animal and encompasses the three sub-indexes each weighted based on relative importance:

1. ***Production Sub-index*** – ranks animals based on their ability to produce good terminal progeny. This takes into account the progeny's growth rate, carcass characteristics and days to slaughter.
2. ***Maternal Sub-index*** – ranks animals on the expected performance of their daughters and takes into account the daughters' mothering ability, the lambing ease, and the efficiently at which their progeny are finished.
3. ***Lambing Sub-index*** – ranks animals for lambing traits and takes into account the lambing ease and survivability of the animal's lambs.

Accuracy

Another important component to the Sheep Value Index is the accuracy value that is published for each trait. The accuracy refers to the "confidence" in the published genetic merit (e.g., Sheep Value) of an animal as a reflection of the true genetic merit of an animal. We never know the true genetic merit of an animal (even with thousands of progeny!). The genetic evaluation process, using sophisticated statistical techniques, provides the "best estimate" of an animal's genetic merit based on the available data. Accuracy values are expressed as a % and indicate the quantity and quality of records used to produce the index or sub-index. The higher the accuracy of the given trait the greater the information that is known about the animal and the greater the confidence we have that their published index value reflects their true index value.

Interpreting published accuracy's
Low → 0 – 20%
Average → 20 – 30%
High → 30 – 40%
Very high → 40%+

How to use it?

Prior to using any index, each farmer must determine the most suitable animal for their production system. The important question for each farmer is how you achieve that ideal animal. For example, if farmers are interested in finishing all their lambs then they should pay particular attention to the production sub-index of the animal under investigation. On the other hand, if a farmer is looking to breed their own replacements then they should examine the maternal sub-index carefully. Irrespective of the type of animal that is needed, careful attention should be placed on the star rating of the animal and the accuracy associated with the trait of interest.

Does it work?

Recent results have shown that selecting animals of high genetic merit on the index can increase animal performance and therefore farm profitability. Results to date have shown that lambs from five-star production index rams with high accuracies were, on average, 4kg heavier at weaning, compared with lambs from one star production index rams. These results show that selecting rams with high star ratings for production sub-index will, on average, increase weaning weight. Research into the benefit of the Sheep Value Index for other traits is on-going.

Recommendations to Pedigree Breeders

- Participate in the Sheep Ireland breeding programme
- Existing members should record all traits across all lambs
- Flocks with poor accuracy should consider entering rams into the CPT programme
- uro-star indices should be used as a tool for the selection of stock rams and replacement ewes

Recommendations to Commercial Sheep Producers

- Consider taking option 2 as a task in the STAP discussion group programme
- Look for rams with genetic evaluations
- Use the genetic evaluations as a tool for selecting rams
- Focus on traits of interest for your production system
- Select rams with:
    - high star rating
    - high accuracy
- Consider participation in the Sheep Ireland breeding programme

Conclusion

The Sheep Value Index provides an important tool for sheep farmers in making more informed breeding decisions and has the potential to increase profitability at farm level. Prior to the selection of a ram farmers should take note of the genetic merit of an animal and select animals with high star rating for the traits of interest.

Sheep Breeding

What is it?

Sheep Breeding involves the use of genetic information

Allows for the selection of superior animals

Why use it?

Long term benefits → genetics is permanent and cumulative

Management can't compensate for poor genetics

How does it work?

Involves the use of information from:

1.On farm data → number of lambs born, weights, survival

2.Ancestry information → sire and dam

How to use it?

Sheep Value Index – indicator of profita rated from progeny

&

Sheep Value Index

€ value

How much profit can be generated from progeny

Sub-indexes

Maternal

Production

Lambing

Star rating

Top 20%

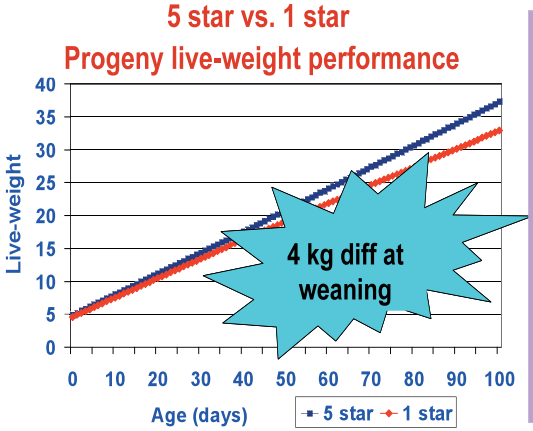
Bottom 20%

Accuracy value

Indicator of confidence in published value

More information on animal, the higher the accuracy

Does it work?



When selecting ram…

- Look for rams with genetic figures
- Use as a tool for selecting rams
- Select rams with:
  - high star rating
  - high accuracy
- Look at rating for traits of interest

Resistance to Worm and Fluke Drenches in Sheep

Barbara Good[1], Ciarán Lynch[1], Orla Keane[2], Tom Coll[3]
[1]Animal & Grassland Research and Innovation Centre, Teagasc, Mellows Campus, Athenry, Co. Galway,
[2]Animal & Grassland Research and Innovation Centre, Teagasc, Grange, Dunsany, Co. Meath.
[3]Teagasc, Mohill, Co. Leitrim.

Wormer resistance

Wormer resistance can be defined as the ability of the worm to tolerate levels of the drug which normally would kill it. Resistance is heritable meaning that a worm can pass this ability to resist a particular drug onto its offspring. It is believed that resistance to a particular drug develops slowly at first but once it has developed in a flock will increase rapidly. The speed of this largely depends on the selection pressure and an environment that favours the development of the resistant worms. The first report of resistance to wormers (benzimidazole) was in the early 90's. Since then a number of studies have been completed, with broadly similar results i.e. widespread evidence for resistance to benzimidazole (white drench) and to a lesser extent levamisole (yellow drench). Of more recent concern, is the emerging situation in the clear group (macrocyclic lactones .e.g. ivermectin, moxidectin) and to triclabendazole (flukicide) While thankfully, there are now 2 other anthelmintic groups/ wormer doses on the market namely monepantel (Zolvix, Novartis Animal Health) and derquantel (STARTECT, Zoetis formerly Pfizer) which are prescription only medicines, this does not leave room for complacency.

To prolong the efficacy of the older and novel anthelmintics and flukicides a more sustainable approach is needed. With wisdom of hindsight and the knowledge that anthelmintic resistance is a threat, it is now thought that "established" and formerly recommended practices such as suppressive dosing and the "dose and move" directly to 'safe' pastures will actually increase the rate at which resistance develops in the parasite population. Under-dosing (administering incorrect dose rates) is also recognised as a risk factor. Results from a survey revealed practices on some Irish farms that would put them at increased risk of developing resistance (see board). There are a number of recommendations to delay the development of resistance (see board). More information on these recommendations is readily available online in a publication by the SCOPS (Sustainable Control of Parasites in Sheep) working group in the UK (www.scops.org.uk)

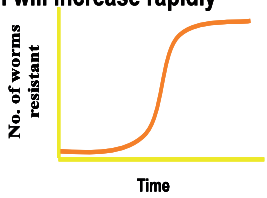
Do anthelmintics works as well as they did in the past, do you have evidence for anthelmintic resistance in your flock? Completing a drench test (independently or as one of the tasks to qualify for Sheep Technology Adoption Programme (STAP)) should provide valuable information on drug efficacy in your flock and is a very well-worthwhile exercise to complete. Instructions for this drench test and a list of accredited laboratories should now be available on the DAFM website (http://www.agriculture.gov.ie/media/migration/farmingsectors/sheepandgoats/stap2013/STAP2013TandCondition160113.pdf). To yield meaningful results, it is important that the instructions as outlined in this document are adhered to and that the anthelmintic is administered in accordance with the manufacturer's recommendations. An inconclusive result / lack of a result (as occurred in 2012 survey for approximately 50% of participants see table) may occur as a result of a number of reasons, some of which you will have more control over others: low faecal egg count in the pre-dosing sample, not adhering to the correct sampling times post dosing or not submitting a post–dosing sample. Knowledge on the anthelmintic resistance status in the parasite populations on your farm is a crucial piece of information pertaining to your enterprise that will help inform decisions and tailor best practice in parasite control for your flock.

Summary and Recommendations

- The effective management of internal parasites on grazing livestock relies heavily on the use of highly efficacious anthelmintics.
- Studies have provided compelling evidence for resistance to anthelmintics in nematode populations in Irish flocks. Resistance to more than one class of anthelmintic (i.e. multiple resistance) is also evident.
- The development of anthelmintic resistance is a direct result of actions that have inadvertently favoured the evolution of resistant worms
- Producers are encouraged to find out the anthelmintic resistance status of the worms on their enterprise and take on board 'new' recommendations to manage the rate at which anthelmintic resistance develops and ultimately prolong the lifespan of anthelmintics.

Wormer Resistance …. What & Why ?

- **Ability of the worm to tolerate levels of the drug that would normally have killed it**
- **Resistance will develop slowly at first but then will increase rapidly**

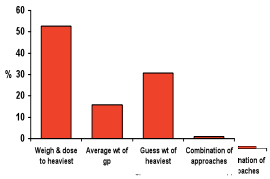


Departures from best practice encourage the rate at which resistance develops

Risky practices
- **Under dosing**
- **Frequent dosing**

Survey results from Irish producers (Patten et al 2011)

Weight basis for dosing



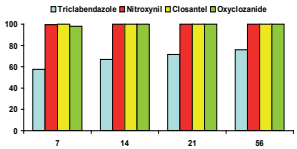
- **~50% element of guesswork**
- **30 % reported checking the calibration of dosing gun regularly**
- **61% gave 4 or more treatments in a 'normal' year**

Evidence for resistance on Irish farms

Flukicides

Teagasc hill sheep farm Leenane

- 4 products tested in ewes with liver fluke infection
- Triclabendazole resistance observed



Sligo/Leitrim Lamb Producer Group

20 farms tested with TBZ in 2012
- 1 farm with no evidence for TBZ

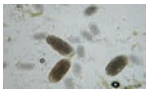
Wormers

Year	2005	2012	2012	2013/14
Demographic	nationwide		Sligo/ Leitrim	
No. of participants	74	57	20	
No. suitable for inclusion	64	33	10	Depends!
No. of drugs tested	2	1	3	
White	95%	100%(10)	100%(10)	
Yellow	48%	50%(3)	90%(9)	?
Clear	N/A	27%(4)	70%(7)	
X2 R			90%(9)	

Recommendations to delay resistance

Establish anthelmintic resistance status on your farm

Pre and post dosing faecal egg count



Use anthelmintic only when necessary

Select the appropriate anthelmintic for the task

Administer drugs effectively – avoid under dosing

Reduce dependence on wormers

Prevent the importation of resistant worms in purchased animals – use effective quarantine strategies

Land Drainage

Pat Tuohy & James O'Loughlin
Teagasc, Animal & Grassland Research and Innovation Centre,
Moorpark, Fermoy, Co. Cork.

- There is a need for a better understanding of the causes of drainage problems and of the design and implementation of appropriate drainage systems.
- The first step of any drainage works is a detailed investigation into the causes of poor drainage using soil test pits.
- Most land drainage systems could work much more efficiently if some simple rules were followed during planning and installation.

A number of drainage techniques have been developed to suit different soil types and conditions. Broadly speaking, there are two main categories of land drainage:

- **Ground water drainage system:** A network of piped drains exploiting permeable layers.
- **Shallow drainage system:** Where the permeability (the ability of the soil to allow water to move through it) of the soil is low at all depths and permeability needs to be improved.

A number of soil test pits (at least 2.5 m deep) should be excavated within the area to be drained in order to establish the drainage characteristics of the soil. As the soil test pits are dug, the faces of the pits are observed, soil type should be established and the rate and depth of water seepage into the soil test pit (if any) recorded. Visible cracking, areas of looser soil and rooting depth should be noted as these can convey important information regarding the drainage status of the different layers of soil. The depth and type of the drain to be installed will depend entirely on the interpretation of the characteristics revealed by the test pits.

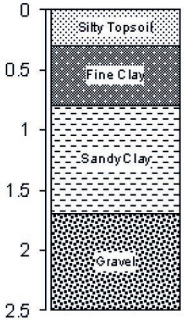
The decision between the two main systems essentially comes down to whether or not a layer is present (at a workable depth) that will allow the flow of water with relative ease (noted as water seepage into the soil test pit) . If such a layer is evident a piped drain system is likely to be effective, at this depth. If no such layer is found during investigations, it is necessary to improve the water carrying capacity of the soil. This involves a disruption technique such as mole drainage, gravel mole drainage or subsoiling in tandem with collector drains.

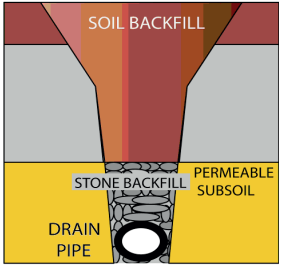
Drainage problems

Soil Test pits (at least 2.5m deep)

- Soil texture & structure
- Water movement (transmit or retain)
- Rooting depth, cracking
- Depth/Thickness of various layers

Groundwater Drainage System





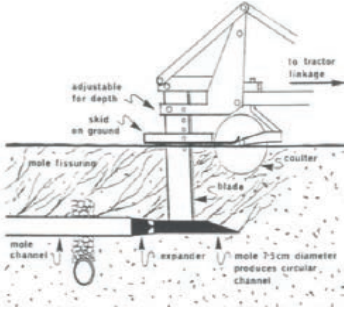
Conventional or deep pipe drains:

- If a soil layer will transmit water
- If excess water can percolate to watertable.
- Most effective way to discharge water
- Drain spacing dependent on water carrying capacity of drainage layer.

Impermeable soils

Mole drain or gravel mole drain:

- Aim to fracture and crack the soil
- Dependent on:
  - Soil type
  - Implement used
  - Weather conditions
- In tandem with collector drains



Feeding the Soil for Maximum Performance

Tim Hyde[1] & Christy Byrne[2]
[1]Mellows Campus, Athenry, Co. Galway
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Productive and sustainable farming begins in the soil. You wouldn't feed your animals without looking at their condition, therefore why do it to soils?

If the soil pH, phosphorus and potassium levels are below optimum levels, the crop will not receive the same response to applied chemical or organic fertilisers. A soil sample costs 25 per sample. Spreading a tonne of nitrogen fertiliser costing up to 350 or compound fertilisers costing 400- 450 and not knowing the soil fertility could be costing you money. Teagasc is promoting 5 simple steps which can be followed on every farm to maximise nutrient requirements of grass:

1) Have soil analysis for the whole farm completed. Costs only 1.25/ha

2) Apply lime as required to increase soil pH up to target pH for the crop. This could increase soil N release by 60 - 84/ha. Sixty percent of farms have a pH below the optimum level of 6.0-6.3.

3) Aim to have soil test P and K in Index 3 in all fields:

   - Index 4 (high fertility) soils are a resource.... exploits them.
   - Index 1 & 2 soils (low fertility) should be increased to the target fertility level of Index 3.
   - Index 3 'v' index 1 = 1.5t/Ha of DM = 400/Ha

4) Start by using organic fertilizers such as slurry and farmyard manure as efficiently as possible, then top up with fertilizer as required. Target low fertility fields with cattle slurry and apply in cool and moist weather.

5) Make sure the fertilizer compound used is supplying nutrients in the correct balance for the crop, the soil, and to complement other chemical and organic fertilizers being applied. Keep an eye on sulphur, Mg and trace elements. ***Buy what you need and not what you are sold.***

Discussion will be based on a balanced approach to fertilizer application and nutrient supply. Both of these provide the option to significantly reduce the chemical fertiliser; whilst achieving high levels of sward and animal performance.

A fertiliser plan for each field is essential to maximise soil fertility; and will also keep you compliant with Nitrates regulations .

If you don't soil test you are spreading the wrong fertiliser in 3 out of 4 of your fields – can you afford this mistake?

5 Steps to Improving Soil Fertility

Step 1- Soil Test

- Test soils every 3 – 5 yrs
- **Cost €1.25/ha/yr**
- Monitor soil P, K, pH, Mg & minor nutrients

Step 2- Soil pH

- Low pH reduces fertiliser efficiency
- Lime - pH 6.0 - 6.3 in Grass
- **Increase soil N release by 50–70 kg N/ha = (€60-€84/ha)**

Step 3 – Index 3

- Aim for soil Index 3 P & K.
- Index 4's are a resource
- Tailor fertiliser to soil P & K
- Index 3 'v' Index 1= 1.5tha of DM **= €300/ha**

Step 4 - Slurry

- Nutrient content & Target low fertility fields
- **33m³/ha cattle = €225/ha** Apply manures in spring to maximise N (cool & moist)

Step 5 - Balance

- Supply correct P : K Ratio
- Allow for P & K in manures
- Select suitable fertiliser
- Apply at correct rate & time
- Apply S, Mg & TE

Silage and Fertiliser for Grassland

- **Silage needs 80 – 100 units N, 15 units P and 94 units K**

Variability & Dilution	DM%	NPK Value
Cattle Slurry	7%	6-5-38
½ slurry; ½ soiled water	4%	5-3-22
Soiled Water	1%	4-0.7-5

1st Application	2nd Application	Comments
Lime - **Don't cut silage for 6 months**	Urea (10mm rain within 2 days)	No urea for 3-6 mths. Losses if hot & dry
Lime	CAN	No problem
Lime	Slurry (N uptake)	3 - 6 months
Urea or Slurry	Lime	1 week between
CAN	Lime	No Issue
Slurry	Any N fertilizer (Urea, CAN or NPK)	1 week between
Any N fertilizer	Slurry	1 week between

Protect Your Soils

Tom Gleeson [1], Tom Walsh [2] & Mark Gibson [3].
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[3]Teagasc, Mellows Campus, Athenry, Co. Galway.

Soil structure is the main building component of your soil. The structure depends on the type of texture a soil has (i.e. amount of sand, silt and clay). Soils have been subjected to damage over the last year as farmers have struggled to utilise grass in wet conditions, whether grazing or silage harvesting. All soils have a structure which is an arrangement of the soil aggregates and the pore spaces between them. Animal or machinery traffic can damage the soil surface (called compaction), which is easily seen as poaching or wheel ruts, but they can also damage the soil structure which may not be visible. Machinery damage is caused by axel load, tyre pressure and wet soil conditions which often leads to subsoil damage of surface capping and wetness. Animal poaching leads to damage in the surface of the soil. Soil compaction reduces pore space and consequently reduces drainage and impedes root growth resulting in water logging and reduced yields due to poorer nutrient uptake. Wet soils are weak and easily damaged, resulting in slowly draining soils in wetter areas being particularly prone to damage.

Before considering any remedial action, it is essential to examine soils for damage. Visible surface cues may be poorer grass growth in areas of the field subjected to extra traffic, such as headlands if machinery compaction is expected. Digging out an intact spade-full of soil in suspect areas allows the structure to be examined. Presence of discrete horizontal compact layers, lack of root penetration and platy/blocky aggregate structures, are all indicators of compaction.

If compaction if the problem; the best option is simply to try to avoid further damage and to let the soil recover itself. If there is a discrete thin shallow compact layer, spiking or aeration in dry soil conditions may help roots penetrate, but these conditions are relatively rare. Sub-soiling or pan-busting should only be considered where there is definite knowledge of serious compaction at a deep level, as there is a real risk of subsequent re-compaction of any loosened soil.

To avoid compaction in the future:-

Restrict access to land when soil moisture is high

Good paddock, water and gateway layout to minimise traffic concentrations

Flexible grazing systems including stand-off capability to minimise animal traffic events

Machinery fitted with large tyres to produce ground pressure appropriate for conditions

Soil Structure Damage

Causes:

- Machinery traffic
- Animal Traffic
- Soil moisture and type

Problems:

- Compaction, smearing puddling
- Impedes: root growth, water movement
- Restricts nutrient uptake and yield
- ↑ Soil density ↓ Pore spaces

Have I a problem:

- Difficult to measure
- Examine the soil

Soil Structure Damage

Prevention Best:

- Restrict traffic in wet
- Tyres, Pressures, Loads
- Flexible grazing

Solution:

- Spiking-inexpensive
- Shallow compact layer
- Routine use questionable

Have I a problem:

- Drastic action – expensive
- Drainage V's Aeration/Ripping
- Solution ≠ Problem
- May reduce yields (10%)

Teagasc Sheep Advisory Service

Michael Gottstein[1], Frank Hynes[2],
[1]Head of Sheep Programme, Teagasc, Cleeney, Killarney, Co. Kerry
[2] Sheep Specialist, Teagasc, Animal & Grassland Research and Innovation Centre, Mellows Campus, Athenry, Co. Galway

Teagasc are proud to offer a comprehensive package of advice, research and education to the Irish sheep industry. The primary aim of the advisory service is to develop and promote the adoption of key technologies thereby increasing output and profitability. The service is delivered through our network of 51 advisory offices, 70 sheep advisers and 3 sheep specialists with support from the education and research directorates. In addition Teagasc collaborate with a huge range of outside bodies on public events such as open days, farm walks, seminars and conferences.

Weather conditions for the last 12 months have imposed significant challenges on drystock farmers. Results from the Teagasc BETTER farm programme show that animal performance has been adversely affected both last year and again this year. In addition expenditure particularly on additional feed has increased dramatically. These facts make today's event even more important. Key messages from research can be implemented at farm level to target areas such as grass growth & forage quality, grassland management, soil fertility, genetic improvement, control of parasites and financial management. One clear message that is coming from the BETTER farm programme is that by having a planned approach to these areas, improvements can be made in terms of increasing output with a corresponding reduction in operating costs and increased farm profitability.

The immediate priority for most drystock farmers is to maximise grass growth with the aim of maximising animal performance and replenishing exhausted winter fodder reserves. Addressing soil fertility and nitrogen applications are only part of the solution. Reducing residency periods by splitting paddocks/fields will greatly improve the amount of grass that is both grown and utilised. This year in particular there is enormous scope for farms that are operating at lower stocking rates to increase fertiliser rates and to conserve additional winter fodder for sale as a cash crop. This is essential if enough fodder is to be grown to feed the national dairy, cattle and sheep herd/flocks.

Another key challenge this year will be to make up for the poor performance of this years lamb crop. Initial indications from the Teagasc sheep BETTER Farms is that lamb performance is adversely affected with lambs being approximately 3 – 5kg behind target weight at weaning time. This will have a significant impact on drafting patterns and grass demand into the autumn. Key decisions need to be made at farm level to ensure that delayed drafting does not impact on ewe reproductive performance or ewe body condition going into the winter.

Financial planning has to be a critical part of any programme dealing with the fallout of this year's weather induced problems. Investigating what options are available and identifying sustainable solutions are critical to ensuring that cash flow problems do not arise later on. These and the other critical areas that drystock farmers need to be aware of will be covered in our feed, fodder and financial advice clinics. We invite all farmers who are concerned about these issues to speak to our experience advisory team.

Advisory Services

Develop & Promote adoption of Key Technologies including Grassland, Nutrition, Breeding & Health

Series of public events
- Open days
- Conferences
- Farm walks
- Demonstrations
- Seminars

Liaise with outside bodies
- DAFM
- Industry
- Farm organisations
- Stakeholders

Work jointly with Research Colleagues
- BETTER Farm Programme
- Research/Demonstration Farm
- Other research projects

Delivered by

➢70 advisers
51 advisory offices
Series of clinics
144 discussion groups

Specific areas of work
- •Business planning
- •Financial Analysis (Pr-monitor)
- •Grass budgeting
- •Fertiliser plans
- •Feed plans
- •Farm yard planning
- •Ration formulation
- •Health
- •Newspaper Articles
- •Newsletters
- •Technical notes

Addressing the Grass and Fodder Shortage

Frank Hynes, Sheep Specialist,

Animal and Grassland Research & Innovation Centre, Teagasc, Mellows Campus, Athenry. Co. Galway.

The spring of 2013 has been very difficult in terms of high rainfall and low temperatures resulting in poor grazing conditions, damage to soil and poor grass growth. This combined with the carry over effects of a poor grass growing year in 2012 has resulted in major shortages of grass and delayed provision for saved feed for the forthcoming winter.

Insufficient grass

Where there is insufficient grass for ewes during lactation (less than 4 cm) milk yield is reduced and lamb performance suffers. Two main approaches are needed to address the situation:

- Special effort is needed to grow extra grass (for grazing and for silage)
- Steps can be taken to reduce demand for grass

Growing More Grass

- Apply Fertiliser
- Operate a rotational grazing system allowing areas to rest & recover

Fertiliser

Fertiliser, and in particular Nitrogen, is required to get a good supply of grass to grow. Nitrogen fertiliser should be applied regularly onto grassland. P & K levels as well as soil pH should be rectified over time to maximise returns from Nitrogen fertiliser.

- 34 -35 kg N /ha (one bag of C.A.N. or equivalent per acre) should be applied in most cases every 4 to 6 weeks.
- Where stocking rates are high, extra nitrogen may be required. This will help rectify the grass shortage when growth recovers.
- If P & K levels are low, a compound fertiliser (e.g. 18:6:12) will yield better results than straight Nitrogen.
- To help avoid similar problems for the future, lime status should be investigated and steps taken to rectify any deficit.

Rotational grazing

Organise some form of rotation to allow fields/paddocks have a rest period. This allows smaller areas to be grazed at any time, allowing other areas to be rested and recover.

- Reduce the number of grazing groups of animals by bringing smaller groups together
- Close gates between fields
- Split fields with temporary fencing such as electrified sheep netting or 3 to 4 strands of electrified polywire
- Where grass supply is very low or none is available, supplementary feed for ewes may continue to be required to slow down the rotation and allow some build up of grass

Use temporary fencing such as electrified sheep netting or 3 to 4 strands of electrified polywire to split large fields

Reduce demand for grass

Consider Creep feeding lambs

- By creep feeding concentrates lambs will eat less grass
- Performance will be maintained or increased
- Lamb drafting brought forward by up to 28 days
- Less pressure on ewes

- Lambs trained to eat meal
- Only recommended when grass is scarce due to high cost of creep feed

Creep Grazing (For lambs > 6 weeks old)

- Gives lambs priority to scarce supply of high quality grass
- Ewes maintained on tighter grass for longer period
- Lambs up to 2kgs heavier at weaning.

Draft lambs as they become fit

- Draft every 1 – 2 weeks
- Aim for 18 / 19 kg carcass vs. 21 kg
- Lambs on meal will have higher KO%

Sell animals planned for sale early

- Culls
- Breeding stock you plan on selling
- Cattle for sale

From 5 weeks post lambing if there is still a grass shortage it is far more practical to offer supplementation in the form of creep feed to lambs rather than supplementing the ewe

.

Early weaning

While weaning is normally recommended at 14 weeks of age, where grass is in short supply and recovery is poor, weaning earlier can be advantageous. Grass dry matter requirements for a 70 kg ewe at various stages of production are presented in Table1. When the ewe is dried off, her requirements drop by approximately 70%. Dry ewes will eat more than 0.8kg DM and they will start to gain weight if given access to this grass. Therefore, careful management is required to allow ewes eat the minimum requirements, thereby reducing demand and save grass for other livestock. Replacing lost ewe body condition can be deferred until grass covers improve. Lambs can be given priority access to available grass. To maintain satisfactory lamb performance, when weaning early some concentrates will be needed especially if weaning at a very young age of less than 10 or 11 weeks.

Table 1. Grass dry matter requirements for a 70 kg ewe at various stages of production

Ewe stage of production	Grass DM required
70 kg ewe rearing twins 10 wks lambed	3.0
70 kg dry ewe (Maintenance)	0.8
70 kg dry ewe (wt gain of 0.85 kg / week) (1 CS in 10 wks)	1.4

Lambs can be weaned early and fattened on an all concentrate diet. However, this is a very costly practice especially if weaned very early such as at 6 / 7 weeks of age. As lamb approach finish weights they will eat in excess of 1.5 kg meal per day when on full ad lib concentrates. Therefore this should only be practiced in extreme situations. About 6 and 10.5 kg of concentrates are required to give 1 kg of live weight and carcase gain, respectively.

To be successful, lambs:

- Must be trained to eat meals before weaning.
- Should be eating 250 gms / day before weaning
- Concentrate levels should be increased gradually
- Ad lib access to clean fresh water is critical

Cash flow problems

- If cash flow is tight, farmers should talk to the bank and/or merchant
- If there are animals on the farm intended for sale (such as cull ewes or beef cattle), consider selling now.

High concentrate diet for ewes in winter

Concentrate rations can replace silage as the main diet for ewes in late pregnancy. It is easy to manage and can save a lot of labour. The information presented in the slide below demonstrates how in excess of 40 tonnes or 50 bales of silage can be replaced with concentrates in a flock of 100 ewes in the final 12 weeks of pregnancy.

When silage quality is poor or is scarce and the price is high feeding extra concentrates as an alternative becomes attractive.

When concentrate prices are relatively high it is a less attractive option.
Care must be taken to introduce meals gradually to avoid acidosis. Adequate trough space must be provided as well as a constant supply of clean water. When this is taken care of there should be no management or health problems.

Key issues for 2013

Monitor Lamb Performance

Lamb Performance year to date
- Back 15% or 5kg at weaning
- Delay drafting 5-7 weeks
- Will affect grass supply in Autumn

Weigh a sample of lambs every 2 weeks
- Consider feeding meals
- Eliminate parasites
- Eliminate lameness
- Correct for mineral imbalances
- Monitor KO% & draft regularly

Breeding Ewe Lambs?
- Asses overall stocking rate
- Consider performance to date
- Asses grass / winter forage demand going forward

Monitor Ewe Body Condition

Target Ewe Body Condition at mating is 3 - 3.5
- Essential to maximise litter size
- Allow for Body Weight loss in pregnancy
- Allow ewes to milk of their back in 2014

Achieving the target is not easy
- Handle ewes at weaning and monthly intervals
- Eliminate parasites & lameness
- Give thin ewes access to good grass or concentrates
- Cull ewes that don't improve BCS

Plan your Autumn / Winter Feed Budget
- Silage / Hay requirements
- Grazing Requirements
- Alternative Options

Grow More Grass

Apply Extra N Fertilser

Nitrogen is a key driver of Grass Growth

- Apply 20 – 30 units after each grazing
- Take out any surplus grass as bales for use on farm or sale
- Blanket spread or spread after each grazing – no difference

Address P, K & pH imbalances

Adequate levels of P, K & pH are required to maximise grass growth & utilisation of fertilisers applied

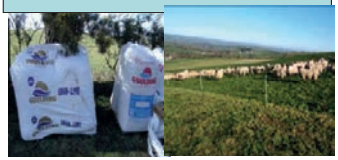
- Use compound fertiliser or slurry to correct P & K Deficiencies
- Apply Granular Lime to correct soil pH quickly
- Apply ground limestone in autumn

Reduce Residency Period

Aim to graze out paddocks/fields in 3 – 4 days

- Splitting paddocks
- Increasing group size by reducing the number of grazing groups on the farm

Fertilser applied today = grass in four weeks time! Must plan ahead and intervene before shortages arise



Reduce Demands for Grass

Many factors can contribute to reducing grass demands

Creep feed lambs

- **Lambs will eat less grass**
- Performance maintained or increased
- Lamb drafting brought forward
- Less pressure on ewes
- Lambs trained to eat meal
- Incurring cost of concentrate

Draft lambs as they become fit

- Aim for 18 / 19 kg carcass vs 21 kg
- Lambs on meal will have higher KO%
- Draft every 2 – 2 weeks

Sell animals planned for sale early

- Culls
- Breeding stock you plan on selling
- Cattle for sale

Wean lambs early & supplement with concentrates

Ewe stage of production	Grass DM Required
70 kg ewe rearing twins 10 wks lambed	3.0
70 kg dry ewe (Maintenance)	0.8
70 kg dry ewe (wt gain of 0.85 kg / week) (1 CS in 10 wks)	1.4

To be successful, lambs will need concentrates, & must be trained to eat meals before weaning. Should be eating 250 gms / day before weaning to maintain performance and prevent set back

Ewe requirement reduced by over 70 % but a costly system of finishing lambs especially if weaned at a very young age such as at 6 /7 weeks!

Planning for Winter Feed

Assess requirements

Prepare a budget

What you need & what you expect to have

Consider all animals on the farm

Cattle need a minimum 1% BW of forage supplemented with meal.
Sheep can manage on all concentrate diet (min 7% CF)

If you will be short of forage make plans now for feeding animals in winter

Winter fodder options

Source winter grazing

Ground being un-grazed
Surplus grass on cattle /dairy **farms**

Look at alternative forages

Rape
Stubble turnips on stubble ground

If buying Fodder

Be aware of poor quality
Have it tested before purchase

Ewe Diet Options – Final 12 Weeks of Pregnancy

6 weeks mid pregnancy

Requirements 70 kg ewe in good CS (3)
0.8 UFL & 130 gms protein

	Option 1	Option 2	Option 3
Diet	1 kg silage* DM (5kg fresh silage)	0.5 kg silage* DM + 0.45 kg conc. with 16% CP	0.85 kg conc. 0.1 kg silage* DM Hay / straw
Nutrients supplied	0.8 UFL 120 gms CP	0.8 UFL 132 gms CP	0.8 UFL 136 gms CP
Silage for 100 ewes	21 T* (25 – 35 bales)	10.5 T* (12 – 17 bales)	2.1 T* (2.5 – 3.5 bales)
Conc for 100 ewes		1.9 T	3.6 T

(*Silage: 72 DMD 12 % CP)

Saves up to 19 T or 23 + bales silage for 100 ewes

6 weeks pre lambing

Increasing demand in final 6 weeks

6 weeks pre lambing	Cost / ewe	Labour index	Required/ 100ewe
Silage* (0.25t @ €34/t or €30/bale) 20 kg conc @ €330/t	€15.10	100	25 T silage 2T conc
60 kg conc @ €370/t	€22.20	40	6 T conc
60 kg conc** @ €330/t	€19.80	70	6 T conc

(*Silage: 72 DMD **Home mixed ration)

Saves up to 25 T or 30 + bales silage for 100 ewes

Caution
- Increase meals gradually
- Adequate trough space
- Clean fresh water
- Offer some roughage

10 Steps to Solving a Cash-Flow Crisis.

James McDonnell,
Financial Management Specialist,
Teagasc, Oak Park Carlow.

The last 9 months have been very difficult time in all sectors of farming. Now that grass is starting to grow, and animals are back at grass, it is time to sort out the financial problems that the Winter 2012 and Spring of 2013 have left behind.

1. If you find that you are short of cash at the moment you can be certain that you are not the only farmer in that situation, but you can also be assured that help is available. Now is the time to look at putting the farm back on a sound financial footing again and to repair some of the recent damage.
2. The implication of the current cash flow situation is likely to extend throughout 2013. In many cases it may not be possible to resolve current difficulties in 2013 and a planned approach extending into 2014 may be the most prudent way of resolving problems.
3. Farmers should act now and involve their advisers at an early stage. Delay in taking action will only magnify the problems. By simply discussing the problem with another person you are starting the process of coming up with a solution.

In many cases, the underlying business is essentially sound; the cash flow position will recover when conditions improve. Such farmers need short term access to additional cash to tide the business over and the farmer's track record would support a high level of confidence in paying off this short-term debt when conditions improve. In other words by talking this through, you can plan, negotiate and farm your way out of the current problem.

The following steps will help you to work through the issues

1. Act early, even the best farm plans and schedules are in need of adjustments. Delay will only magnify the problem. It will not solve it. If you believe that you will not be able to meet repayment schedules is far better to have this discussion in advance or the repayment date than after missing a repayment.

2. Know your debt, put together a list of all your debts including who you owe, how much you owe and the interest rate and term. Put this down on a sheet and include all bank repayments, all merchants, other farmers, contractor and vet. By knowing this you will not over promise when it comes to speed of repayment.
3. Consult your Teagasc Advisor or accountant and draw up a cash flow plan including a forecast for remainder of 2013 and possibly longer. They have the expertise and experience to help you present tailor-made proposals to your bank and/ or your merchant/ farm input supplier. It is important to be realistic when it comes to calculating your financing requirement and your potential to meet existing repayment schedules on time.
4. Arrange a meeting with your bank manager. Take time to prepare the appropriate information for this meeting including:
    - A recent set of farm accounts/ Profit Monitor;
    - A statement quantifying the impact of 2012 & 2013 weather related issues on your farm business; and
    - A cash flow forecast for the remainder of 2013.
5. Maintain contact throughout the remainder of 2013.
6. For those with short term cash flow problems, an extension to an existing overdraft facility or a new overdraft facility may be all that is required. Some may require a restructuring of merchant credit to a short-term loan.
7. Arrange a meeting with your main input suppliers and those whom you owe money to. Explain your situation and offer a repayment schedule to them which you can realistically meet. Do not offer to pay more than you can afford against arrears. Look for staged repayments of the outstanding amount without interest.
8. Delay non-essential investment or expenditure on your farm.
9. Review the main efficiency factors on your farm, identify where can you get the best return for your efforts
10. In more severely affected farms, the farm household income will be insufficient for living expenses, check out your entitlement to income supplements e.g. Farm Assist, Carers Allowance etc. If you are under severe financial pressure then Farm Assist may be an option – many

farmers availed of this in 2009 with the down turn in milk prices. This should be looked on as a safety net and may have a part to play in getting you over this extreme period. If you or your spouse are employed off farm for 19 hours per week and you have children then you may be entitled to the family income supplement. You can get application forms for either of these schemes by ringing the Department of Social Protection 1890 202325 – this is an automated application form request phone number so following the instructions. After completing the application form an inspector will visit your home – if approved the payments can be made directly to your bank account.

List of all current debt as of today _____2013

	Loan Name/ Debtor	Current Amount Outstanding	Remaining Loan Term (years)	Current Interest Rate	Total Repayment per year	Payments due before 1st Dec 2013
Term Loans (incl house mortgage)		€		%	€	€
		€		%	€	€
		€		%	€	€
		€		%	€	€
Overdraft & Stocking Loans		€		%	€	€
		€		%	€	€
		€		%	€	€
Merchant Co-Op Debt (+outstanding farm-to- farm debt)		€		%		€
		€		%		€
		€		%		€
		€		%		€
		€		%		€
Hire Purchase/ Finance				%		€
		€		%	€	€
Total Payments						€

Cash Flow Assessment

Cash Out [to 31st December 2013]	Current Outstanding	From Today to 31st December 2013	Total
Total Repayments From above	€	€	€
Feed & Fertiliser		€	€
Contractor	€	€	€
Vet	€	€	€
Other Operating Expenses	€	€	€
Health Ins/ Policies (Pension etc)	€	€	€
Tax	€	€	€
Living Expenses	€	€	€
TOTAL PAYMENTS			
Cash In [to 1st December 2013]	To Date		
Farm Sales (milk + other Sales less Exp. not included above)		€	€
Direct Payments (SFP, AEOS, SWCS)		€	€
Off Farm Income (Net)		€	€
Child Benefit, Pension, Farm Assist,		€	€
TOTAL NET INCOME AVAILABLE			€
BALANCE SURPLUS /DEFICIT (Deficit should not exceed available merchant credit and OD limit)			€

Financial Planning Support (Cash-flow , Budgeting and Analysis)

Ten Steps to get through the cash flow crisis

Act early

- Know your Debt
- Consult your Adviser/ Accountant
- Meet the Bank Manager
- Maintain contact with Bank
- Seek an extension (OD or loan)
- Meet creditors
- Delay non essential investment
- Review efficiency
- Get the payments you are entitled to.

List of all current debt as of today __/__/20__

	Loan Name/ Debtor	Current Amount Outstanding	Remaining Loan Term (years)	Current Interest Rate	Total Repayment per year	Payments due before 1st Dec 20__
Term Loans (incl house mortgage)		€		%	€	€
		€		%	€	€
		€		%	€	€
		€		%	€	€
Overdraft & Stocking Loans		€		%	€	€
		€		%	€	€
		€		%	€	€
Merchant Co-Op Debt (+outstanding farm-to-farm debt)		€		%		€
		€		%		€
		€		%		€
		€		%		€
		€		%		€
Hire Purchase/ Finance		€		%	€	€
		€		%	€	€
TOTAL PAYMENTS						€

Farm Business Planning

- Investment Analysis
- Bank loan application

Cash Flow Budgeting & Recording

- Teagasc Cost Control Planner
- 3 year cash flow plan

Analysis

- Teagasc Profit Monitor

Department of Agriculture, Food and the Marine
An Roinn Talmhaíochta, Bia agus Mara

Veterinary Laboratory Service Some current animal health issues arising for Irish livestock farmers

William Fitzgerald RO[1], John Fagan SRO[2], Micheál Casey SSRO[3]
[1]Kilkenny RVL, Hebron Road, Kilkenny,
[2]Athlone RVL, Coosan, Athlone, Co. Westmeath
[3]Head of RVLs, Central Veterinary Research Laboratory, Backweston, Celbridge, Co. Kildare

Schmallenberg Virus - Summary of current knowledge and update on vaccination

In December 2011 a new virus was identified as the cause of mild disease in cattle in Germany during late summer and autumn 2011, and foetal abnormalities in sheep, cattle and goats in the Netherlands, Germany and Belgium in November the same year. This virus was named 'Schmallenberg virus' after the German town where the virus was first identified. Schmallenberg virus is in the Simbu serogroup of the *Orthobunyavirus* group. This group of viruses includes many different viruses which occur in Asia, Africa, Australia and Israel, but have not previously been identified in Europe.

Geographical distribution

The virus spread rapidly during the vector season in 2012, and as of January 2013 disease has now been detected in 16 countries in Europe including Germany, the Netherlands, Belgium, France, Great Britain (England and Wales), Italy, Luxembourg, Spain, Denmark, Switzerland, Czech Republic, Finland, Sweden, Estonia and Poland. Disease was detected in Ireland for the first time on 30 October 2012 and Northern Ireland on 31 October 2012.

Species affected

The disease affects ruminant animals (sheep, cattle and goats). Antibodies to the virus have also been detected in bison and in red and roe deer. Horses are not affected.

Transmission

Orthobunyaviruses are primarily spread by biting insect vectors. Schmallenberg virus has been confirmed in *Culicoides* biting midges. Transmission by vectors is

likely during the vector season (April to November). The virus can also infect the foetus of animals infected during the early stage of pregnancy. This may lead to abortion, stillbirth or the birth of weak, malformed newborn animals. The role of infected newborn animals in the transmission of disease is not yet known.

Risk to humans

There is no evidence to date of disease in people at greatest risk of infection, such as vets and farmers. The European Centre for Disease Prevention and Control has determined that the Schmallenberg virus is unlikely to cause illness in people. The risk posed by milk and meat is also considered negligible by the World Animal Health Organisation (OIE).

Ireland

The first cases appeared in Ireland and in Northern Ireland in October 2010 (deformed calves born in Co Cork & Co Down). Subsequent blood testing showed that exposure to Schmallenberg virus was widespread in the south and south-east, decreasing further north and west, to very low levels of exposure in the counties of Connacht and Ulster.

In spring 2013, the virus caused the same range of birth defects in calves and lambs as described on the continent and in the UK. Its overall impact was low, although some holdings suffered significant losses,especially those with synchronized breeding or very compact lambing/calving that had a lot of pregnant animals at the critical stage when the virus entered the holding.

Vaccination

At the time of going to print (end May 2013) it remains possible that a vaccine recently licenced in the UK may become available during the summer of 2013. If this becomes a reality, farmers will have to decide on the information available as to whether flock/herd vaccination is appropriate for their animals, in conjunction with their veterinary practitioner.

Factors to consider and to discuss with your vet when making this decision will include:

- Value of the stock considered to be at risk (e.g. pedigree vs non-pedigree)
- Cost of the vaccine
- Whether natural infection is likely to have occurred on the farm , with

resulting protective natural immunity (the occurrence of affected lambs/calves in the previous season, the location of the farm on the island, and the time of year will inform this assessment)

- Whether farm practices synchronized breeding
- Early or main season lambing (early lambing flocks have grerater exposure to biting midges during pregnancy

Further reading on Schmallenberg virus
http://www.agriculture.gov.ie/animalhealthwelfare/diseasecontrol/schmallenbergvirus/

Liver Fluke - Recent findings from the Regional Veterinary Laboratories

There has been a major increase in the prevalence of liver fluke infection in Irish sheep and cattle in the Autumn and Winter just past relative to the corresponding period a year previously. This risk was the subject of a liver fluke forecast and alert in a press release issued by DAFM in October 2012, which was also put on the DAFM website at;

http://www.agriculture.gov.ie/press/pressreleases/2012/october/title,67193,en.html .

Impact on sheep

Analysis of the diagnosed causes of death of sheep submitted to the Department's Regional Veterinary Laboratories throughout the country in the last three months of 2012 revealed a four-fold increase in the proportion of sheep examined that died because of liver fluke infection from 13.5% of cases submitted in the last 3 months of 2011 to 58.5% of an increased number of cases received in the corresponding period of 2012. While an increase in the incidence of liver fluke infection in 2012 was anticipated because of the increase in rainfall in 2012, the increased occurrence of sheep deaths caused by liver fluke infection was confirmed by the Regional Veterinary Laboratories in early Autumn 2012 and an alert issued in October. Although less sheep losses due to liver fluke infection occurred in the first three months of 2013, Liver fluke disease was also a cause of a significant proportion (12%) of sheep cases submitted to the Department's Regional Veterinary Laboratories in the first three months and significantly more than the (2.8%) rate in the beginning of 2012.

Impact on cattle

Liver fluke disease was also more frequently diagnosed in cattle in the last three months of 2012 and the first three months of 2013 than one year previously, but is more important as a cause of reduced production of milk or carcass weight gain than as a cause of death in cattle.

Table 1. Comparison of rate of diagnosis of acute and chronic liver fluke disease in sheep submitted to the Regional Veterinary Laboratories from the fourth quarter of 2012 in contrast to the fourth quarter of 2011

Q4 **2011**	Chronic liver fluke disease	Acute liver fluke disease	Total carcasses examined	% Chronic liver fluke disease	% Acute liver fluke disease	% Total liver fluke disease
Total 1/10 - 31/11	10	12	163	6.1%	7.4%	13.5%
Q4 **2012**	Chronic liver fluke disease	Acute liver fluke disease	Total carcasses examined	% Chronic liver fluke disease	% Acute liver fluke disease	% Total liver fluke disease
1/10 - 31/12	32	268	512	6.3%	52.3%	58.5%

Table 2. Comparison of rate of diagnosis of acute and chronic liver fluke disease in sheep submitted to the Regional Veterinary Laboratories during the first quarter of 2013 in contrast to the first quarter of 2012

Q1 **2012**	Chronic liver fluke disease	Acute liver fluke disease	Total carcasses examined	% Chronic liver fluke disease	% Acute liver fluke disease	% Total liver fluke disease
1/1 - 31/3	8	5	468	1.7%	1.1%	2.8%
Q1 **2013**	Chronic liver fluke disease	Acute liver fluke disease	Total carcasses examined	% Chronic liver fluke disease	% Acute liver fluke disease	% Total liver fluke disease
1/1 - 31/3	39	42	670	5.8%	6.3%	12.1%

Keep anthelmintic resistance at bay - 10 tips to keep your wormers working!

10 things you should know about anthelmintic resistance:

1. Effective anthelmintics (wormers) are essential and resistance to them is growing

2. Most people underestimate weights when estimating 'by eye' and this is a risk factor

3. You can buy in resistant worms with purchased sheep –use a quarantine treatment programme

4. Mature healthy sheep have immunity to most worms –very seldom need dosing

5. Check if you have resistance by taking dung samples for Faecal Egg Counts (FEC) pre & post dosing.

6. Most farmers who use FECs to monitor worm burdens use less anthelmintic without any loss in flock performance - lambs may do better because they are treated at the right time.

7. If you know which internal parasites you have on the farm, you can target them more effectively and with the most appropriate product.

8. Dosing sheep and then putting them straight on to clean pasture increases the risk of anthelmintic resistance developing on your farm. Delaying the move or leaving some sheep untreated will reduce this risk.

9. Rams are being bred that have a greater resistance to worms. This trait is passed on to their progeny, reducing dependence on anthelmintics in the future.

10. It's not too late. We can slow down the progress of resistance and protect the future of the Irish sheep industry — but action is needed now. Once resistance is present there is no going back.

Adapted from SCOPs - the campaign for the Sustainable Control of Parasites in Sheep

– see www.scops.org.uk

Department of Agriculture, Food and the Marine
An Roinn Talmhaíochta, Bia agus Mara

SCHMALLENBERG VIRUS

Veterinary Laboratory Service
National Serological Survey Nov 2012 - Feb 2013

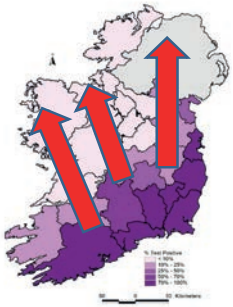
Survey captures the situation during the midge-free season (virus not spreading

Herds in south/south-east have had most exposure

Results varied from 0% in Donegal and Roscommon to 100% of herds in Wexford and Waterford

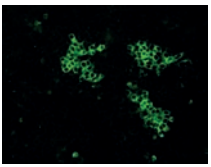
Nationally 37% of samples and 47% of herds positive

Predicted to spread north and west in 2013

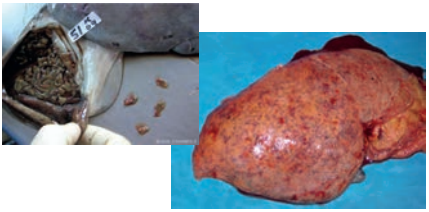


% of herds positive by County in winter 2012/spring 2013

= predicted spread 2013 based on speed of spread across continent 2011-2012



Liver Fluke vs Rumen Fluke



Fasciola hepatica

- Very common parasite, whose range within Ireland has expanded rapidly
- Causes liver damage weight loss, failure to thrive, dry coat, anaemia, sudden deaths (acute fluke)
- Preventive dosing programme in place
- Resistance to some products now well established

Paramphistomum or *Calicophoron*

- Causes no problems on most farms
- Where it causes a problem- severe diarrhoea, weight loss, some deaths
- No preventive dosing programme validated
- Only one effective product available
- Resistance as risk if this product is over-used

Sheep Nutrition Studies at UCD

Tommy Boland
School of Agriculture, University College Dublin,
Lyons Estate, Newcastle,
Co. Dublin

Lyons Research Farm has been synonymous with leading research in sheep nutrition for close on 40 years. The 350 ewe flock, individual animal feeding facilities and state of the art feed analysis laboratories provides an important resource for the national sheep industry. Initial work focused on different forage types, source and level of protein supplementation, and various concentrate ingredients and specifically how they influenced lambing performance and colostrum production.

More recently work has examined the impact of late pregnancy energy and protein nutrition on the subsequent performance of the lamb to slaughter. This work highlights the importance of nutrition during late pregnancy on setting the ewe up for lactation. How we feed the ewe in the last six weeks of pregnancy can have a major influence on the performance of her lambs up to weaning. Dietary approaches which appear to give similar performance at lambing time can have dramatically different impacts on the performance of the lamb up to weaning.

Our team has recently received funding to investigate this topic in more detail. Recent international work has shown that how we feed our ewe during pregnancy has a major influence on the health and performance of her lambs and even her lambs' lambs. This new area requires much more research to fully understand how we can 'preprogram' the performance of our lambs.

As the emphasis in Irish agriculture continues to shift towards maximizing the utilization of grassland the intake capacity and requirements of the suckling ewe and her lamb(s) is becoming more important. We need to fully understand how much grass a ewe requires to support lactation and what level of performance is achievable from grass alone.

The major focus of our research work in the last 10 years has looked at the effect of mineral nutrition of the pregnant ewe on the disease resistance of her lambs. When the lamb is born it has practically zero disease resistance and is dependent on absorbing antibodies from the mothers' colostrum to obtain disease resistance

in early life. Our work has clearly demonstrated that excessive iodine intake in late pregnancy (something which frequently occurs) will result in the lamb being unable to obtain immunity from its mother's colostrum and as a result is more susceptible to disease. This is a very specific response and the excess iodine intake must occur during the final two weeks of pregnancy. During this time the lamb is pre programmed to be unable to absorb the antibodies, through an alteration in the expression of certain genes located in the small intestine which are responsible for transporting these antibodies into the lambs' bloodstream.

What to do with triplet lambs is a recurring question on many farms, while some farmers would prefer not to have triplet lambs to deal with. We have examined the potential to finish triplet lambs through early weaning approaches. Triplet lambs reared using an early weaning system has achieved growth rates in excess of 300g/day from birth to slaughter. This demonstrates the great potential for growth that the triplet lamb processes and highlights the potential this lamb has to contribute to output in a prolific flock. The challenge is to maximize this potential in commercial practice. To discuss this work please call to the UCD stand today or contact Tommy Boland: tommy.boland@ucd.ie

Sheep Breeding

In 2009 UCD began a sheep breeding programme in collaboration with Sheep Ireland. This partnership resulted in establishing the Central Progeny Test (CPT) Centre at UCD Lyons Estate. The CPT Centre consists of a ram semen collection and test facility and the Lyons sheep flock entering the CPT programme that routinely records pedigree, DNA, and phenotypic information.

Ram Semen Collection and Test Facility: Since 2009 approximately 35 rams with good genetic linkage representing six breeds (Belclare, Charolais, Suffolk, Texel, Vendeen, and Rouge de l'Ouest) enter the semen collection and test centre at UCD Lyon. The rams are trained for artificial semen collection, and the semen is analysed for sperm motility, sperm count, linear motion, and semen concentration as part of the semen quality assessment. Only rams with high quality semen are used for laparoscopic artificial. These rams are transported to four flocks in the CPT programme where over 2000 ewes are inseminated with fresh semen.

Lyons Sheep Flock: The UCD flock is currently taking part in Sheep Ireland's CPT programme. In October the oestrous cycle of 400 ewes is synchronised. The ewes

are then artificially inseminated using Laparoscopic AI. These ewes lambed in March, within 12 hours of birth all lambs are double tagged with a DNA tag and an EID NSIS tag. Information collected at lambing included date of birth, litter size, gender, lambing difficulty, and birth weight. This information is collected using a hand-held scanner and the data uploaded immediately to the Sheep Ireland database in Bandon, Co. Coker where it is used in the national genetic evaluations. As part of the CPT programme 40 day weights, weaning weights and slaughter weights are recorded. Ultrasound measurements of fat and muscle are also recorded to estimate carcass quality. The health trait of faecal egg counts is also recorded to help estimate the parasite load in Sheep.

The over-arching objective of all sheep breeding research conducted at UCD Lyons is to improve profitability for Irish sheep enterprises. Currently research is focusing in determining factors tthat contribute to lambing difficulty and selecting for ewes that will have an increased twinning rate while reducing the number of singles and triple litters. Future research using the Lyons CPT flock will focus on investigating the genetic and genomic components of meat quality, feed efficiency, reproduction, health and welfare, and the evaluation of new breeds that may have a commercial benefit to the Irish Sheep industry. For further infromation please contact Dr. Alan Fahey at alan.fahey@ucd.ie

Undergraduate and Graduate Taught Agriculture Programmes

Tommy Boland
School of Agriculture, University College Dublin,
Lyons Estate, Newcastle,
Co. Dublin

University College Dublin is the only university in Ireland offering a Bachelor of Agricultural Science programme. The School of Agriculture and Food Science offer level eight honours degree programmes across the entire food chain.

These include:

DN250: Agricultural Science. Candidates entering via DN250 have the option of specialising in one of five options listed below

DN250 AES	Agri-Environmental Sciences
DN250 ACP	Animal and Crop Production
DN250 ASC	Animal Science
DN250 FAM	Food and Agribusiness Management
DN250 ENT	Engineering Technology
DN251	Animal Science – Equine
DN252	Dairy Business
DN261	Food Science
DN262	Human Nutrition
DN271	Forestry
DN272	Horticulture, Landscape and Sportsturf Management

The School of Agriculture and Food Science also offer a range of Graduate Taught and Graduate Research opportunities (at Masters and PhD level). Professional Work Experience is an important component of all programmes within the School of Agriculture and Food Science. The duration of Professional Work Experience varies on each programme and it takes place in all instances in year three. PWE takes place for an entire year in Human Nutrition while on the Dairy Business programme students complete 20 weeks of PWE. Students organise their own PWE and receive support from Professional Work Experience Coordinators that are assigned to all programmes. Placement takes place on a range of different

enterprises and farms depending on the UCD programme students are enrolled on and on the experience they have received to date. For example, students enrolled on the Food Science degree programme will complete a minimum of 15-week placement in the Food Industry. Weekly meetings are timetabled to assist students in the organisation of their placement. On the Animal Science programme for example, students are expected to gain appropriate experience on approved farms with suitable animal production enterprises. A period of placement in research laboratories or centres and in agribusiness organisations is also acceptable. Experience may be obtained in Ireland and abroad and there are a limited number of scholarships available, supported by industry, to support the costs associated with undertaking PWE abroad. With regard to Animal Science, monthly reports and a final oral examination are used to assess students. Many Animal Science – Equine students have chosen to complete their PWE in the Blue Grass Region of Kentucky in recent years. Generally, in recent years more students are travelling abroad to conduct Professional Work Experience, with New Zealand and the US particularly popular options.

The UCD School of Agriculture and Food Science offers nine graduate taught programmes as listed below.

- MSc Animal Science (Reproduction)
- MSc Applied Equine Science
- MSc Crops and Green Energy
- MSc (Agr) Environmental Resource Management
- MSc Food, Nutrition and Health (Online Delivery)
- MSc Humanitarian Action
- Certificate/Diploma/MSc (Agr) Rural Environmental Conservation and Management (Distance Learning)
- Certificate/Diploma/MSc (Agr) Sustainable Agriculture and Rural Development
- MSc Wildlife Conservation and Management

Four new Master's programme's (Animal Science (Reproduction), Applied Equine Science, Crops and Green Energy and Food, Nutrition and Health) commence in September 2013 providing new opportunities for both graduates and employers. There are also funded Teagasc Walsh Fellowship opportunities available such as the MAgrSc in Agricultural Innovation Support programme and many research Masters and PhD opportunities also exist.

Sheep Ireland and Its Role in Sheep Breeding

Eamon Wall & Kevin McDermott
Highfield House, Shinnagh, Bandon, Co. Cork.

Who is Sheep Ireland?

Sheep Ireland are the organisation with the responsibility to achieve the greatest possible improvement, from genetic and other factors, in the profitability of the national sheep flock for the benefit of Irish farmers and the sheep industry. The collection of performance data from our sheep population is the only way in which we can assess current levels of performance (genetics), identify the better performing genetics and encourage more widespread use of these genetics and then finally to measure the contribution of these better genetics over time.

Current Situation with performance recording in Ireland

The number of performance recording pedigree ram breeders continues to grow in Ireland. This year there are over 300 pedigree flocks of different sheep breeds submitting performance information for their sheep.

Breakdown of LambPlus breeders 2013

Rank	Breed	No. of Breeders
1	Texel	104
2	Suffolk	59
3	Charollais	50
4	Belclare	28
5	Vendeen	25
6	Beltex	9
7	Rouge de L'Ouest	8
8	Other	19
	Total LambPlus Breeders	***302***

According to the most recent Department of Agriculture sheep census carried out in December 2012, there were just over 80,000 breeding rams in existence in Ireland. Since 2009 Sheep Ireland have performance recorded over 18,000 pedigree rams. Obviously a large proportion of these rams are culled by breeders annually due to physical imperfections, poor genetic evaluations, etc. So we can assume that the number of 'active' performance recorded breeding rams

currently in use across the Irish sheep industry is relatively low. This needs to be addressed quickly.

Situation in other sheep Industries

In New Zealand over 80% of rams purchased annually are performance recorded. Despite a 50% reduction in the breeding ewe population in the country over the past 20 years, the New Zealand sheep industry has managed to maintain the same level of lamb carcase output. Genetic improvement has played a key role in this process.

Commercial data recording helping to back up the uro-Star evaluations

Sheep Ireland is currently operating two commercial recording programmes – the Central Progeny Test (CPT) and the Maternal Lamb Producers Group (MALP). Each of these programmes have different objectives, but both generate a huge volume of accurate and valuable commercial farm data which helps to validate and contribute to the quality of the uro-Star evaluations being provided for Pedigree rams across all breeds.

In both the CPT and MALP programme, performance recorded pedigree rams are used to mate with ewes and the performance of progeny is measured intensively. The majority of this performance data is collected by Sheep Ireland field technicians through the use of electronic handheld devices which make maximum use of electronic identification. All lambs are double tagged at birth with EID tags which facilitates easier data collection.

STAP & Sheep Irelands role in the Programme

The launch of the Sheep Technology Adoption Programme by the Department of Agriculture has come as a welcome boost to the Irish sheep industry. From a genetic improvement point of view there will be an immediate benefit to our national genetic improvement programme. As already mentioned the main issue facing genetic improvement in Ireland currently is the small number of performance recorded rams being used annually. There are a number of factors contributing to this issue.

1. The number of performance recorded rams available for sale annually is not what it needs to be. As an industry if we can increase this availability then there would undoubtedly be an increase in the number of recorded rams being used by commercial farmers.

2. The low level of awareness among sheep farmers as to the potential benefits of using high genetic merit breeding rams.

The number of farmers that have signed up to participate in STAP is hugely encouraging and will bode well for increasing the exposure of the uroStar Indexes and the benefits of genetic improvement to all involved in the programme. Sheep Ireland main involvement in STAP will be through Tasks 1 & 2. Further detail on these tasks and a document containing some useful questions & answers can be found on www.sheep.ie

Future Plans

The development of useful facilities to help sheep farmers and ram breeders alike to make annual breeding improvements in their flock is a major objective of Sheep Ireland.

Online ram search

The online ram search which can be found on www.sheep.ie will be a fantastic resource for all involved in the industry as it will greatly increase the visibility of uro-Star rams. This online ram search allows farmers to assess the STAP eligibility of their existing stock rams in association with finding local performance recording breeders and rams. Performance recorded rams can be searched for using a number of different criteria including location, genetic evaluations and breed.

Inbreeding checker

Sheep Ireland is currently working on an online inbreeding checker that will assist ram breeders to easily assess the inbreeding risk that may or may not exist when using a range of different sires across the ewes currently in their flock. Inbreeding has been shown to have a negative effect on traits such as reproduction, health and fertility and we have no doubt that ram breeders currently partaking in performance recording will welcome such a facility.

Incorporation of factory carcase data into the Sheep Ireland genetic evaluations

The goal of the Production (growth) trait that is displayed on the uro-Star evaluations, is to improve carcase quality, growth rates and the number of days it takes a lamb to reached the desired slaughter weight. In the absence of actual factory carcase data it is necessary to predict slaughter weights and days to

slaughter from lamb weights collected throughout a lambs development from birth. The movement of carcase data between a small number of the main lamb processing plants has now started to commence and this is something Sheep Ireland will continue to progress and develop in the coming months and beyond. We will be requesting that all pedigree ram breeders that cull a number of pedigree lambs annually, request their abattoir to collect their slaughter information accurately and forward it to Sheep Ireland for inclusion in the uro-Star genetic evaluations.

Data Quality Index

Maintaining a high standard of pedigree ram data entering the Sheep Ireland database is critical to providing reliable and accurate genetic evaluations for the benefit of Irish sheep farmers. When assessing the 'quality' of data there is a number of important considerations such as:

- The timeliness of recording (amount of time it takes a breeder to enter data onto the Sheep Ireland database),
- Completeness of data recorded (all weights/lambing difficulty etc recorded for all lambs)
- Use of well genetically linked breeding rams (well related/linked rams produce ram lambs with high evaluation accuracy%, which hugely desired)

The objective of Sheep Ireland is produce an index which ranks performance recording breeders on the above topics and others, which in turn will help to increase the level of confidence a ram purchaser can place in a specific breeders uro-Star evaluations.

Conclusion

The Sheep Ireland breed improvement programme has made considerable progress since its development in 2009 and the plans currently in place will ensure further significant progress will be made in the future. In order for us to deliver on our objective to increase farm profitability it will be critical that farmers begin to make more use of the genetic evaluation information currently being produced and the Sheep Ireland online ram search (www.sheep.ie) will greatly improve farmer access to this information. Anyone wishing to find out more about Sheep Irelands genetic improvement programme and our involvement in STAP can contact us on 023 8820454 or through email at query@sheep.ie.

Other Ongoing and New Sheep Research Projects at Teagasc Athenry

Is There a Taint of the Meat of Ram lambs?

Project Leaders
Michael G Diskin

Collaborators
Aidan Maloney & Paul Allen (Teagasc)
Frank Monohan, Alan Fahey and Nigel Brunton (UCD)
Linda Farmer & Ronald Annett (AFBI, NI)

Funding
Dept of Agriculture, Food and Marine FIRM/RSF/CoFoRD (€840,000)

Start Date
May 2013

Background & Objectives
There is concern in the Irish lamb meat industry about the marketability of lamb from ram lambs, arising from a perception among suppliers, buyers and consumers that the sensory quality of such lamb is inferior to castrate lambs. This project sets out to establish if there is any scientific evidence to support this perception. Thus, the project will investigate the influence of different Irish lamb production systems on the sensory quality and acceptability of lamb meat, focussing specifically on the effect of castration of male lambs, their age at slaughter and diet, and interactions between these factors, on lamb meat quality, particularly flavour quality.

Relevance
The new information generated will be invaluable to farmer in devising mitigating strategies to address issues of taint, if they exist, and will underpin the efforts of the lamb meat industry and Bord Bia to increase the sale of lamb at premium prices on national and international markets.

Coping with Anthelmintic Resistance in Ruminants (CARES)

EMIDA ERA-NET

Project Leaders
Barbra Good & Orla Keane

Collaborators
Denmark (Copenhagen)
France (INRA)
Canada (McGill University)
Greece (Thessaloniki)
Sweden (Uppsala)

Objective
Develop sustainable strategies for roundworm control

- On-farm selective treatment strategies
- Improved detection of anthelmintic resistance

Selective Treatment:

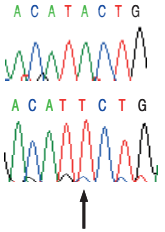
Evaluate the effect of part-flock treatment on post-weaning lamb performance

2 groups:
- light lambs ≤ 28kg ± anthelmintic
- heavy lambs ≥ 32kg ± anthelmintic

Pre and post-treatment measurements:
- Faecal egg count
- Dag score
- Weight
- Body condition score
- Biochemistry measurements
- Haematology measurements

Improved AR detection:

Identified white drench (benzimidazole) resistant & susceptible worms in Irish flocks and sequenced β-tubulin gene



Future work:
Search for genetic markers for clear drench (macrocyclic lactone) resistance

Diagnostic test for roundworm infection in sheep

Project Leaders
Barbara Good & Orla Keane

Collaborators
AgResearch Ltd. (New Zealand)
UCD

Background:

•New test for roundworm infection has been developed in New Zealand[1]

• Sheep with greater resistance to parasites display higher antibodies levels

• Potential tool for the selection of resistant animals

Objective:

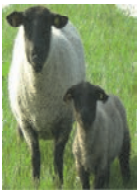
• Evaluate the potential of this test in Ireland

• Evaluate the test as a tool for early detection of *Nematodirus battus* infection

Antibodies to parasite larvae are detected in saliva sample

Method:

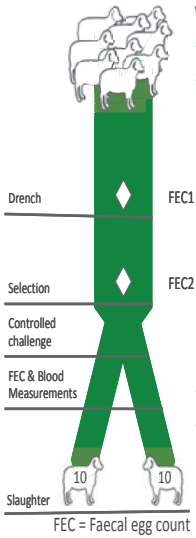
• Saliva and blood samples taken from Suffolk and Texel flocks over the grazing season
• Samples tested for anti-parasite antibody levels
•Between and within breed differences will be examined to identify resistant animals



[1] Shaw et al., 2011 Vet Parasitology

Genetic Improvement of Sheep: Breeding for Worm Resistance

Project Leaders B. Good, O Keane & K. McRae

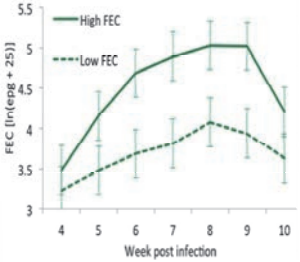


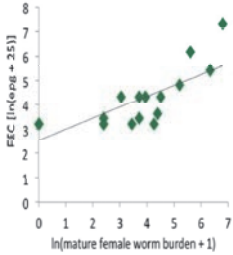
FEC = Faecal egg count

Within breed differences to parasite resistance/susceptibility exist in the Scottish Blackface population

❖Identified lambs that differed in their response to gastrointestinal parasites

❖Characterised their response to a controlled challenge

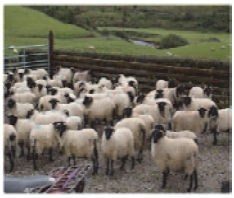




❖Divergence in FEC under natural conditions is reproducible under controlled conditions

❖Mature female worm burden is correlated with FEC

- Similar to what is seen in Texel & Suffolk (Good *et al*., 2006)
- Contrary to what has been previously reported in Scottish Blackface (Stear *et al*., 1999)



Scottish Blackface ewe lambs
Teagasc Hill Farm, Leenane, Co Mayo

Selection for resistant sheep possible

Next step is to identify genes involved:
- Look at genes in abomasum
- Compare high and low FEC animals

Preliminary Results

Day post infection	Genes that are different
7	18
14	39

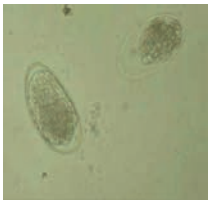
White drench (Benzimidazole) Resistance in Sheep Roundworms: Investigating the genetic basis for resistance (Project Leader: Barbara Good)

Resistance first reported in Ireland in 1989 → Irish studies revealed over 88% of flocks with evidence of white drench (Benzimidazole) resistance[1]

1. Sixteen sheep purchased from four flocks with a history of white drench resistance
2. White drench administered twice with a 14 day interval between treatments
3. Eggs in faeces post treatment confirmed the presence of resistant worms
4. Worms collected post-mortem and identified
5. DNA extracted to determine the sequence of the β-tubulin gene

Preliminary Results

One novel and one known mutation identified



Roundworm eggs from sheep faeces

Adult male roundworm

Table. Identified Roundworm species

Species	No. Farms	
	Present	Abundant
Teladorsagia circumcincta	4	4
Cooperia curticei	3	3
Trichostrongylus colubriformis	2	1

[1]Good et al 2012

Sustainable Solutions for Small Ruminants (3SR)

(Project Leaders: Barbara Good & Orla Keane)

Objective:

Discover selectable genetic markers for sustainable production and health traits

- Roundworm resistance
- Ovulation Rate

European Collaborators:

Scotland (Roslin)
France (INRA)
Italy (PTP & AGRIS)
Greece (AUTH & UTH)
Spain (University of Leon)
Poland (Warsaw University)

Roundworm resistance:

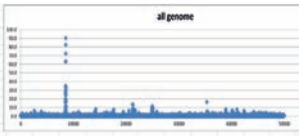
Genome scans carried out using 50,000 genetic markers to identify selectable markers for roundworm resistance

1000 genetic markers being tested in
- Texel
- Suffolk
- Scottish Blackface

Ovulation rate:

Novel gene controlling ovulation rate segregating in Cambridge flock at Athenry

Number of copies of gene	Number of animals	Number of genotypes
1 copy	13	50,000
2 copies	13	50,000



Gene mapped to chromosome 2
We are currently identifying the gene

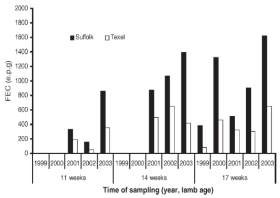
Breed Differences in Roundworm Resistance

(Project Leader: Barbara Good)

Background:

Texel sheep are more resistant to roundworms than Suffolk sheep [1]

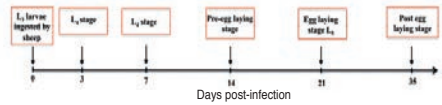
Lower FEC and worm burdens

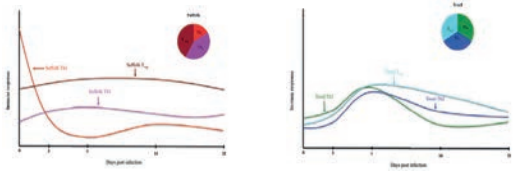


[1]Good *et al.*, 2006
[2]Ahmed *et al.*, 2013

Objective:

Characterise the immune response in Texel and Suffolk to roundworm infection over time





Conclusion:

Texel have a balanced immune response while Suffolk have an unbalanced response [2]

Effect of age at first lambing

Project leader: Tim Keady

- Ewe replacements are a major cost in prime lamb production
- Lifetime lamb carcass output is influenced by :
  - ewe longevity
  - litter size (thus genotype)
  - age at first lambing
- Study initiated last year
  6 treatments as follows:
  2 ages at first lambing (1 or 2 years old)
  X
  3 ewe genotypes - Suffolk X
  - Suffolk x Belclare
  - Belclare

Preliminary results of ewe lamb performance

	Ewe genotype		
	Suffolk X	Suffolk x Belclare	Belclare
Scanned litter size	1.24	1.41	1.81
Barren (%)	8.6	2.6	5.2
Lambed in 3 weeks (%)	90	91	84
Lamb birth weight (kg)	4.4	4.3	4.0

- Major effect of ewe genotype on litter size and potential lamb carcass output per ewe
- On-going study which will determine the effects of age at first lambing and ewe breed on lamb carcass output and flock profitability

Effects of plane of nutrition during the rearing phase and pregnancy on the performance of ewes lambing at 2 years

Project leader: Tim Keady

♦ **Cost of rearing ewe replacements is influenced by the plane of nutrition offered during the first winter and second summer**

Effect of plane of nutrition on animal performance

	Winter 1			
	Low		High	
Summer 2	Low	High	Low	High
Pre-mating weight (kg)	53.3	56.8	56.8	61.7
Litter size	1.95	1.98	2.05	1.92
Lamb weaning weight (kg)	29.4	28.0	28.4	27.8

♦ Plane of nutrition altered pre-mating weight by 8.4 kg but had no effect on litter size

♦ Improving plane of nutrition during the first winter increased lamb weaning weight by 0.4 kg

Effect of plane of nutrition during pregnancy on animal performance

	Nutrition	
	Low	High
Litter size	1.96	1.99
Lamb weight (kg) - birth	3.48	3.78
- weaning	27.4	28.5

♦ Ewes offered the high and low plane of nutrition received grass silages with 71 and 76 % DMD

♦ Plane of nutrition offered during pregnancy had a big impact on ewe and lamb performance

Plane of nutrition offered during pregnancy was the greatest factor effecting lamb carcass output from 2 year old ewes

Winter finishing of store lambs

Project leader : Tim Keady

♦ 20% of lambs slaughtered from January to March

♦ A large proportion are finished on diets consisting of concentrate or concentrate and conserved forage

Effect of silage type and feed value and concentrate feed level on carcass gain (g/d)

	Concentrate (kg/lamb/day)			
	0.4	0.8	1.2	Ad-lib
Silage DMD (%) -71	15	82	109	-
-75	50	97	122	144
Maize silage	63	106	123	-

♦ Major benefit to increasing silage DMD

♦ Response to DMD declined as concentrate feed level increased

♦ Maize silage as good as high DMD grass silage

Effect of silage type and feed value and concentrate feed level on time (days) to gain 5kg carcass gain

	Concentrate (kg/lamb/day)			
	0.4	0.8	1.2	Ad-lib
Silage DMD (%)-71	333	61	46	-
-75	100	52	41	35
Maize silage	79	47	40	-

♦ Increasing concentrate feed level and forage feed value dramatically reduces time to finish

♦ Be aware of the importance of diet on kill out %, and therefore on drafting weight

♦ **Ad-lib concentrate - 10.5 kg concentrate required per kg carcass gain**
- results in the highest daily margin over feed

Teagasc Website

On the Teagasc public website there are many useful publications dealing with sheep production.

http://www.teagasc.ie/publications/2009/4/4_todaysfarmnovdec09.pdf

http://www.teagasc.ie/publications/2012/1287/sheep-booklet.pdf

http://www.teagasc.ie/publications/2012/1519/Drystock_2012.pdf

http://www.teagasc.ie/publications/2012/1519/Drystock_2012.pdf

http://www.teagasc.ie/publications/2012/1635/Shearing_5674.pdf

http://www.teagasc.ie/publications/2013/1922/SheepBetterFarmRoscommon_20130502.pdf

http://www.agresearch.teagasc.ie/rerc/downloads/SitOutl_2008_Proceedings_a.pdf

http://www.teagasc.ie/publications/2010/20100804/SOmidyear2010final.pdf

http://www.teagasc.ie/publications/2012/1459/sheep-2012.pdf

http://www.teagasc.ie/publications/2009/OpenDayWebOverheads_20090526.pdf

Notes

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NDP
National Development Plan 2007 - 2013
Transforming Ireland

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Agriculture and Food Development Authority