



# Today's Farm

Business, production, environment and countryside issues [www.teagasc.ie](http://www.teagasc.ie)



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AGRICULTURE AND FOOD DEVELOPMENT AUTHORITY

# Spring Tillage Seminars 2017

All farmers are invited to Teagasc Tillage Seminars taking place throughout January and February.

***Topics covered will include:***

- Crop planning and margins 2017
- Spring cereal varieties and sowing rates
- Crop nutrition to achieve savings
- Pest management in light of resistance

Date	Venue	County
23 Jan	Teagasc office, Dundalk	Louth
24 Jan	Munster Arms, Bandon	Cork
24 Jan	Teagasc office, Navan	Meath
25 Jan	Teagasc office, Dungarvan	Waterford
30 Jan	Bel-Air Hotel, Ashford	Wicklow
30 Jan	Teagasc office, Clonmel	Tipperary
31 Jan	Kettles Country House Hotel, Swords	Dublin
31 Jan	Ferrycarrig Hotel, Wexford	Wexford
1 Feb	Teagasc office, Nenagh	Tipperary
2 Feb	Teagasc office, Athenry	Galway
7 Feb	Ballyroe Heights Hotel, Tralee	Kerry
8 Feb	Teagasc office, Kilkenny	Kilkenny
9 Feb	Tullamore Court Hotel, Tullamore	Offaly
16 Feb	The Killeshin Hotel, Portlaoise	Laois
28 Feb	Radisson Hotel, Letterkenny	Donegal

***Events start at 7.45pm***



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## COMMENT



**Mark Moore**  
Editor,  
Today's Farm

# Skills are not gained overnight

**M**oving to far greater grass production and utilisation is not straightforward. There's a whole new vocabulary and several skills to acquire. It's a bit like learning a trade...and that requires the accumulation of knowledge, skills and experience. A trade takes years to learn...becoming an expert grassland manager can't be mastered overnight either. Farmers need

patience, perseverance and above all encouragement as they face the challenge.

In Kay O'Connell's article we learn about the Teagasc Grazing Coaches initiative, which gives farmers intensive support while they gain and perfect their grassland management skills. By 'sticking with it' until grassland management becomes second-nature farmers will gain access to a lifetime of reduced costs and better margins.

# Ní thar oíche a fhoghlaimítear scileanna

Ní furasta an rud é bogadh ar aghaidh chuig úsáid i bhfad níos mó a bhaint as an bhféar. Tá stór focal iomlán nua le foghlaim, mar aon le scileanna nua. Is amhail mar a bheadh sé ceird a fhoghlaim é. Agus tógann sé na blianta ceird a fhoghlaim... díreach mar a thógann sé na blianta a bheith i do shaineolaí i dtaobh bainistíocht féaraigh.

Ní mór d'fheirmeoirí foighne a bheith acu, ní mór dóibh cloí go stuama leis an obair agus ní mór iad a spreagadh agus an dúshlán á sháru acu. San alt a scríobh Kay O'Connell, foghlaimimid faoi thionscnamh Teagasc maidir le hOidí Féaraigh, faoina dtugtar dlúth-thacaíocht d'fheirmeoirí agus a gcumas bainistíochta féaraigh á fhoghlaim agus á bheachtú acu. Fágfaidh na scileanna sin go mbeidh corrlaigh níos fearr le saothrú acu ar feadh an tsaoil.

## GRASS MANAGEMENT

New Teagasc discussion groups are helping farmers to gain the skills and confidence to become highly successful grass managers

>> 11-13



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**Cover** | Teagasc dairy advisor Catherine Colfer says a good start in life means heifers are healthier and ultimately calve down earlier.

# Minister launches 2017 as the Year of Sustainable Grassland

**T**he Minister for Agriculture, Food and the Marine, Michael Creed TD, launched 2017 as the Year of Sustainable Grassland.

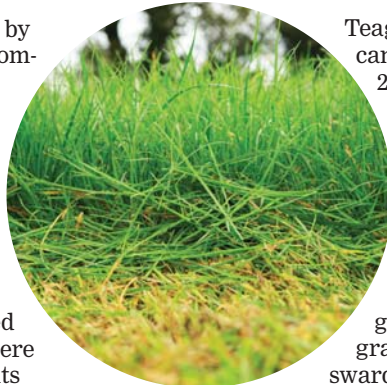
This initiative will see a year-long focus by the Department, its agencies and other stakeholders on grass productivity and utilisation, grassland sustainability and the international reputation of Ireland's grass-based production systems.

## Efficiency

Speaking on a visit to the farm of Cork farmer Ger Dineen, Kilnamartyra, Macroom, Minister Creed said: "Grass is at the heart of our efficient dairy and livestock systems and is

recognised and valued by our international customers as a sustainable system."

The aim of the initiative is to improve grass productivity and utilisation and to enhance and promote awareness of the sustainability of Ireland's grass-based production system. There will be a range of events over the coming year to support the initiative, which will involve all the agencies and many industry stakeholders.



Teagasc launched a campaign in January 2017 called "Grass 10". This is a four-year campaign, which will focus on improving grass utilisation at farm level through a range of farm-based activities such as grazing management, grass measurement and sward composition, etc.

Teagasc will run a Grassland Farmer of the Year competition this year, with support from the Department.



## STRATEGY COURSE GRADUATES

The third cohort of farmers to complete the Teagasc/UCD Michael Smurfit Business School certificate in strategy graduated in December. Farmers pictured include Jim Curran, James Curtis, Dara Kavanagh, John Brophy, Paul Costello, John Kelly, Frank O'Mahony, John McGuinness, Tom Campion, Dermot O'Leary, Patrick Kelly, Mark Kiernan, David Hannon, PJ Nangle, Eamonn Healy, Carmel Lawlor and Tom Cummins.

## New Teagasc Ashtown centre opens

A new Education, Research and Conference Centre at Teagasc Ashtown, Dublin, was officially opened by the Minister for Agriculture, Food and the Marine, Michael Creed in December. Opening the facility, Minister Creed

said: "In today's rapidly changing geopolitical, economic and trade environment, it is more important than ever to explore the boundaries of science and technology when it comes to food. Innovation is the key to unlocking the value added in food raw materials, to improving competitiveness and to providing a vital layer of insulation against the vagaries of highly volatile commodity markets. This is why this Teagasc development in Ashtown is so critically important."

Teagasc director, Professor Gerry

Boyle, said: "Greater synergies are now possible between our research, demonstration and education activities in food, horticulture and forestry because we have laboratories, experimental plots, pilot plant facilities and classrooms within one campus."

"This unique campus can now address the innovation needs of the meat/seafood/cereal-based foods and horticultural sectors under one roof and allow easier access by firms to specialised infrastructure, education programmes and researchers," he said.





The national tillage conference will take place in Kilkenny on 26 January.

## NATIONAL TILLAGE CONFERENCE

- 26 January 2017
- Event time: 9.30am
- Venue: Lyrath Hotel, Kilkenny.
- Theme: "Coping with and managing risk on tillage farms"

The morning session will focus on managing volatility and focusing on how farmers can diversify into alternative markets. Speakers will address how to manage volatile grain prices, look at premium markets and a farmers perspective to managing volatility on his farm. The afternoon session will focus on technical challenges on the farm. There will be research updates on disease control and resistance along with a flavour of current ongoing research in Oak Park.

- Registration: on the day from 9.30am.
  - Conference fee: €55 (€35 for Teagasc clients)
  - Lunch: €15, payable by cash, cheque or credit/debit card.
- See Table 1.

**Table 1:** National tillage conference agenda

9.30am	Registration/tea/coffee
10.30am	Conference opening – Frank O'Mara, director of research, Teagasc
<b>Session one: chaired by John Spink</b>	
10.45am	Prospects for grain prices and managing volatility – Andy Doyle, <i>Irish Farmers Journal</i>
11.05am	Grain use in the UK for brewing and distilling – Sarah Clarke, ADAS
11.50am	OSR and bean premium markets? – Dermot Forristal, Teagasc
12.10pm	Spreading the risk on my farm – David Walsh-Kemmis, Laois farmer
12.30pm	The maize guide and inter-farm trading – Kevin Cunningham, DLF and chair of the industry maize group
12.45	Panel discussion
1pm	Lunch
<b>Session two: chair Paddy Browne</b>	
2.30pm	Resistance update wheat and barley – Steven Kildea
2.50pm	Barley disease control, timings and rates – Liz Glynn
3.10pm	The value of variety choice in cereals – Joseph Lynch
3.30pm	Research update, five-minute presentations
	• Grass weed resistance - Ronan Byrne
	• Aphid monitoring and resistance – Louise McNamara
	• OSR row spacing and seed rate – Roisin Byrne
	• Understanding resistance to Septoria – Ger Hehir
	• Genome editing – what is it? – Ewen Mullins
	• Factors influencing eyespot – Henry Creissen
4pm	Close of conference – Professor Gerry Boyle, Teagasc director, TBC
4.15pm	Tea/coffee

## NATIONAL SHEEP CONFERENCES

### 31 January 2017

- Event time: 5.30pm.
- Venue: Landmark Hotel, Carrick-on-Shannon, Leitrim.

### 2 February 2017

- Venue: Dolmen Hotel Carlow
- Event time: 5.30pm

### 8 February 2017

#### Hill sheep conference:

- Venue: Malton Hotel, Killarney, Co Kerry.
- Event time: 4.30pm.

## CALF CARE EVENTS

Below are the remaining calf care events:

- **Tues 24 Jan:** Philip Healy, Droumature, Ballyheigue, Co Kerry; and Matthew and John Quinlan, Cappa House, Cahir, Co Tipperary.
- **Wed 25 Jan:** Ballyhaise Agricultural College, Ballyhaise, Co Cavan.
- **Thurs 26 Jan:** David O'Connor, Clover Hill, Croghan, Boyle, Co Roscommon; and Richard Glynn, Beechmount, Riverstown, Killucan, Co Westmeath.

## ORGANIC DEMONSTRATION FARM WALK

### Wednesday, 25 January 2017

- Suckler to beef.
- Venue: Eugene Kirrane, Cullane, Irishtown, Claremorris, Co Mayo
- Event time: 12pm.

### Thursday, 23 February 2017

- Dairying.
- Venue: Grennan's Organic Farm, Lismoyney, Clara, Co Offaly.
- Event time: 11am.

# Early grazing: it's not just for spring calvers

**Joe Patton**

Teagasc Animal and Grassland  
Research and Innovation Programme,  
Grange

**I**ncreased milk solids, reduced silage and concentrate costs and better subsequent sward quality are proven benefits from early turnout. Teagasc Moorepark analysis of farm data indicates a further potential gain of 25% to 35% extra spring grass growth from better early season management. Many farmers who turn their cows out early report a reduced spring workload and more grazing days.

There has been a perception, however, that winter-calving herds, with high feed demand in spring, and herds on heavier soil types, do not gain to the same extent. On-farm experience is showing that the potential benefits are just as great for such farms.

## The Johnstown Castle herd

Herd manager Aidan Lawless has been early grazing the 140-cow Teagasc Johnstown Castle winter milk herd over the last 10 years and has had to manage various trial stocking rates and calving patterns. The spring rotation planner gives the basic outline in each situation, according to Aidan:

**Aidan Lawless,**  
herd manager.

“Some tweaks to management are made along the way.”

“There have been a number of different combinations run here over the years,” explains Aidan, “from 100% autumn calving and buffer feeding to autumn and spring calving at lower stocking rates. At the moment, we have ‘block autumn’, ‘block spring’, and 50:50 split calving systems in place. For all systems, we find that getting cows out to early grass and using a spring rotation plan as a template is very important.”

The goal? “The main aim is always to set up the grazing block to have plenty of quality grass from mid-April and into the later rounds,” says Aidan. “We are trying to kickstart clean new growth by cleaning off paddocks in rotation from early February. Moving cows out to grass early means that the first areas grazed have a long interval to recover, and this helps to ensure we have enough grass for the second round. Having around 40% grazed by early March is a working target.”

The varying stocking rates and calving patterns result in quite different demands for grass in spring, so how is management adjusted to cope with this? “The first thing to say is that the targets of grazing 35% to 40% of the area by early March and 70% by St Patrick’s Day don’t change. After that, it is a case of budgeting out the available grass using quality silage and concentrate to fill the gaps.”

For the block autumn calving herd, for example, all cows are calved and the average daily feed intake is 20kg DM in early February. This creates a very high feed demand in February. “To manage this, we stick to the plan for area grazed per week, which usually means grazing by day only until early March,” says Aidan. “The cows will get at least 5kg to 6kg grass DM per grazing to minimise poaching, after morning milking. The rest of the herd’s diet is fed indoors, with

silage feeding adjusted depending on grass allocation.”

## Grass allowance

“Once daily grass allowance increases the cows will be out for two grazings per day through mid-March and are finally out full-time during the last one third of the first round.

“This contrasts with the spring or 50:50 split-calving groups, which need to be out full-time earlier in order to get enough area grazed,” notes Aidan. “But when you look at each farm in mid-April, the grass situation should be close to identical on each one.”

Aidan also highlights that correct autumn closing is essential for early grazing. “We closed the farm on 11







Michael Malone assesses early spring covers with Killian Brennan, Kilcogy, Co Cavan.



Killian plans to have cows grazing by 10 February this year and have one third of the farm grazed by early March

– **Cian Devanney**,  
dairy advisor,  
Ballyhaise

## HEAVY SOILS

"There's mixed opinion on the idea of early grazing," says Michael Malone, of the Teagasc Lakeland Joint Programme. "Some farmers have already bought into it; some will not entertain the idea – they have their own reasons, and some are willing to give it a go but need some practical help to get things moving. We prioritise these guys because we feel time with them will be time well-spent."

Michael says that the main barriers to achieving more days at grass in spring are similar on farms across the region. "It comes down to the same few issues nearly every time," he argues. "Applying spring nitrogen early is probably the number one issue. It can be a struggle to promote application of 70-plus units of N by 1 April because the response is not immediately visible, but local farm data confirms the value of this practice."

After that, the issue of poaching and a perception of increased workload with strip grazing are common issues. "There is no doubting the extra poaching risk on some of the farms further north and west in the catchment area," Michael says. "But I think there is a real need for objective assessment of what level ground damage is acceptable, and what isn't. We certainly don't want to be reducing annual growth by poaching high-risk paddocks. We have used the Ballyhaise farm to demonstrate recovery of grass on some ground marked during the first round of grazing, and there are real lessons for guys here."

The farmers on heavy soils who are striving for more days at grass also recognise the value of good field infrastructure. "Lack of investment in roadways and water to make grazing access easier and reduce poaching is another issue locally," says Michael. "In a wet spring, it's very tempting to just close the shed door behind the cows in the morning and wait a few weeks – farms that have invested in infrastructure are more likely to move on grazing in marginal conditions, at least by day. For heavy farms, the distance from any point in the paddock to a roadway access point should be no more than 150m."

So does Michael see progress being made on early spring grazing? "I definitely think so. The first and most important thing is that we are seeing more and more middle-ground farmers willing to give it a go. One of our clients describes early grazing as akin to doing heavy training with his football team in January. "It is tough going and not enjoyable at the time, but you will get the rewards for the rest of the year."

November at an average farm cover of around 680kg DM per hectare.

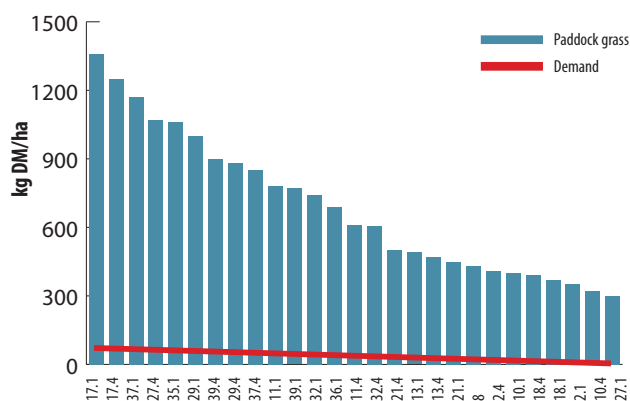
The wedge chart (Figure 1) showed me that there were four or five paddocks that could have been grazed given the good weather conditions, but we stuck to the plan and walked away to have grass for the spring.

"We will have an opening cover close to 800kg DM per ha and this will help to get grazing off to a good start. We have seen over the years that closing earlier and with a high cover is needed for winter milking herds in order to have enough grass to cope with extra spring demand.

"So some adjustment is needed in autumn as well as spring for these systems."

**Figure 1**

Closing covers for the Johnstown dairy unit (block autumn herd), November 2016



# How much poaching is acceptable?

## Moisture probe takes out the guesswork

**James Humphreys and Dan Barrett**  
Teagasc Animal and Grassland Research and Innovation Programme, Moorepark

**D**uring wet weather farmers are faced with the decision of turning cows out to grass or keeping them indoors and incurring higher costs. The decision varies from farm to farm, mainly due to differences in soil type but also due to the mind-set of the farmer.

Farmers are justifiably keen to avoid poaching damage because it has consequences for subsequent grassland productivity. However, there is no consensus as to what is, or is not, acceptable poaching damage. This is because there is a lack of knowledge of the long-term impact on grassland productivity.

Since 2008 we have conducted a number of experiments at the Teagasc Solohead Research Farm with the objective of quantifying the impact of poaching damage on grassland productivity on a heavy soil.

These long studies included 2009 and 2012, which were very difficult years for grassland management, primarily because an exceptionally high proportion of annual rainfall fell during the late spring and summer months.

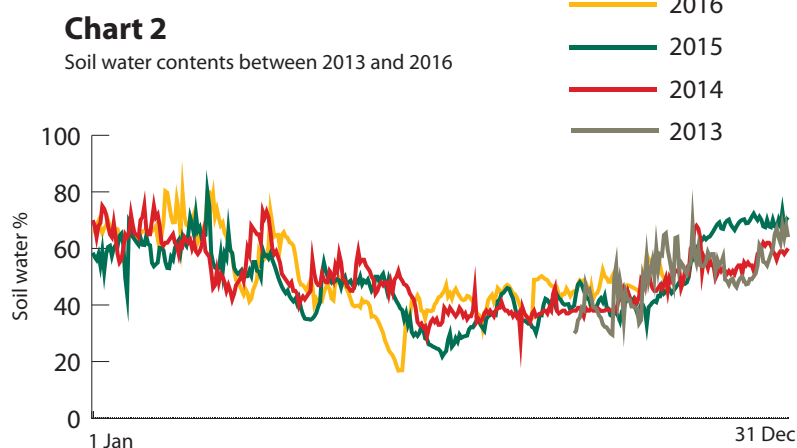
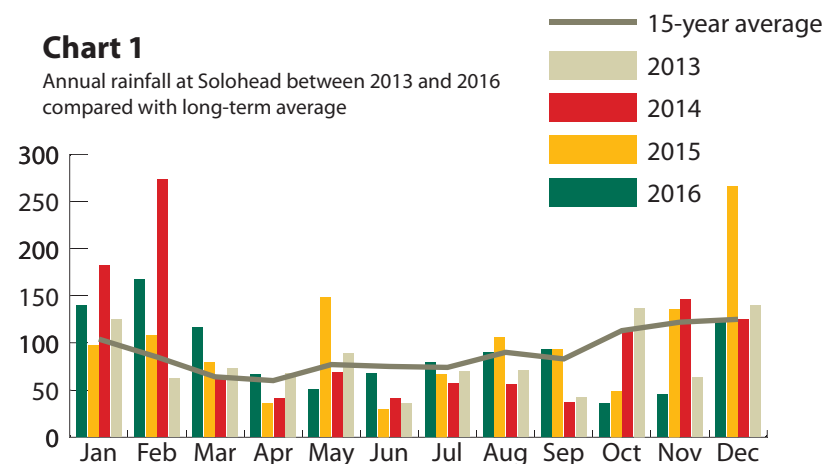
The results of these studies indicate that poaching was less damaging to pasture productivity than anticipated. Perennial ryegrass has a considerable capacity to recover from poaching damage and is well adapted to cope with such conditions.

Cows performed better when they were outside on grazed grass even under very difficult conditions. During February and March 2016, for example, (Figures 1 and 2), cows on grass outperformed their comrades on silage and concentrates.

### Soil structure and wetness

Soil is composed of sand, silt and clay, and the organic matter that binds them together in a particulate structure. This framework of soil particles comprises only 50 to 60% of total soil volume. The remainder is the space between the particles, which is filled with air and water. The ratio of air to water in the soil varies depending on rates of rainfall, evaporation, plant uptake and natural drainage from the soil.

By international standards, soil



conditions in Ireland range between being wet and very wet and, generally speaking, excessive wetness is as or more likely to limit growth than drought. Nevertheless, such conditions ensure a long grass growing season, which gives us a competitive advantage in dairy production.

The space between the soil particles is never 100% filled with water or 100% filled with air. During drought conditions, when grass growth is limited by lack of water, the soil space can still contain 15 to 20% water. On the other hand, even where the soil is wet to the extent that there is ponding on the soil surface, only 80% of this space is filled with water; many small packets of air remain trapped in the soil. A soil moisture probe can be used to get an objective measure of soil wetness, which we used for managing experiments on poaching damage (Figure 3).

Although soil conditions at Solohead have been massively improved by artificial drainage over the years there are two fundamental problems that remain: (i) the water table is typically only 1 to 2 m below the soil

surface and it doesn't take much rainfall to raise the water table up to the soil surface and (ii) the heavy soil has poor infiltration characteristics, which means that surface water is slow to drain away after heavy rainfall.

### Soil wetness and poaching damage

When soils are dry the soil particles sit on top of each other in close contact and have a structure that is sufficiently weight-bearing to bear the weight of a dairy cow or silage harvesting machinery. When soils are wet the spaces between the soil particles contain a high proportion of water, which causes the particles to 'float' and have less contact with each other. This gives the soil a more malleable consistency, which makes it vulnerable to poaching damage.

Hooves can penetrate the soil surface mashing the grass into the soil and breaking up the network of grass roots. In the short-term, mashing the grass into the soil causes poor sward utilization whereas damage to the root network can have longer term consequences. Our experience





Figure 1: Pre-grazing sward showing ponding at the soil surface in low lying parts of the paddock and cows out fulltime on pasture on 23 February 2016.

has shown that there is little or no poaching damage when the soil water content is at or below 50%. Poaching damage progressively increases with increasing soil wetness above 50%.

### Decision support

We have recently concluded a study looking at using soil water content as a decision support for turning cows out to pasture or keeping them indoors. In the study there were four grazing systems.

In system 1, cows were turned out to the pasture full-time as they calved from early February and remained at pasture until late November or early December regardless of soil and weather conditions. In system 2, cows were turned out to pasture in February but were put on on-off grazing at any stage of the grazing season when soil water contents were above 60%. System 3 is similar to system 2 except that cows are on on-off grazing at any stage of the grazing season when soil water contents were above 50%.

In systems 2 and 3 on-off grazing involved allowing cows access to pasture for four hours after morning milking and for four hours after evening milking. They were housed for the remainder of each day and were not supplemented with silage.

In system 4 cows were housed full-

time until soil water content dropped below 50% and were housed again in the autumn when soil moisture went above 50%, which is equivalent to turning cows out in April and housing them in October. This study was conducted over three years between autumn 2013 and autumn 2016.

The long term average annual rainfall at Solohead is 1075 mm. During the study there was above rainfall in 2014 (1202 mm) and 2015 (1214 mm) and below average rainfall in 2013 (975 mm). Despite an exceptionally wet winter and spring, rainfall during 2016 was close to average. The soil water contents during these years can be seen in Chart 1.

The herd of cows that was outside full-time, even under very difficult conditions (Figure 1 and 2), performed substantially better than the herd kept inside, with higher milk yield and protein percentage and, hence, higher milk solids production during this period.

There was little difference in performance of the herds on on-off grazing and the herd outside full-time although there was a trend for the cows out full-time to perform better particularly in terms of milk protein percentage. Furthermore, there was no difference in grass growth between the four systems. On-off grazing

increased labour requirement compared with keeping cows out full-time and keeping cows indoors substantially increased costs.

Keeping cows out full-time, albeit incurring some poaching damage (Figure 1 and 2) was more profitable than on-off grazing and substantially more profitable than keeping cows indoors until such time as there was minimal poaching damage.

### Implications

There was no benefit to avoiding poaching damage. Perennial ryegrass is well adapted to coping with poaching; many of the swards at Solohead are up to 20 years old and contain over 80% ryegrass, which we attribute to the maintenance of good soil fertility over the years.

Even where the soil is completely churned up, with ryegrass roots turned downside up, the ryegrass can recover reasonably well from a once-off severe poaching event (Figure 2). However, repeated severe poaching can lower subsequent grass growth by 20%.

Damaging repeated poaching is most likely to occur during April and early May when soil water contents are still high and grazing rotations are short (21 days). In contrast, although soil water contents can be





Figure 2: Post-grazing damage and recovery of the sward seven days later.



very high in the early spring and autumn, longer rotations (42 days or so) at these times of the year means that the sward has a longer time to recover between grazings and this has a big bearing on subsequent pasture productivity. Likewise pastures badly poached in the autumn have plenty of time to recover during the winter to full productivity by the spring.

The best defence against inevitable poaching damage is the maintenance of soil fertility. Resting the sward and applying a compound fertilizer containing N, P and K is best way of recovering a damaged sward.

Oversowing with grass seed can benefit severely poached swards. Using a lighter breed of cow (jersey crossbred) offers a marginal advantage in avoiding damage. We have found the impact of rolling a poached sward to be far more damaging than the original poaching. Grass will grow equally well on a rough surface



Figure 3: Soil moisture probe.

as on a level one. Allowing cows in to graze out a sward under good soil conditions (<50% soil water) is a very effective way of levelling a previously badly poached sward with minimal impact on subsequent grass growth.

Although there is no consensus on what is or is not acceptable poaching damage the soil moisture probe gives

an objective measure of soil wetness. We have found that at, or below, a soil water content of 50% there is little or no poaching damage. Poaching damage increases with increasing soil water between 50% and 70% but with acceptable damage levels once the situation is managed with due attention, ie moving the cows to fresh grass after each milking etc.

The tipping point seems to be around a soil water content of 70%. At this point the soil is easily liquidified and a lot of damage can be done in a short time. At this stage it is better to keep cows indoors on silage and concentrates. There is a need to test the usefulness of the soil moisture probe for this purpose on commercial farms.

**This work is supported by DAFM funding under RSF 11 151.**

**Table 1:** Milk production per cow between October and May averaged over three years (SW = soil water content)

	Outside fulltime	On-off grazing until SW = 60%	On-off grazing until SW = 50%	Inside until SW = 50%	Difference
Milk (kg)	3027	2966	2979	2779	*
Fat (kg)	141	139	138	127	**
Protein (kg)	115	112	111	100	***
Milk solids (kg)	256	251	248	227	***
Fat (%)	4.66	4.74	4.65	4.63	ND
Protein (%)	3.80	3.77	3.68	3.61	***



# Grazing coaches building grass management skills

New specialised discussion groups are helping farmers to gain the skills and confidence to become highly successful grass managers

**Kay O'Connell**  
Teagasc Dairy Advisor, Gorey

**S**hane Doyle, a dairy farmer from Gorey, Co Wexford, says: "There's nothing wrong with feeding concentrates at €180/t but when you can get the same feed value from a tonne of grass at €70 it seems obvious to me that you should maximise your production and use of grass. Shane has been measuring and managing his grass for about five years and he credits improved grass management for increasing his grass utilisation.

Teagasc data presented at the recent Teagasc dairy conference showed that every extra tonne of grass dry matter utilised per hectare increases profit per hectare by €180. On average, National Farm Survey farms utilised 7.1t of grass dry matter per hectare per year between 2008 and 2015, which is significantly lower than the 11.6t DM/ha/year utilised on Teagasc research farms.

So why the gap? A recent Teagasc/UCD study on the reasons for the low uptake of grass measurement technology on dairy farms by Teagasc Walsh Fellow Paul Newman found that while 92% of farmers surveyed were aware of and were interested in grass measurement technology, just 14% measured grass on their farms.

The study found that focused support for farmers making the transition to full grass measurement, possibly through the formation of a grass budgeting group, increased adoption of grassland measurement from 14% to 34%. Shane Doyle is the host farmer in his Teagasc grass budgeting group, a group offering focused support on grass measurement.



In spring 2016, a Teagasc Pasture-Base Ireland initiative called "Grazing Coaches" invited dairy farmers to join a local grass budgeting group. It was targeted at farmers interested in up-skilling themselves in grazing management, measuring grass and increasing grass dry matter production level on their farm. A two-hour monthly meeting would be dedicated to grassland management.

In north Wexford, local Teagasc dairy advisor Kay O'Connell, Shane Doyle and up to 15 local farmers meet on Shane's farm monthly. Each meeting includes a farm walk to estimate paddock covers; data entry on to PastureBase Ireland, and agreement on grassland management decisions for the week ahead.

Once grass measurements are uploaded, the PastureBase programme creates a grass wedge for the farm along with important figures including grass growth, cover/cow, average farm cover, daily demand and target pre-grazing covers. The grass wedge is then used to help make decisions for the following week.

The group met 11 times on the host farm between February and November 2016 with an average of 13 attend-

ing each meeting. Most of the group are dairy farmers who were already in discussion groups but wanted a specific grass-budgeting course to learn or enhance their grass measurement and budgeting skills. The group members come mainly from Gorey but some travel from south of Enniscorthy and across the county bounds from Co Wicklow.

The host farmers are Shane and his wife Margaret. In 2016, they milked 220 crossbred cows on their 75ha milking platform in Churchtown, Gorey. In 2015, they utilised 11.2t of grass dry matter per hectare. Shane was selected as a grazing coach as he was measuring grass on a weekly basis and was a confident grassland manager with a good understanding of the principles of grassland management.

Shane learned grass measurement and budgeting skills by attending an earlier grass budgeting group. Prior to this, like many farms a lot of the terminology was lost on him.

Shane says: "It came to a head one day when I stood at a general dairy discussion group and heard two farmers and Kay discussing grass figures

.....  
»Continued on next page

» From page 11

such as cover per cow, growth rate per day, demand per hectare, etc, and realised I only understood 30% of the conversation.” At the end of that meeting, he asked: “Is there a grass budgeting group I can join?” and he hasn’t looked back since.

The terminology can be off-putting when you’re starting out. “You need to give yourself a year or two to get comfortable with it and, above all, stick with it because grass management gets much easier over time.”

Shane says: “It is important to allow time after walking the farm to calculate farm cover and to make decisions based on the information collected. There is no point collecting data if you do not use it to make decisions.” Unlike most discussion groups, the grass measurement group always meet on the same farm rather than rotating around each member’s farm.

Peter Hill, who farms a few miles away from Shane, said: “By visiting Shane’s farm every month, we could see how he dealt with grass shortages and surpluses during the year.” Peter had been interested in budgeting for a few years but found it hard to put into practice.

“By seeing how tightly he was grazing, I gained the confidence to get the cows to clean out the paddocks better and it paid off. My milk solids were better in April and May than ever before.

“Going to the group meetings allows you to see first-hand how you should be managing the grass and like most people for me seeing is believing,” said John Earle from Killenagh who milked 95 cows this year. John’s farm is on Macamore soil type – a very heavy gley soil, which differs greatly from the light free-draining soil on Shane’s farm.

Despite the differences in drainage on both of their farms, John still sees benefit in attending the group meetings each month.

“The principles of measuring and managing grass are the same regardless of soil type. It simply means making different decisions depending on ground conditions and being flexible.”

The group agrees that it’s the same when it comes to breed of cow with the group having a mix of Jersey and Kiwi cross spring-calving herds, and purebred Holsteins producing winter milk. While the group has differing views on the type of cow and system of milk production, all agree with Shane who says that “the cow is purely the tool to convert grass into profit – it’s personal preference for each farmer to decide for themselves

what cow type best suits their system, but the focus must be on the fact that grass is our cheapest feed and its use must be maximised.”

### Weather

The weather of 2016 was very different in north Wexford to many parts of the west and southwest of Ireland, which had to deal with very wet weather. In Wexford, the most difficult periods occurred with poor growth in April and drought in August. On Shane’s farm, growth peaked at 91kg DM per hectare day (/ha/day) in June and dropped as low as 23kg DM/ha/day on 17 August before bouncing back up to 67kg DM/ha/day a month later.

To maintain his 2.9LU/ha stocking rate on grass alone, Shane needs a growth rate of 52kg/ha/day, so weekly grass measuring and budgeting helped him to see the deficit coming and act accordingly. In Shane’s case, this meant introducing soya hulls and then baled silage to help reduce his demand for grass until growth rates increased again.

Donal Kennedy farms 49ha and milked 100 cows this year near the Wexford/Wicklow border. “During the drought, I saw Shane using straights to supplement the cows and did the same at home and saved money when compared with feeding a nut, which

is what I would normally do. This was important with low milk price this year, but I would expect to do the same next year at hopefully a higher milk price and save even more money!”

For this group, meal feeding has a place but as a supplement – the focus is on using the cheapest feed available to them which is grass. By implementing what he has learned at the grass group during the year, Donal says he has an added bonus – 380 bales of silage from surplus grass.

“This is not grass that we would have put in with first- or second-cut silage but grass that would have been wasted by grazing covers that were too high,” Donal stresses. These surplus bales are especially important to Donal’s liquid milk system as they are high DMD silage which is ideal for milking cows.

Paul Kinsella and Pdraig Doyle farm alongside one another in Tara Hill outside Gorey town.

Paul had been coming to group meetings for a few months before he convinced Pdraig that he should come along too. “I’m really only getting into it now but have worked on setting up the farm for spring 2017 by grazing out tight this autumn,” said Pdraig.

By following an autumn rotation plan and ensuring that he had 60% of







## ADVANTAGES OF GRASS BUDGETING

- Walking the farm each week allows you to see what is happening in each paddock – you can accurately quantify grass growth.
- It helps you manage and maintain grass quality – by identifying grass surpluses and deficits.
- It enables you to work out weekly growth rates (kilos of dry matter per hectare).
- It allows a feed budget to be calculated – when and how much supplement (meal/silage) to feed.
- It makes it possible to calculate how much each paddock grows annually.
- It exposes poorly performing paddocks which need reseeding.

If interested in developing your grass management skills, contact your local Teagasc advisor.



Growth rates vary from farm to farm depending on factors such as soil type, fertiliser applications, grass varieties

Today'sfarm

his farm closed in early November, Padraig is confident that he is starting spring 2017 with adequate grass to turn cows out early and keep grass in the diet until the start of the second rotation in early April. Padraig's neighbour, Paul, has been entering his measurements onto PastureBase Ireland each week since getting training with the group in the spring.

"Measuring the grass gives you the weekly growth rate on your farm. Growth rates vary from farm to farm depending on factors such as soil type, fertiliser applications, grass varieties, etc. Knowing the growth rates on my own farm helps me to predict the following week's growth rates with only one factor in mind – the weather. Once you know your grass covers, you will be better able to match supply with the herds demand. Matching supply and demand will ensure that paddocks are grazed out tightly and increase grass utilisation. It's all about trusting the figures."

It takes around three years to become fully confident in grass budgeting, according to Shane, and many members of the group agree. With one year completed, the group's plan for 2017 is to have all group members measuring weekly and entering their figure on to PastureBase, so they can compare figures and learn from each other.

Farmers in the group bring their own data to the meetings.

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# Calf health and management: the essentials

**Catherine Colfer**  
Teagasc dairy advisor,  
Johnstown Castle

**S**ean Roberts, who farms at Old Ross, New Ross, Co Wexford, has 370 cows and heifers to calve down in the spring of 2017. His planned starting date is 30 January. Half of the herd will be calved before the middle of February, with 90% calved within six weeks. Ten to 15 cows will calve on any given day.

Sean condition scores his cows three times per year, including in October where any under-condition cows are identified and will be given a longer dry period and housed with heifers. "The pre-calving diet of the cows is the foundation when it comes to delivering healthy calves," says Sean. "I aim to feed 68 to 70 DMD silage to dry cows. Cows are usually in good condition at drying off, so they only need to be maintained over the winter."

## Minerals

"I have the silage tested for minerals and feed dry cow minerals through the water with the target of meeting

necessary requirements as identified from the silage test. It's important in particular to supply the correct amount of phosphorus and magnesium to the dry cow, and to identify the potassium (K) level."

Potassium seems to be increasing in silages and can cause issues with milk fever, hence the recommendation to feed lower K silage/haylage in the week prior to calving.

Although Sean lost about 5% of calves last year, he feels it was a magnesium issue and so has increased the Mg level in his pre-calver mineral this year. "In general, calves are good and lively," says Sean. "We use iodine on the umbilical cord and allow it to break naturally."

## Colostrum

"I'm a great believer in getting the colostrum or biestings into the calf as soon after birth as is possible," says Sean, "generally within the first two hours." He also aims for the first milk to be fed and keeps this milk stored separately. Calves have no immunity and must be given antibodies (present in biestings) to survive while they are building their own immunity.



Over 300 farmers attended the Calf Care event on Sean Roberts' farm on 9 January.



Sean measures the quality of the colostrum on his farm with a hydrometer. "Quality is usually good," says Sean. "Good cow condition and a long enough dry period contribute to this." Also, 75% of the herd are Kiwi cross, while the remainder are British and New Zealand Friesian." In general, three litres of the first milk within two hours should be fed. Sean feeds Jersey cross calves about 2.5 litres for the first feed.

AHI recommends feeding rates of six litres per calf per day. All calves are not the average weight, of course, with heavier calves sometimes not getting enough to even maintain their weight. There are many situations where calves need more energy, eg where temperatures are below 15°C (lower critical temperature), heat stress, disease or after vaccinations. Under these circumstances, calves may be underfed.

Research has shown that calves that get more than four litres/day of milk grow faster and are generally healthier. Heifers that grow faster before weaning go on to calve earlier





Sean Roberts and Catherine Colfer.

and have higher milk producing potential.

The birth weight of Sean's Kiwi cross calves averages 35kg to 36kg. Sean feeds them five litres of milk. They are on transition milk for a few weeks, and then move on to an automatic feeder where they are fed 750g milk replacer in five litres of water. This should achieve a 0.75kg ADG target. The same level of solids must be fed as the desired weight gain. They get straw and a muesli-type concentrate for a few days and go on to a pellet after that.

### Concentrates

Calf concentrate should be 12MJ Energy, 18% to 20% crude protein and at least 25% starch and sugar with necessary vitamins and minerals. Access to clean fresh water must be available. "I aim to have them eating 1.5kg of ration at weaning at eight weeks, when they will have more than doubled their birthweight," says Sean. "The first three months are a very efficient time to take advantage of potential weight gain. Calves are

let out to grass mid-April to the end of April."

### Housing

Ideally, calving in individual pens is preferable, but on Sean's farm cows calve in group pens. Cows are checked at midnight and again at 4am and 6am. In general, cows calve easily with few problems.

"We sell bull calves at three to four weeks old," says Sean. "These are kept in group pens in a loose house. We rear heifer calves in calf hutches roofed by a shed. Seven calves are in a hutch, 7ft x 8ft.

The door of the hutches faces the centre of the shed, with a lying area outside of the hutches. There are no walls on the shed. There are no draughts in the hutches, they come into the hutches at about two days old. A total of 112 calves are housed, ie 16 hutches with seven calves in each.

"As the calves get bigger, they tend to lie outside more. The fall of the floor of the shed is one in 20 to the centre of the shed and one in 60 down the length of the shed to a collecting



## Key messages

"For me, the three key areas most important for calf rearing are to get as much colostrum as possible into the calf within two hours; to have good ventilation in calf sheds; and scour prevention including an excellent hygiene and vaccination programme.

"A good start in life for the calves is a key factor in us achieving 99% of heifers calved between 22 -26 months of age on this farm."

tank at the end of the shed. They get plenty of straw and are cleaned out twice during the calving season. Correct ventilation in calf housing is vital."

### Scour

Scour prevention is a big focus on the farm. Correct ventilation and hygiene are of utmost importance. Cows are vaccinated on 10 January with Rotavec. This is effective from 12 to three weeks pre-calving to prevent against Rotavirus, Coronavirus and E Coli. Sean also feeds Biolaze Protect in the milk twice a day for the first 14 days. Calves are vaccinated for coccidiosis at 14 days and for pneumonia at one week to 10 days. They are also vaccinated for IBR at three weeks of age.

"When scouring occurs, we remove the scouring calf from the group. This helps to prevent the spread of infection and gives the calf a better chance of recovery," says Sean.

Healthy calves need up to four litres of fluid a day and scouring calves need an additional four litres to replace lost fluids. Give two extra feeds (two litres each) per day of a good quality oral rehydration solution when the calf starts scouring and while scouring persists. These should be given separately from the milk feeds (for example, at lunchtime and again late in the evening). It is safe to give these fluids by stomach tube, assuming you are competent and confident with the technique.

Continue to offer scouring calves normal amounts of milk or milk replacer as long as they want to drink. Do not feed diluted milk to calves. Continue to feed with milk or good-quality milk replacer as it does not cause, worsen or prolong scour.

Milk or milk replacer should not be stomach-tubed, as this can lead to the build up of acids in the rumen and damage to the ruminal wall.

# High-tech international milk

## The Teagasc Milking Machine Maintenance and Research Programme

**John Upton** Teagasc Animal and Grassland Research and innovation Programme, Moorepark.

**O**ptimum milking management requires the cow, milker and milking machine to be operating in harmony. A key element of the Teagasc programme in the coming year will be a management survey on 20 farms which will assess the interactions of these factors on Irish dairy farms.

Teat dimensions will be recorded prior to milking unit attachment. Mouthpiece chamber vacuum and teat end vacuum will be measured during milking, non-invasively using the Bio-Control VaDia. The VaDia is a battery-operated data logger, which is small and light enough to be taped to a teatcup during milking (figure 1). Post-milking teat condition will be assessed by a number of visual observations.

This kit can be used by a trained advisor or researcher and is used mainly as a research tool at the moment. But it may become more widely available in the future. For example, many advisors in Norway use the device as an on-farm diagnostic test. It is a milking time test device, as opposed to a dry test device or milking simulator device. Therefore, if the standard set of dry tests fail to detect a problem (eg a problem during milking of a cow), then this is a useful tool.

### How it works

VaDia logs the vacuum data at four points during milking. The data can be downloaded and analysed to identify any vacuum irregularities, to identify where the milking equipment and milking routine are underperforming.

The over-milking period for a teat is identifiable by the point where the mouthpiece chamber (MPC) vacuum increases sharply toward the end of milking (figure 2). Analysis of on-farm data shows that herds without cluster removers are prone to over-milking towards the end of lactation. During the over-milking period, short



**Milking researchers and consultants gathered to undertake an experiment at UW-Madison in April 2015. Left to right standing: Ian Ohnstad, The Dairy Group UK; Muireann Conneely, post-doc University of Wisconsin Madison; Graeme Mein, milking machine consultant Australia; Morten Dam Rasmussen, Aarhus University, Denmark; John Upton, Teagasc Ireland. Kneeling left to right: John Penry PhD student University of Wisconsin Madison; Doug Reinemann University of Wisconsin Madison.**

milk tube vacuum can approach system vacuum causing congestion (or swelling) of the teat tissue and hence delayed closure of the teat canal after milking.

Classification of cow teat condition can be used to assess the effects of milking management, milking equipment or environmental factors on teat tissue and the risk of new intramammary infections. Short-term changes in teat condition in response to a single milking can be used to diagnose faults in milking machines or milking management.

These short-term changes include firmness of the teat-end after milking and swelling at or near the base of the

teat. These changes can be assessed after milking. Factors commonly associated with teat-barrel swelling include over-milking and teat-cup crawling. Factors commonly associated with swelling near the teat-end include over-milking, high vacuum, pulsation failure or insufficient rest phase of pulsation.

Longer-term changes in teat-end condition can be monitored by assessing the degree of hyperkeratosis (or roughness of the teat-ends) in the herd. Apart from seasonal weather conditions, major factors affecting teat-end hyperkeratosis include teat-end shape, production level, stage of lactation and interactions between milking management and machine factors (ie slow milking and over-milking).

Teat-end hyperkeratosis can be made worse by disinfectants that cause chemical irritation to teat skin or may be alleviated by the use of a disinfectant with a high concentration of emollient.

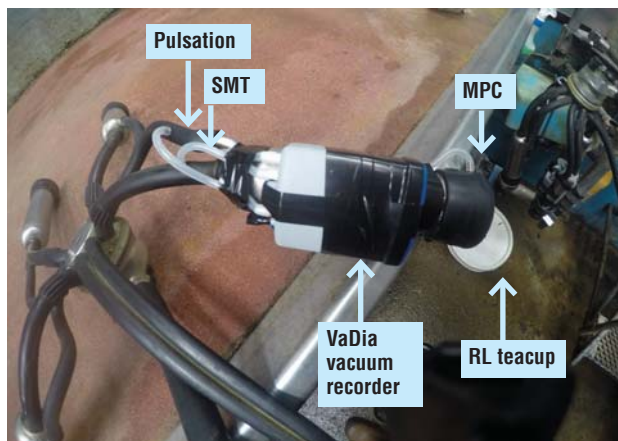
Combining milking time tests with teat condition assessment provides useful information for assessing milk-



# research links

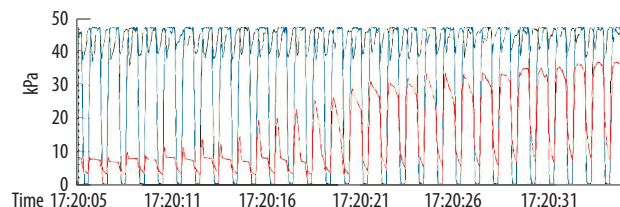


**Figure 1:** VaDia device fitted to the rear left (RL) teatcup of the cluster. Recording points for short milk tube (SMT) vacuum and mouthpiece chamber (MPC) vacuum can be clearly seen.



**Figure 1**

Transition from main milking period to over-milking period. Short milk tube (SMT) vacuum in blue and mouthpiece chamber (MPC) vacuum in red. Pulsation chamber vacuum is shown in green. The liner is open when the pulsation chamber vacuum is high.



ing machine, milker and cow interactive effects. Teat swelling or damage, which becomes evident during these observations, can often be explained by vacuum data obtained through application of the VaDia device.

## Links with Wisconsin, USA

The same challenges to milk the cow as quickly and completely as possible while maintaining udder health and milk quality are faced by farmers in the USA and in Ireland.

Many US farmers milk their cows three times per day to maximise production. This fact, together with large herd sizes (typically greater than 500 cows), makes milking a 24-hour operation on many farms. Hence, hiring trained staff to operate the milking parlour is a major issue for the US dairy farmer.

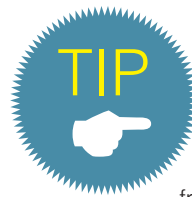
Farmers in the US are very much focused on the number of cows milked per hour. Hence, they train their staff to operate as efficiently and methodically as possible, using standard operating procedures and working routines. Documented operating procedures for cow preparation and

milking routines ensure easy handover from one milker to another (in the case of a US farm) or from farmer to relief milker (in the case of an Irish farm) in times of staff changes or labour shortage.

The milking machine research programme at Teagasc Moorepark is strongly linked with the milking research lab at the University of Wisconsin-Madison in the USA where the programme is managed by Prof Douglas Rienemann.



Farmers in the US are very much focused on the number of cows milked per hour. Hence, they train their staff to operate as efficiently and methodically as possible



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There are large variations in the price of a unit of electricity (eg from 18.3 to 13.8 cent per kWh of day rate electricity).

An average size farm can save over €700 per year by changing electricity suppliers.

Note: Night rate electricity is a good fit for all dairy farms. There is no charge from ESB networks to install a night rate meter. The meter standing charges increase from approx. €0.46 per day to €0.60 per day after moving to night rate electricity. This means that a minimum of 1.5 units of electricity would need to be used each night to offset the extra charges.

Researchers from Teagasc, the UK, Denmark and Australia met at the UW-Madison in early April 2015 for 10 days of discussions and experimentation on the interaction between the milking machine liner and the teat of the cow.

One important goal for the group was to clarify and simplify advice on how to optimise three of the key physical influences of any milking unit on cows' milking characteristics (e.g. average and peak milk flow rates) and teat condition. Those three key influences are milking vacuum, pulsator settings and liner compression.

Results of a series of recent studies at UW-Madison indicate that the relative effect of each of these factors on raising or lowering average milk flow rate is approximately 20% for milking vacuum, 20% for liner compression and 10% for pulsator settings.

This collaboration between Teagasc and UW-Madison has developed a method of assessing teat end and teat barrel congestion through analysis of milk flow rate from a teat using a quarter milking device.

The milking machine research programme at Moorepark will use these techniques to quantify the congestive effects on the teat induced during milking with various combinations of vacuum level, pulsation settings and liner compression levels.

The aim is to provide refined guidelines for milking machine settings and liner suitability for different herds with the goal of minimising teat-tissue congestion during milking. Minimising teat-tissue congestion will reduce the risk of bacteria passing through the teat canal after milking, thereby reducing new mastitis infection risk.

# Maintenance tips for milking machines

**Tom Ryan**

Teagasc Rural Economy Development Programme

**H**ave your milking machine serviced and tested by an Irish Milk Quality Co-operative Society (IMQCS) registered milking machine technician at least once a year. A list of registered milking machine technicians is available on [www.milkquality.ie](http://www.milkquality.ie). Thorough servicing will ensure that the machine will work well and with practically no breakdowns. The milking machine should be tested at least annually.

After servicing your milking machine the technician must test it, write the results on a test report form, list any faults and recommendations and leave you a copy. The technician must look over the results to see that all readings from the test are within limits. Test results on the report should show that the vacuum gauge is accurate, the vacuum level is correct, the pulsation system is working properly, there is sufficient vacuum reserve and that there are no unnecessary or excessive air leaks.

The test report is proof that the machine is performing correctly after being serviced. It may be needed for quality assurance purposes also.

## Spare parts

A good supply of spare parts will come in handy throughout the year. Spare sets of liners, short pulse tubes, claw bowels and claw seal kits, vacuum pump oil, v-belts, etc, will be needed from time to time. Having parts to hand will mean that anything that goes wrong can be sorted straight away as opposed to struggling along, for perhaps weeks without them.

## Liner change interval

Research indicates that liners should be changed after about 2,000 cow milkings. Worn liners are not able to milk out cows fully and milking speed will be slower. Calculate the recommended liner change interval for your

machine, eg a 10-unit plant milking 80 cows will milk eight rows twice a day, ie 16 milkings per liner per day therefore change the liners every 125 days (2000/16) or about twice a year in this case.

When liners are being changed, cut a few liners lengthways for any signs of wear inside the barrel, especially if the change interval is longer than recommended.

## Claw bowels and seal kits

Check claw seal kits and replace as necessary. Shut-off valves that don't seal properly at cluster take-off can cause clinical mastitis and raise cell counts. It is much more difficult to attach and detach a cluster that needs a new seal kit or has a cracked bowel.

Claw seal kit replacement is often neglected at servicing. I have seen gaskets that are not seated properly under bowels and ones that have swelled up because they are long overdue a change.



Having parts to hand will mean that anything that goes wrong can be sorted straight away as opposed to struggling along, for perhaps weeks without them

Chipped or cracked claw bowels should be replaced. I have found that some spurious bowels don't fit correctly so that they don't seal fully on the gaskets.

The claw air admission hole should be above the milk in the bowel during milking. The admission hole can be in the bowel or in the claw piece. There is a danger when using spurious or different versions of bowels that one could end up with none or even two claw air admission holes on a cluster.



## ONGOING CHECKS

While the milking machine technician will carry out the main servicing and test the milking machine, there are checks that you should do yourself daily and from time to time. The following list outlines some key tasks:

- Clean foam filters on the vacuum regulator regularly. They can be cleaned by washing in warm water and mild detergent. Dry by squeezing in a dry cloth.





Shut off valve seal

Claw bowl seals.

Claw bowl and valve seals must be checked and serviced regularly. Excessive leaks will make cluster attachment and detachment difficult and can cause mastitis, cell count and hygiene issues.



Sanitary trap

Receiver vessel

The wash drain tube valve between the sanitary trap and the milk receiver must be closed during milking, otherwise drain-back, if any, will affect TBC.

Replace long milk tubes and long pulse tubes as recommended.

Replace liners if short milk tubes get holed.



Trim or replace short pulse tubes once holed. Otherwise water and dirt will be sucked in between shell and liner.

- Listen for the sound of air hissing through the regulator during normal milking.
- Check vacuum level on the vacuum gauge daily.
- Don't delay in replacing any liners and short pulse tubes with holes. Have spare parts to hand. Dirt and water will be sucked into short pulse if tubes with holes are not replaced promptly.
- Ensure no water, birds or vermin can enter the air supply pipe to the pulsators.
- Check vacuum pump oil regularly, top up the reservoir and adjust oil drop rate, if necessary.
- Check that claw air bleed holes are free daily.

- The pulsation airline should always have a drain valve at its lowest point. Check that it is sealed during milking and free to drain out any liquid when machine is turned off. The airline should slope towards the drain valve.
- Check that there is an even and continuous fall on the milkline. The slope should be at least 1:100 (1%) and preferably 1:67 (1½%). There should be a similar slope on the pulsation airline.
- Inspect all rubberware for cracks and wear, regularly. If your fingers get blackened from the inside of rubber milk tubes it's a sign that it is overdue a change and/or harsh or incorrect cleaning methods may have been used. Flattening

of the milk tube near the cluster can be caused by kinking of the tube to shut off the vacuum at cluster take off.

- Avoid excessive loops in the long milk and pulse tubes. Milk tubes that loop down into the pit lower vacuum at the teat end and slow down milking.
- Check that the wash solution/rinse water flows freely in all clusters during machine washing. Check the jetters for signs of dirt or milk residue which can spread infection. Brush wash occasionally, if necessary.
- Check that teat sprayer nozzles are forming a full cone shaped pattern and that valves are not sticking and valves and joints are not leaking.

# Carlow farm makes

This new entrant is driving milk solids per hectare on a mixed owned/leased farm in Carlow

**Eamonn Grace**  
Teagasc Dairy Advisor, Carlow

**Richard O'Brien**  
Teagasc/Glanbia joint  
programme coordinator

**W**e have gradually managed to assemble the land we needed, says Jamie Kealy, who farms with his wife Lorraine at Slaneyquarter near Tullow in Co Carlow. "Originally, we were beef producers on a 13ha owned block. In 2013, we leased a 27ha block 8km away. We started in dairying in 2014 milking 63 heifers that year. In 2015, we leased another 10ha beside the

milking platform. For 2017, we have leased another seven hectares, which is about 2km away from the milking platform."

The most remarkable feature of this farm is the excellent milk output achieved from a young herd. "The key thing was the quality of stock we were able to acquire," says Jamie. "We were fortunate to be able to start with very high EBI heifers."

In the first year of production, they milked all heifers with an average yield of 435kg milk solids/cow. This increased to 516kg MS/cow in 2016 from first second and third lactation animals. The herd is predominantly Friesian with some crossbreeds. The fertility performance of the herd is excellent with six-week calving in excess of 85% and infertility of less than 10% over the last three years.

"Our meal feeding was excessive over the initial two years in production," says Jamie. "I'm now more focused on measuring grass and I believe that we can sustain high production based on well-managed high-quality grass and good cow fertility."

The original 27ha milking platform

has excellent soil fertility. Jamie says that the remaining blocks of land are low in phosphorous and potassium and are currently receiving maintenance, plus build up fertiliser treatment. This will continue for the next few years and the whole farm will be soil sampled again in 2017 to check soil fertility status. "We're fortunate in that this is a very dry farm in a low rainfall area (well under 1,000mm/annum)," says Jamie.

"Cows were grazing for 280 days last year. The spring of 2016 was very difficult but on this farm our animals were out grazing day and night from 1 February. The average growth on the farm has been 13 TDM/ha over the last number of years. Some 75% of the milking platform has been reseeded in the last four years. The farm needs to grow 13t DM/ha to sustain a stocking rate of 2.5LU/ha."

"The overall investment to get the farm up and running will amount to €200,000," says Jamie. "Half of this was funded from the sale of our suckler herd and other stock. This is a former dairy farm and it was leased with good facilities and infrastructure in place. Reseeding and fencing were funded through cashflow. Bank borrowing funded the remainder of the investment."

Milk price is very good on the farm due to high fat and protein percentage. Costs on a per-litre basis are being diluted over time as the volume produced increases. The cash break-even for this farm in 2016 was 26.5c/l. Costs were kept to a minimum this year. No reseeding took place and there were very few repairs and maintenance in 2016. Jamie has recently completed a cashflow budget for 2017.

"As new entrants to dairying, we were careful not to get too carried away by a good price for milk in the early years," says Jamie. "We expected the price to be volatile and so it proved. We believe the only way to be competitive is produce a high output of milk solids largely from grass."

## The future

With 60ha, this farm should be able to go to 130 cows and 30 replacement units over the next three years. Output of 65,000kg MS/year (130 cows x 510kg MS) is realistic with a whole farm stocking rate of 2.5LU/ha. "Both Lorraine and myself work off farm but we plan to reduce or eliminate that work to run this operation with assistance from seasonal labour," says Jamie.

**Table 1:** Physical data

	2014	2015	2016	2017
Total land farmed (ha)	40	50	50	57
Overall stocking rate (lu/ha)	1.49	1.84	2.5	2.5
Milking platform (ha)	27	37	37	37
Milking platform stocking rate (lu/ha)	1.89	2.08	2.46	2.81
Cow number	58	77	91	104
Milk solids per cow (kg)	435	480	516	525
Fat and protein (%)	4.16/3.64	4.29/3.71	4.44/3.7	
Milk solids per dairy ha	826	884	1215	1475
Grass growth (kg dm/ha)	13	13	13.2	14
Six-week calving rate (%)	88	85	87	90
Meal fed kg	1000	770	800	600

## Investments

	2014	2015	2016	2017
Heifers	63 (€75,600)	20 (€25,000)	20 (€24,000)	10 (€12,000)
Grazing infrastructure				
Quad	€4,000			
Slurry scraper			€12,000	
Additional cubicles			€9,000	
Upgrade parlour				€12,000
Bulk tank				€9,000
Reseeding		€4,000		
Upgrade fencing	€15,000			

**Table 2:** Financial performance

€/litre	2014	2015	2016
Co-op milk price	39.41	32.54	27.70
Gross output	37.73	33.70	28.71
Total variable costs	11.79	10.20	9.28
Total fixed costs	17.62	12.17	9.01
Net profit (excluding BPS, drawings, tax and capital repayments)	8.32	11.33	10.42



# rapid progress



Ailbhe Kealy (seven), Jamie Kealy and Eamonn Grace. Jamie and Lorraine Kealy are part of the Teagasc GII joint monitor farm programme.

# KT Beef Farm Improvement Plans – what you need to do **Part 1**

**James Keane**

Teagasc Animal and Grassland Research and Innovation Programme

**T**here are currently over 7,200 Teagasc clients participating in Knowledge Transfer (KT) beef and sheep groups around the country. Year 1 of this programme ends in May and every participant must have completed a farm improvement plan (FIP) with their facilitator before 31 May 2017. The FIP has five components –

1. Teagasc eProfit Monitor
2. Breeding Plan
3. Animal Health Measure
4. Grassland Management Plan
5. Farm health and Safety

We will deal with the first three in this article and the remaining two components will be covered in the March-April issue of *Today's Farm*.

## Teagasc eProfit Monitor

Completing an eProfit Monitor is a mandatory but useful deliverable. It allows you to look at the financial performance of your farm in detail with each enterprise (cattle, sheep or tillage) getting its own individual analysis.

Once you have the information on your farm output and costs of production then you can begin to identify areas to focus on for improvement. It gives you a comparison of your farm figures with a target, or with results from other similar farms locally or nationally.

The key data required for the completion of the eProfit Monitor is stock sales and purchases, variable costs and fixed costs. Farmers have all this data available to them but pulling it together and finalising the figures takes time. You should contact your facilitator to complete your profit monitor in early January as this is a quieter time to get paperwork completed before the calving season begins.

The Teagasc eProfit Monitor is specifically designed to help you identify areas on the farm where you can save money and become more efficient for the coming year. eProfit Monitor beef and sheep input sheets can be downloaded from [www.teagasc.ie](http://www.teagasc.ie).

## Breeding plan

Participants must complete a breeding plan in conjunction with their facilitator and this information will be inputted

onto the Irish Cattle Breeding Federation (ICBF) website.

You will see a KT beef button when logged into your HerdPlus homepage. This is where the breeding plan is completed. Note that ICBF will pre-populate all of your current breeding performance figures for 2016.

However, targets will be required to be inputted for the years 2017, 2018 and 2019. These targets will be set after a discussion between the farmer and the facilitator. Facilitators and farmers must put in a target that they feel is achievable. For example, if the farmer currently has a calving interval of 450 days and calves over eight months.

Is it realistic to assume that over the three years of the programme that this farmer will achieve a calving interval of 365 days and calving spread over 10 weeks? The targets in all the performance indicators should be discussed at length between farmer and facilitator.

The breeding plan has four key performance indicators:

**1 Calving performance targets for:** calving interval (days), calves per cow per year, heifers calved 22-26 months (%), number of months with a calving.

Summary				
Calving Performance				
The following table details the 4 main Key Performance Indicators (KPIs) for a herd's calving performance. Please set realistic targets for 2017, 2018 & 2019. <a href="#">Click here for reports &gt;</a>				
		2016	2017	2018
1 Calving Interval (days)	This Herd	354		
	Nat. Avg.	369		
	Top 15%	361		
	Target			
2 Calves per Cow per Year	This Herd	96		
	Nat. Avg.	83		
	Top 15%	96		
	Target			
3 Heifers Calved 22-26 Months (%)	This Herd	27		
	Nat. Avg.	20		
	Top 15%	50		
	Target			
4 No. of Months with a Calving	This Herd	7		
	Nat. Avg.	5		
	Top 15%	3		
	Target			

**2 Euro-Star profile of suckler cows:** ICBF will pre-populate the current replacement index figures of the cows and heifers in the herd. It is broken down into cows, females 1+ and females 0-1. Future replacement index targets have then to be set for 2017 to 2019. Farmers have to look at their current herd and think about their own replacement policy on the farm. Some farmers will have very high replacement index figures and may target a slight increase each year, others with low index values may decide to put a policy in place to breed heifers with more



milk and fertility thus increasing the replacement index figure substantially over the programme. The main priority is to have this discussion with your facilitator so that a plan can be put in place.

**3 Euro-Star profile of the stock bull:** current replacement and terminal figures will be available and a future target required. If you have a young bull on your farm that you intend to keep over the next three years then use his figures as a starting point for future targets. If you intend to change your bull in the near future, decide on whether the bull you buy is for replacement or terminal traits. This will help you to decide on targets after discussion with your facilitator.

**4 Beef output** ICBF will prepopulate figures for 2016 once the facilitator has put in the number of hectares used for beef production on the farm. When this is completed, 2016 figures for beef output/LU, beef output/ha and stocking rate will be available. Output on your farm is linked to efficiency and stocking rate.

With this in mind it is very important to become efficient in relating to your current breeding performance figures before you even attempt to increase stocking rate. Increased efficiency with current stocking rates will lead to increased output on your farm. It is very important that the farmer and facilitator discuss and set targets for these up until 2019.

### Animal health measure

Animal health has been included in the KT programme because the Department of Agriculture, Food and the Marine (DAFM) wishes to target calf health, biosecurity, parasite control, fertility and lameness as priorities for the next three years. We know that improving calf health, parasite control and fertility while reducing mortality promotes:

- Increased production and profitability on farm.
- Reduced carbon footprint of Irish food.
- Reduced usage of antimicrobial products and associated resistance.
- Reduced labour requirement on farms.
- Better animal welfare.

Over the last few months, 570 vets have received training in relation to their role in the knowledge transfer programme and those who have completed the training are on the Department of Agriculture Food and the Marine (DAFM) approved Private Veterinary Practitioner list.

The farmer requires an approved PVP to visit and carry out a health risk assessment on the farm and the practices carried out. The vet will identify priority points that will improve the herd health status and will make some practical recommendations to the farmer. The PVP will then upload this data onto the DAFM portal before 31 May 2017 thus satisfying the requirement of this measure.

Beef farms must complete two animal health measures. One is mandatory and the second is chosen from a menu of options.

- Calf health and biosecurity (mandatory).
- Fertility (option).
- Parasite control (option).
- Lameness (option, dairy only).

For sheep farms, again two animal health measures must be completed.

- Flock health and production (mandatory).
- Lameness (option).
- Parasite control (option).

## SUMMARY

- Contact your vet – find out if they have completed KT training.
- Arrange to have your animal health measures completed early in 2017.
- Once you receive the verification code by text, contact the vet.
- Ensure that the data is uploaded by the vet before 31 May 2017.

## What must the farmer do?

Vets are made aware of which of their farmer clients are in the KT programme. Some vets may not be trained and therefore will not be eligible to conduct the on-farm risk assessment.

In most cases, each practice will have at least one trained vet. The farmer can choose any trained vet to conduct the animal health measures. It is important that you approach your vet without delay.

The trained vet of your choosing will enter your herd number on to the DAFM web portal system. You will receive a verification code by text message (on the phone where you receive your BVD results). Giving this code to your vet will allow the vet to download your data and commence the animal health measures.

It is important that the quieter months of January and early February are utilised to conduct the animal health measures. It is also very important for you, the farmer, to have the risk assessments conducted at the commencement of the calving or lambing season so that you will get maximum benefit from the recommendations. The risk assessments will be less beneficial to you in May.

The animal health measures must be completed and uploaded onto the DAFM system by 31 May 2017 to qualify for payment.

## PVP-delivered group meetings

Each discussion group must attend a meeting delivered by an approved PVP in year one of the programme. The purpose of this meeting is two-fold:

1. To outline what is required in the animal health measures
2. To facilitate group discussion on animal health topics

The feedback from these meetings has been very positive with lots of engagement from farmers. It is clear that there is a hunger for knowledge on animal health and that the potential benefits from this knowledge transfer programme are significant.

# Vaccinating your flock against clostridia and pasteurella

**Ciaran Lynch**

Sheep Specialist, Teagasc Animal and Grassland Research and Innovation Programme, Ballyhaise

**I**n sheep production some losses are avoidable and some are not. One area where flock management can have a huge effect is by safeguarding against clostridia and pasteurella disease with an effective vaccination programme.

At the 2016 National Sheep Conference last February, William Fitzgerald from the DAFM Regional Veterinary Laboratory in Limerick outlined the benefits and pitfalls of clostridial and pasteurella vaccination (full paper available at: <https://www.teagasc.ie/media/website/publications/2016/Sheep-Conference-Booklet-2016.pdf>). Let's revisit some of the key points.

Both clostridia and pasteurella are families of bacteria. There are a number of species from these families prevalent in Ireland and which can cause fatal conditions in stock. Clostridia bacteria are present on every farm, in the environment and the animals themselves. They most commonly arise on farms in diseases such as pulpy kidney, blackleg, Braxy and Black's Disease.

Conditions such as *Clostridium Sordellii* are relatively new to many farms and seem to be more prevalent in certain geographic regions. Similarly, Pasteurella bacteria will be present in flocks; however the incidence of clinical conditions varies between flocks due to individual farm management.

## What vaccines are available?

There are a number of different vaccines available through stockists on the Irish market. Not all of these offer the same protection. To start with the clostridial vaccines, currently available products will cover between four and 10 different species/toxins of clostridia. Among pasteurella vaccines there are two combination

products available (ie they also cover some of the clostridial strains) and one standalone pasteurella vaccine.

So which product do you pick for your farm?

The best practice is to consult your vet and use previous farm history when making the decision on what product is best for your own farming situation. However, as a rule of thumb, it is better to be safe than sorry, so opting for the most protection, ie using a product or combination of products that covers the most strains may be the best strategy in the long term.

## How to use vaccines

**•Administration:** In all cases, farmers need to follow manufacturers' instructions carefully in terms of product storage and correct administration. In most cases, an automatic vaccinator gun is recommended as it makes the process easier.

Most products are administered via a 1ml to 2ml dose (product dependant: read data sheet) given by subcutaneous injection in the loose skin on the upper side of the neck. Cleanliness is essential throughout the process. It is generally not recommended to conduct vaccinations on sheep with wet fleeces.

**•Primary vaccination:** Each animal has to complete a full primary course of vaccination. This requires two doses given four to six weeks apart (read manufacturers' instructions). This is often one of the areas that is not done correctly at farm level.

**•Immunity:** Onset of immunity will not occur until two weeks after the primary vaccination has been completed. Active immunity (ie in those that have received the full course) is reported to last up to 12 months.

**•Passive immunity:** This is the transfer of maternal immunity to newborn offspring that occurs via colostrum (provided that the ewe has been vaccinated four to six weeks pre lambing). The duration of passive immunity varies, with reports of two



You should consult your vet and use previous farm history when making the decision on what product is best for your own farming situation

With a large number of farmers involved in the Knowledge Transfer programme due to complete a flock health plan, vaccination can form part of the discussion with your veterinary surgeon.







to 12 weeks, depending on disease species and product (see manufacturer's data sheet). As passive immunity declines, lambs will need to be enrolled on a vaccination programme, as outlined above, to provide cover.

- **Annual booster:** Once the primary vaccination course has been completed, an annual booster needs to be administered within a 12-month period to facilitate re-vaccination. In addition to the ewe flock, it is important not to forget to give the rams their annual booster to afford them protection too.

- **Timing:** The primary vaccination course requires two shots given four to six weeks apart.

In the case of pasteurella for high-risk farms – based on previous experience, a booster shot may need to be administered two to three weeks prior to high risk periods (eg ewes pre-tupping).

To facilitate the transfer of passive immunity from in-lamb ewes, the primary course and/or annual booster needs to be given at the correct time.

There is slight variation between products with ranges of between eight to two weeks or six to four weeks pre-lambing, so read the guidelines of your chosen product carefully. In addition, farmers with split lambing flocks may need to consider vaccinating batches on separate dates to ensure that they fall within the recommended vaccination window.

In young lambs, it is recommended that they are at least two to three weeks old before administering vaccines (product dependent) to avoid complications with immuno-competence of maternal immunity.

#### For the coming weeks

As young animals have been shown to be the highest risk category for losses associated with clostridial disease, equipping them with necessary antibodies via passive immunity in early life is an essential tool to reduce losses.

Therefore, in the coming weeks, for midseason lambing flocks it is important to firstly ensure the correct vac-

cination procedure has been followed for the in-lamb ewe flock.

It is also vital that adequate ewe nutrition is provided to ensure sufficient colostrum production at lambing.

Lambs will need to receive antibodies via colostrum within the first 24 hours of life. Where a ewe has insufficient colostrum, many will opt for an artificial colostrum supplement.

Although this will provide a valuable substitute for the lamb's nutritional needs, it will not provide the requisite antibody transfer needed to safeguard against clostridial and pasteurella disease. In this scenario, it is important that the lamb receives colostrum from another freshly lambed ewe from within the flock that has completed the vaccination programme.

With a large number of farmers involved in the Knowledge Transfer programme due to complete a flock health plan, vaccination can form part of the discussion with your veterinary surgeon.



# What makes a perfect steak?










A grass-based diet for starters...

**Lauren Van Rooyen, Lara Moran and Gonzalo Delgado-Pando,**  
Teagasc Food Research Programme,  
Ashtown

**T**he perfect steak will be tender, juicy and full of beefy flavour. There are many factors that affect eating quality which don't alter the appearance of the steak. Consumers are attracted by a bright red colour in meat but this is unrelated to eating quality.

While on-farm factors such as breed, sex, age, genetics, and feed type affect eating quality, the majority (75% to 80%) of the variation in tenderness, the most important aspect of eating quality, is due to what happens after slaughter. This includes electrical stimulation, hanging method, chilling rate, ageing time, packaging type and cooking. There is also considerable variation in the eating quality of different cuts.

**Figure 1:** Recommended cooking times for a 2.5cm steak. Cooking time depends on the thickness of the steak

	<b>Blue, rare</b> One minute each side	
	<b>Rare</b> 1.5 minutes each side	
	<b>Medium rare</b> Two minutes/side	
	<b>Medium</b> 2.5 minutes/side	
	<b>Medium-well done</b> Three minutes/side	
	<b>Well done</b> Five minutes/side	



Lauren Van Rooyen and young steak-lovers at the Teagasc Ashtown Science Week open evening.

Packaging type affects both the appearance and the quality of a steak. The bright red colour which consumers prefer is due to oxygen reacting with myoglobin, the main pigment in meat. Overwrap packaging and high oxygen Modified Atmosphere Packaging (MAP) encourage oxygen to react with the meat.

Unfortunately, MAP also promotes oxidation of muscle proteins reducing tenderness. It can also lead to oxidation of fats which produces off-flavours. Shelf-life is limited as the meat will turn brown after seven to 10 days. Vacuum skin packaging, where an air-tight film is tightly sealed over the steak avoids these problems and gives a longer shelf life, but the steak has a dark purplish colour due to the absence of oxygen.

Ageing improves tenderness and enhances flavour. Steaks are usually aged for at least 14 days. Longer ageing, up to 35 days, results in a stronger flavour. Dry ageing means chilling carcasses or large cuts without packaging. Wet ageing involves vacuum-packaging. Dry, aged meat tends to have a more intense beefy flavour, but incurs chilling costs and yields are lower, therefore wet ageing is more common.

The amount of fat is another aspect of a steak that consumers notice. The fat on the outside edge (subcutaneous) is usually well trimmed but any fat between (intermuscular) or within (intramuscular (IMF) or marbling) the muscles cannot be trimmed.

Marbling adds flavour and juiciness to the meat and may improve tender-

ness. During cooking, IMF melts providing added flavour and juiciness and improving the eating quality. Highly marbled steaks are more likely to be "the perfect steak", but many consumers will reject them as being too fatty.

## Marbling factors

The extent of marbling depends on animal breed, sex, age, genetics, slaughter weight, feeding regime and cut of meat. Consumers consider a high-fat diet to be unhealthy. However, when compared with other fats in beef, IMF provides higher levels of healthier fats such as monounsaturated fatty acids (MUFA) and polyunsaturated fatty acids (PUFA), including long chain omega-3 (EPA, DHA).

Animals fed mainly on grass, which is the majority of Irish cattle, produce meat with more omega-3 PUFA compared with those fed on concentrates. Therefore, even though a highly marbled steak will have higher fat content, its nutritional composition is healthier.

Cooking is also an important factor to consider when preparing the perfect steak. Steaks are cooked best at a high temperature for a short period of time, as extended cooking increases toughness.

Cooking time is also important and depends on the thickness of the steak. For a thickness of 2.5cm (one inch), cooking times are presented in Figure 1. In summary, for the "perfect steak", choose Irish premium grass-fed, aged, marbled beef and cook it to medium or medium rare.



# Equine winter care

**Wendy Conlon**

Equine Specialist, Teagasc, Rural Economy Development Programme, Athenry

Once in good health and provided with adequate nutrition, horses are well equipped to deal with wind, cold and even snow.

## Stabling

Adequate ventilation will help to protect the animal's respiratory system from endotoxins; from manure and dust; mould from forage and bedding and ammonia from urine. When cleaning stables, turn animals out or move them to a clean stable to reduce exposure to these harmful agents.

## Turnout

Even during the worst winter days, cold, fresh air is desirable and comfortable for horses. Full-time turnout, or as much as is possible, is the healthiest way for a horse to live once adequate shelter is available. Besides benefiting musculoskeletal and mental health, exercise is also important to maintain intestinal mobility.

Shelter can be as simple as a good non-deciduous hedge or a man-made shelter that protects against prevailing winds. In frosty conditions, don't turn out regularly stabled horses.

## Rugs

For horses with full coats, rugs are rarely needed. Horses have an innate ability to withstand cold and wind with no more than a windbreak. Rugs tend to compress woolly coats reducing their insulating properties. Horses that have poor body condition, are prone to weight loss, or are clipped should wear rugs. Regularly remove rugs to inspect the animal's condition.

## Body condition and nutrition

Assessing body weight and body condition over the winter is critical. Weigh tapes offer a good guide and will help you monitor if condition is being gained or lost. It is also a good idea to occasionally assess body condition by handling (especially ribs



Provide adequate feed and shelter and your horse will be comfortable as well as winter-safe.

and spine) and closely observing the horse.

Horses that are living out keep warm by burning calories. To maintain body condition they need high quality forage (hay/haylage) and the recommended amount of suitable hard feed. The amount and type of hard feed will depend on body weight, body condition and workload.

Additional calories help to keep a horse warm but it is best to increase calories by offering more good quality forage as the first option over bag feed. Fermentation of forage in the hindgut generates internal warmth without risking a carbohydrate overload that could cause laminitis.

“Assessing body weight and body condition over the winter is critical. Weigh tapes offer a good guide and will help you monitor if condition is being gained or lost

Horses that maintain body condition may do very well on a diet of forage, a small quantity of straight such as oats and a balancer product. Animals that require a high calorie intake to maintain or add condition will require a more energy-dense diet and perhaps oil supplementation.

“Poor doers” also benefit from being fed several small meals (no more than 2kg per meal for a 500kg horse).

It is critical to check water sources regularly and ensure that they are both clean and unblocked. Water intake is especially important in winter to maintain hydration and prevent impaction colic.

## Feet and teeth

Feet and legs should be cared for too. There is an increased risk of things such as thrush (if stabled); stone bruises; abscesses and mud fever at this time of year, particularly for horses in muddy conditions.

All horses should have an annual dental check, with those under three years requiring two checks per year. Sharp edges, hooks or dental disease will prevent a horse from gaining maximum benefit from its food. Most horses need dental work and floating (rasping) once or twice a year.

## Parasite control

The recommendation these days is to decrease worming frequency, move away from regular treatments and treat on the basis of parasite burden measured with the assistance of faecal egg counts and ELISA blood test (tapeworm). This will reduce the risk of resistance to chemical products, which is an ever increasing problem. Consult with your vet about using faecal egg count tests to tailor a programme to your farm. Smart pasture management aids significantly in reducing parasite burden.

## Conclusion

Horses thrive best when they can move around and breathe fresh air, regardless of the season. Provide adequate feed and shelter and your horse will be comfortable as well as winter-safe.

# Why data is plentiful and information is scarce

**Kevin Connolly**  
Farm Management Specialist,  
Teagasc Rural Economy Development  
Programme

**L**ike never before, farming is generating figures, facts and values which act as indicators of performance. Almost everything done on a farm generates a trail of numbers identifying key metrics relating to a particular event.

Take the example of a farm doing a silage quality test on a pit for diet formulation. The farmer and the advisor try to put the analysis results in context by piecing together the story behind them:

- What were the weather conditions like – leading up to and during harvesting?
- Was the grass tested prior to cutting for insolubility (sugar and nitrogen readings)?
- Was the crop wilted?
- Was there an additive used?
- What fields were ensiled in that pit?
- When were the fields last reseeded?
- What was the total yield of silage from the area harvested?
- When were the fields last grazed and when were they closed and fertilised?
- What was the soil fertility status of the fields when the fields were closed?
- How much organic and chemical fertiliser was applied?

The answers to all these questions should be available in reports, fertiliser records or diaries kept on the farm or in a computer database. Piecing it all together to identify the various decisions and factors and how they influenced the final outcome (the silage to be fed) would undoubtedly be useful.

The key to converting data into useful information to improve future decisions is to have access to all the

necessary details. The process of using this data, converted into usable information, is often called “business intelligence”.

Farmers have traditionally relied on their gut instinct, shaped by past experience, to guide them in making decisions. This will still be a core part of the decision-making process on any farm in the future but with the volume of data available now we have the ability to make data-informed gut decisions.

What this means is that farmers can take all the available facts and figures into account and once they have considered all of it... then determine what their gut is telling them. There must be room in the decision-making process for past experience and local knowledge to stack alongside the business intelligence focused hard facts and figures.

What can we do to make the best use of business intelligence? We might know all this data is there – but it will take some effort to find it, put order on it and interpret it. Putting order and understanding on the data with the eventual hopeful outcome of what is called “actionable knowledge” (information that can be used to guide your eventual decision) revolves around two goals:

- 1** Trying to find trends in the data that can point to what is happening.
- 2** Identifying common links and indicators/markers which can explain why the results of a particular decision turned out the way they did.

The “what” questions will normally be a little easier to get answers to as the data often just confirms what has already happened in terms of crop or animal performance. Having data just to back this up can give us confidence that we understand what happened and that we will know how to react in future when a decision is required.

## What does the future hold?

We know for sure that the volume of data generated on farms will continue to grow. Many of the machines and even individual animals on farms are already churning out data by the bucketload. Robot milking machines, electronic weighing scales, animal activity sensors and machine sensors are collecting electronic records by the second thereby giving “real-time” data on the farm.

There is, however, a possible danger that the increasing amount of information could overwhelm us in a flood of figures and statistics. All of this extra data could potentially hinder timely decision-making by clouding farmers’ thinking and causing them to hesitate, and miss the chance to make a timely decision as they wait for the next vital deal-breaking piece of data.

Computer systems and, in particular, smartphone apps available now can help greatly in handling, processing and most importantly displaying information from the analysis of underlying data. The problem is that many of the systems developed dis-





# COMPUTER ANALYSIS

Computer analysis can crunch the data and give predictions or model the outcomes from potential decisions to help finetune the decision making process. The potential is also there to allow an analysis programme to feed information back to an automated system to carry out actions and put the decision into practice.

This concept of the "connected farm" is already a reality on some farms with tractors and fertiliser spreaders and chemical sprayers already set up to respond to the fertiliser status of soils or pest status of crops.

However, the final decision will still rest with the farmer to decide what the data is ultimately saying and use the information to make better-timed, accurate and more influential decisions for the good of farm businesses, farm families and rural communities.

play data and information from only a single source.

But as we have already discussed, a lot of the data on farm events and performance is linked. If the information from all the various sources could be combined in one interface – on one smartphone screen or on one graph or display, then it would make the job of understanding the connection between the various bits of information easier.

Some already-developed systems are aiming to display of data from various sources. There are some significant but not insurmountable stumbling blocks: including dealing with the issues of data protection, sorting out issues to do with permissions around data-sharing for both commercial companies, as well as the farmer.

Most of all, the challenge will be to come up with a user-friendly and understandable interface able to display the information in a linked way to allow the connections between the data to become visible. Teagasc is working hard, with partners, to develop such tools.

**Farmers have traditionally relied on their gut instinct, shaped by past experience, to guide them in making decisions.**

## BOBMAN Bedding Machines

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**BOBMAN - VALUE YOUR TIME  
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IN UNDER 5 MINUTES**

### Facts

1. BOBMAN spreads - lime, all types of sawdust, chopped straw, peat bed, paper mulch and more.
2. BOBMAN brush can float up and down 8 inches to clean cubicles of different heights.
3. BOBMAN can be fitted with a sprayer system to spray disinfectant on the cubicle beds.
4. BOBMAN is the world leader in cubicle cleaning. Introduced to Denmark in 2001 BOBMAN is now sold in over 30 countries
5. BOBMAN is still manufactured in Denmark by a family owned company Jydeland A/S, don't accept lower quality imitations.
6. BOBMAN use only the best quality steel, engines (Hatz & Kubota) and hydraulic components. When you buy a BOBMAN you buy quality.
7. BOBMAN after sales - BOBMAN new or old, were here to help 24/7. With your BOBMAN you have direct access to assistance anytime.

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# Benefits of liming? Ask our ancestors

**Paul Fox**

Tillage and drystock advisor,  
Teagasc Tullamore

**D**otted around the Irish landscape are the remains of old lime kilns, many dating from the 18th century. These were used to burn limestone rock at high temperatures to produce lime dust. Farmers of the time recognised that spreading the lime dust improved soil productivity, boosting grass and crop growth. Lime kilns were seen as indicators of farming prosperity, and most villages had at least one lime kiln.

The wisdom of our ancestors is lost on many of us today and lime is often the forgotten fertiliser when it comes to growing tillage or grass crops. The level of lime application to Irish soils has decreased dramatically over the past 40 years. There was twice as much lime spread in 1977 as there was in 2015. Ongoing analysis of soil sample trends by Teagasc shows that 55% of tillage and 65% of grassland soils are still below the optimum soil pH.

## What does lime do?

Lime is a natural soil conditioner which corrects soil acidity. Most Irish soils are naturally acidic, but there are a few exceptions (see farmer profile). Improving soil pH allows soil biological organisms and earthworms to thrive, breaking down plant residues, manures and facilitating the efficient release of soil nutrients.

Excessively low (or indeed excessively high) pH has the effect of locking-up nutrients in the soil (most notably soil phosphorus). Correcting soil pH can improve the availability to plants of nitrogen, phosphorus, potassium and sulphur, as well as many of the trace elements.

Lime also has beneficial effects on soil structure, particularly in heavy soils, helping to improve soil drainage and making it easier to prepare a fine seedbed for crop establishment.

## How is lime lost from soils?

There are three major processes by which lime is lost from soils. In order of importance: lime is lost through leaching, high nitrogen usage and crop removal or harvesting. Leaching losses can vary from 250kg to 625kg per ha per year, depending on rainfall levels.

Nitrogen is a major and essential driver of crop yield but lime is required to neutralise acidity produced by nitrogen fertiliser. Estimates are that 180kg to 220kg per ha per year of lime is required to neutralise 100kg of nitrogen as CAN or urea fertiliser. Harvested crops remove approximately 15kg/t of lime per tonne of dry matter removed. Growing spring barley for three years in the a field will deplete up to one ton of lime per acre, as outlined in Table 1.

## Soil pH and lime requirements

January is the ideal month to check soil fertility status and determine the amount of lime required to deliver



optimum crop growth.

Aim to maintain soils growing tillage crops at a pH of between 6.5 and 7.0. In general, heavy soils will tend to have a higher lime requirement than lighter soils. Lime advice is reported in tonnes per ha on the soil analysis report.

There are some quick soil test kits available, such as handheld pH meters, but a full soil test is the best and most accurate indication of soil lime requirement.

Apply lime as recommended on the soil test report. Check the lime requirement every three to five years.

## Soil pH and tillage crops

As well as recognising the benefits of lime, our ancestors also knew how to

**Table 1**

Lime depletion and growing a spring barley crop	kg/ha removed
Grain and straw removed = 8t DM at 15kg /t DM	120
Leaching and drainage losses (estimate)	500
Lime used to neutralise applied N	270
Total lime depletion per ha	890kg/year
Total lime depletion per acre	360kg/year

Three years of growing spring barley can deplete up to 1,000kg or 1t of lime per acre (1,000kg). Assumptions: Grain yield = 7t DM/ha. Straw yield 1t DM/ha. 135kg N/ha applied to grow the spring barley crop.

**Table 2:** Optimum soil pH for a range of crops on mineral soils

Crop	Optimum soil pH
Beet, beans, peas and oilseeds	7.0
Cereals and maize	6.5
Potatoes	6.0
Peaty soils	5.8



# FARMER PROFILE AIDAN WALSH

Aidan is a specialist tillage farmer and agricultural contractor based in Durrow, near Tullamore, Co Offaly. Aidan has experience in growing a range of crops including winter and spring cereals, spring beans, fodder beet, oilseed rape and linseed. He places strong emphasis on the importance of testing soil and getting the pH right to grow a successful crop. "In my experience, beet and barley are the most sensitive of all the crops to low pH, and I have seen crops fail where low pH was not corrected," says Aidan. "If we take new land we will always do soil tests."

Aidan's preferred method of liming tillage soils is to apply lime to the stubble in autumn, followed by a run of a heavy grubber. He leaves the soil until the following spring before ploughing and sowing the crop. This takes a certain amount of planning he acknowledges, so having a three- to five-year liming plan for the farm is important.

While Aidan is a strong advocate of spreading lime, ironically the soils on his home farm are naturally high in pH, with typical readings of pH 7.1 to 7.8 being reported on soil test results. "We never have to spread lime here on this farm in Durrow," Aidan explains. He feels that the close proximity to the Eiscirs (ridges of sand deposited during the ice age) is probably the cause of this effect on soil pH. However, once you leave this immediate area, Aidan notes, the soil pH changes dramatically. "Our rented land receives lime on a regular basis."

Crop margins are tight, Aidan concludes, but lime is still good value for money. Get your land tested and spread lime if required; your crop won't yield without it.



**ABOVE: Aidan Walsh and Paul Fox.**

match crops with soil type. Peaty soils (generally a pH 5.5 to 5.8) are common in the midlands, and past generations successfully grew crops of oats and potatoes in these black soils, where they knew barley crops would fail.

Table 2 outlines the optimum soil pH for a range of tillage crops. Barley is the most sensitive of the cereal crops to soil acidity.

Wheat is more tolerant, but it is desirable to maintain a pH of 6.5 to avoid yield penalties. Beet, oilseeds and the protein crops (beans, peas) require high soil pH 6.8 to 7.0 and are sensitive to lime deficiency. Crop failure can result where liming is overlooked.

## Lime – a great investment

Teagasc research shows that maintaining mineral soils at a pH of 6.5 can increase grain yield by up to 1.5t/ha. Taking current grain price and an annual lime maintenance cost into account, this represents a return of almost €7 in additional grain sales for each €1 invested in lime, or a 7:1 return on investment (grain: €225/ha, lime: €33/ha). Just ask our ancestors – applying lime always made complete sense.



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tillage

# Bounteous benefits from growing beans

**John Carroll**

Teagasc Crops, Environment and Land Use Programme, Oak Park

**B**eans are good for soil structure and fertility. The bean tap root can be up to 45cm (18 inches) deep leading to a beneficial disturbance of the soil for subsequent crops. As bean straw is routinely chopped and incorporated, the crop helps to improve soil structure and organic matter.

As a leguminous (nitrogen fixing) crop, there is no need to apply nitrogen to beans. In fact, they will leave a legacy of up to 40 kg/ha of N for the following crop.

## Reduce disease

The definition of a “break crop” is one which “breaks” the cycle of disease. In rotation with cereals, beans offer control of take-all giving a yield boost of 5% to 30% to first wheats compared with second or subsequent wheat or barley crops.

## Boost your rotation profits

Beans boost rotation profits. It is important to take into account the

value of the break crop to the entire rotation's profitability rather than looking at each crop in the rotation individually.

## Supply high quality Irish protein

With over one million tonnes of protein imported annually and a shortage of protein throughout Europe, it is important to produce native protein sources.

Beans are a high-protein (28%) grain, which can be included both in coarse rations and pelleted feed for ruminants and non-ruminants as a replacement for imported soya/distillers grains. With this goal in mind, a €250/ha protein payment for growing protein crops, including beans, is currently in place.

## Meet EU requirements

With the greening “three-crop rule” forcing many farmers to think about alternatives to cereal monoculture, beans can be seen as a very viable option. The fact that beans can contribute 0.6ha of ecological focus area for each hectare sown is another major positive on farms where hedgerows alone will not meet the EFA requirements.

## RESEARCH PROJECTS

In the past three months, two new research projects focusing on faba bean agronomy and physiology have commenced at Oak Park.

**1** “Opti-BC: Optimising production technology in Ireland for break crops.” funded through the DAFM Research Stimulus Fund aims to develop an understanding of the factors affecting the performance of bean and OSR

crops in Ireland and to develop crop management practices that will improve performance in our climate. For beans, it focuses specifically on soils and establishment systems.

**2** “Optimising canopy size and structure in field beans grown in a temperate climate.” This Walsh Fellow postgraduate research aims to study the physiology of field beans to gain a better understanding of the effect of variety, seed rate and sowing date on their growth, development and yield.

**The Teagasc Break Crop Agronomy Programme is funded through the IFA grain levy.**



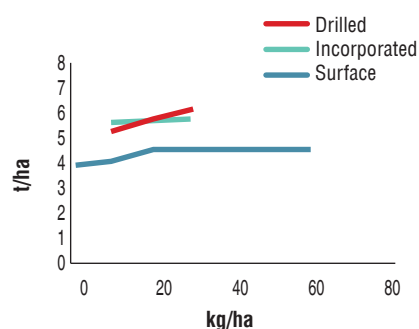


# 5 STEPS TO GROWING BEANS IN IRELAND

**1 Select the best sites >>** As beans produce large crops, with dense foliage, drought stress, especially during pod fill, can be a limiting factor in yield. Choose fields with medium to heavy soils with good moisture retention capacity. A pH of 6.5 to 7 is ideal. As mentioned earlier, no fertiliser N is needed. However, P and K should be applied according to soil analysis. Phosphorus placement is especially important on low index soils where Teagasc research has shown yield benefits of up to 30% where P is placed with the seed (drilled or incorporated) as compared with broadcast (Figure 1).

**Figure 1**

Effect of phosphorus placement method on bean yield (index 1)



**2 Sow a good variety, at the right rate, at the right time >>**

2016 saw the release of the first bean recommended list in over 20 years. It contained three varieties: Fuego, Fanfare and Boxer. Fuego has been in use in Irish conditions for a number of years and is by far the most common with over 75% of sowings in 2016. However, yield improvements have been shown in both Fanfare and Boxer and more seed of each is likely to be available in 2017.

Spring beans can be sown any-time from early February to late March, with earlier sowing giving slightly increased yields (2016 trial data shown in Table 1). However, earlier sowings will be very susceptible to crow damage and sowing in

John Carroll.

» Continued on next page



# tillage

good soil conditions is more important than calendar date.

Teagasc Oak Park trials have shown that increasing seed rate can increase yield in the absence of disease pressure but the economic optimum is usually 35 to 40 seeds/m<sup>2</sup>. As beans vary hugely in size and weight, it is vital to know the thousand grain weight (TGW). This can vary from 450g to 750g giving optimum seeding rates of 150kg to 250kg/ha (9st to 16.5st/ac).

**Table 1:** Effect of sowing date on yield (2016)

Sowing date	Yield (t/ha)
28 January	7.99
20 February	7.58
16 March	7.37
10 April	5.98

**3 Control weeds >>** Early season weed control in beans using pre-emergence herbicides is vital. Pendimethalin, imazamox and clomazone-based products are the most common and are most effective on fine, moist seed beds. Products containing clomazone can cause a bleaching effect after emergence but this will have no adverse yield effect. Post-emergence options are limited and have a narrow window of application. To get good season-long weed control, it is important to have a good, even plant stand through sowing in good conditions.

Bean-growing offers a good opportunity to control challenging grass weeds. A number of graminicides are available for wild oats, scutch, sterile brome and other grass weeds.

**4 Control pests and diseases >>** Serious damage to bean root nodules can be caused by the larvae of the bean weevil. Adult weevils migrate from their over-wintering sites, mainly around field margins, especially if the field or neighbouring fields have been previously cropped with peas or beans. Migration occurs early in the spring and this often coincides with short periods where the maximum air temperatures exceed 15°C.

The pest can cause damage to spring beans if large numbers appear when plants are small. Leaves of attacked plants show characteristic U-shaped notches around the edges (Figure 2), but the main damage is caused by the larvae. Once crops emerge, monitor crops for leaf-notching and if seen across the crop, apply a suitable insecticide.

Black bean aphid colonisation of individual plants can occur in late summer. Heavily infested individual plants will be badly damaged but



Leona Murphy is pursuing research into optimising canopy size and structure in field beans grown in a temperate climate.

treatment is not necessary unless more than 5% (one in 20) of plants are heavily colonised, as more damage may be caused by the spraying operation in the maturing crop.

Chocolate spot (*Botrytis Fabae*) is the main disease threat to beans (Figure 3) but its occurrence can vary greatly across the country depending on location and weather conditions. Symptoms appear as brown spots which eventually enlarge to a more aggressive phase in cool, wet or damp weather.

Yield losses of up to 50% can be seen in high disease years. High-density plant stands will lead to increased pressure and disease spread. Usually, a two-spray programme is recommended and early spraying is

critical to achieve good control as no curative chemistry is available. Spray at first signs of infection, which will usually occur at the start of flowering (or earlier in coastal areas) and repeat two to three weeks later. Options include strob plus chlorothalonil/tebuconazole or Boscalid plus strob. These products will also give control of *Ascochyta*.

Downy mildew can be common on spring beans, where it causes greyish-brown, felty growth on the under-surface of the leaves. Some varieties have resistance to the disease.

Treat with mancozeb at the start of flowering. This has mainly protective properties. Earlier treatment was not beneficial in NIAB trials but early infection should be monitored. Products containing metylaxyl offer some curative control. Some bean rust was seen in 2016 but will be well controlled by products applied for chocolate spot.

**5 Harvest at the correct stage >>** Spring bean harvest is late, normally from mid-September. Crops must be allowed to ripen naturally – patience is required. Neither diquat nor glyphosate will speed the ripening process. However, once 90% of pods are black, diquat can help to dry up stems and small late-fill pods.

In crops with large weed populations, glyphosate applied pre-harvest provides an excellent opportunity for control of problem perennial broad-leaved species, but must not be used in crops for seed or human consumption.



Figure 2.



Figure 3.



# The beauty of beech

**Paddy Smith,**  
Teagasc College,  
National Botanic Gardens

**T**he European, or common, beech, *Fagus sylvatica*, is not native to Ireland and its origin and introduction date remain obscure but it thrives here and is frequently described as the “mother tree” of the forest, or the “lady of the woods.”

The species, which belongs to the same family as oak and chestnut, is renowned for its beauty, its excellent hedging potential and its benefits for wildlife. Beech hedges have been widespread throughout Ireland since the 18th century due mainly to young beech’s ability to extend branches into every conceivable gap in their vicinity, forming excellent barriers. These hedges usually retain their dead leaves throughout the winter.

Unfortunately this beautiful tree is particularly sensitive to a problem known as transplant shock, which accounts for its sometimes high mortality rates post-planting. In temperate areas of the world such as Ireland, beech is often planted in the dormant season as bare-root stock. The ideal bare-rooted beech plant should be well balanced, have a good shoot/root ratio and sturdy root collar/height ratio, with a fibrous root system.

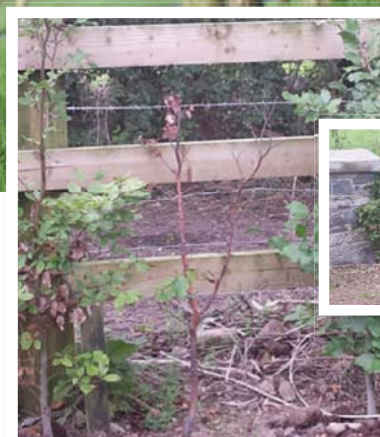
A 60-90cm tall plant with a 12mm plus root collar diameter generally meets these requirements and one should watch out for and discard any trees with severely unbalanced or ‘J’ shaped roots before planting.

Regrettably, bare-rooted beech transplants can be subjected to a series of potential stresses from harvest right through to planting. These stresses can range from extremes in temperature/desiccation during handling, planting and storage to root and shoot injury due to rough handling when transporting and planting.

If planting is delayed for any reason after delivery, bare-rooted beech plants should remain in their co-extruded (black on the inside white on the outside) bags in an upright position, and spaced about 25cm apart, not stacked on top of each other. They should be stored in a cool shaded area for no longer than three weeks. Farm buildings are generally ideal for storage. If planting is delayed for a prolonged period of time, stock must be heeled in. Young beech is a poor competitor with grasses and other ground vegetation compared with other tree species.



**The Meikleour Beech Hedge in Scotland**  
(Stokes and Rodgers, 2004)



**Poorly planted 60/90cm beech**  
75% mortality rate

Beech will grow on a wide range of soils and it is a very thirsty tree but it cannot tolerate periodically or permanently wet or water-logged soils. Short periods of waterlogging, especially to small plants, are lethal but one should also note that beech will not survive on extremely dry sites.

Inadequate maintenance following transplanting, poor planting, poor site condition/preparation, planting at the wrong time of the year and poor plant handling techniques are some of the causes of failure leading to transplant shock. However, a little care at this critical stage in the life of a beech will be rewarded with decades, or even centuries, of the magnificent beauty of this relative newcomer to our shores.

**i** Recognised by the *Guinness Book of Records* as the highest hedge in the world, the Meikleour Beech Hedge located north of Dundee was planted in 1745 and is one-third of a mile long (530m) and 100ft (30m) high.

It is thought the men who planted it were called to fight in the Jacobite Rebellion and none of them returned alive. In tribute the trees were allowed to grow and the hedge acts as a living landmark to them. (Visit Scotland.)



# Picking apples and choosing trees

**Catherine Keena**, Countryside Management Specialist, Teagasc Crops, Environment and Land Use Programme

About 3,700 farmers have planted 41,000 traditional apple trees under agri-environment schemes from REPS, AEOS and GLAS I. These orchards contribute greatly to genetic diversity. They provide a rich reservoir of rare alleles, possibly not present in modern cultivars, and contribute to Ireland's genetic heritage.

A key point for the 1,260 farmers currently choosing apples trees to plant before the deadline of 31 March 2017 is that they must buy traditional Irish varieties from the GLAS list available from Irish Seed Savers Association in Clare and a limited number of other outlets.

Secondly, most people who have not undertaken a horticulture course are unaware the apple trees are manually grafted on to rootstock. Therefore, there are two choices to be made: which rootstock and which variety. The choice may depend on what traditional trees are available at this stage if not already ordered. Rootstock determines the height of the tree. There is a choice of three in GLAS.

M26, the most dwarfing rootstock allowed in GLAS, results in a smaller tree up to 3m, produces fruit in three to four years; the tree will have a lifespan of 40 years and needs permanent staking. Two higher-yielding options are MM106, which grows to 4.5m and fruits in five to six years, and M111 which grows to 5.5m and produces fruit in seven to 10 years, living up to 100 years.

The choice of varieties from the list of over 70 approved for GLAS is very interesting. Apple trees are generally not self-fertile, which means that to set fruit they need a pollination partner of a different variety. Most need one, some need two. Apple varieties are divided into three flowering groups – early, mid-season and late. It's unlikely an early and a late-flowering variety will pollinate each other. If there is a crab apple within a mile, it can provide pollen for your apple trees. It does not matter if the pollen comes from another variety of apple tree or crab apple, the fruit will grow true to your tree's variety.

A mixture of varieties with different uses is a good idea: dessert or eaters; culinary or cookers; and cider. Dual-purpose varieties can be used as cooking apples early in the season and as dessert apples later on when they've sweetened up. Ripening times range from August to December. For example varieties such as Irish Peach and Widow's Friend ripen early, while late ripening varieties such as Ross Nonpareil and Sam Young wait until December.

I would encourage all farmers with traditional varieties to mark their trees with a permanent label showing the variety and rootstock and date of planting. This will make it more interesting and build up knowledge and expertise.



A mixture of varieties with different uses is a good idea

Information on the apples from The Heritage Apples of Ireland by Michael Hennerty [www.irishseedsavers.ie](http://www.irishseedsavers.ie) 061 921866



## Gibbons Russet

- Uses: Dessert or Cider
- History: Kilkenny, Cork, Dublin, Meath
- Picking: Late August
- Size: Medium
- Flowering: Mid-season





Conor Norris, James Comerford and Finn Keating, Co Waterford, picking apples in the traditional orchard in Teagasc Kildalton College.



#### Lough Tree

- Uses: Dessert
- History: Wexford
- Picking: Mid August – mid September
- Size: Medium
- Flowering: Mid season



#### Red Brandy

- Uses: Dessert
- History: Kilkenny
- Picking: Early September
- Size: Medium
- Flowering: Late



#### Kilkenny Pearmain

- Uses: Dessert or Cooker
- History: Kilkenny
- Picking: Late August – mid September
- Size: Large
- Flowering: Late



#### White Moss

- Uses: Dessert or Cooker
- History: Kilkenny, Clare
- Picking: Late August
- Size: Medium
- Flowering: Late



# Trees get the personal touch

This Clare farmer manages and shapes each tree in his forest. The rewards are substantial.

**Michael Sommers,**  
Forestry Development Officer, Teagasc  
Crops, Environment and Land Use  
Programme.

**T**here's a Chinese proverb – “The best time to plant a tree was 20 years ago. The next best time is now.” Martin Murphy from Cahermurphy in west Clare lives by it. He's a Christmas tree grower, firewood producer and a passionate pioneer of farm forestry.

Martin began planting trees in 1982. Since then he has won or been placed in the RDS forestry awards on numerous occasions. He's taken the science of growing trees to a new level that has not been achieved in Ireland. The local primary school has used Martin's forest in their Green Flag initiative. Martin's forest is mainly Sitka spruce.

The species is from the Pacific northwest of the United States and Canada. In 1831 it arrived in Europe. Today it accounts for 60% of the total forest area in Ireland and thrives on wet mineral soils.

When Martin started out in farming he wanted to utilise all of his land. So he planted the poorer parts first. “This was very poor peaty land,” he says. “Before planting there was a lot of purple moor grass and heather present. Both use up a lot of nitrogen, one of the key nutrients in tree growth.” In order to make use of whatever N was available in the soil Martin removed the heather and continued spreading fertiliser until the trees were able to compete with the natural vegetation.

## High pruning

High pruning is the systematic removal of a tree's lower branches. This allows knot-free timber. Conventional advice is for high pruning to commence after first thinning. But Martin began before thinning. He started in year 13 and continued pruning and thinning by chainsaw. He had a practical reason.

“From various trips and workshops I

concluded that the best way for me to thin was ‘complete selection’,” says Martin. “Most people thin forests in lines as it suits machinery. But I wanted to do my own thinning, sell my own product. I felt if I high pruned all the stems at canopy closure I could achieve this.

“Also I knew it would mean I wouldn't have to cut the lower branches when the tree was harvested. So it would mean less work for me with the chainsaw overall.”

## Harvesting

First thinning involves the removal of one third of the trees. Conventionally one line in seven is removed with some selection. Martin says his goal is to produce clean, knot free, saw log to 6m. “I never did a first or second or subsequent thinning. I continued thinning each year.”

Because the site was pruned initially to 4m, Martin could pick out the good stems and mark those to remain. The first few years he removed the weak, crooked and wolf stems (big stems with no form). This was done over a 15-year period until he got the spacing down from the 2,500 stems/ha planted to 500 stems/ha.

“It's the way farmers do it in Finland,” says Martin. “Only they do it over 50 years. (Trees grow much slower in Finland than here.) If it works near the Arctic Circle, I figured it would work in west Clare.”

## Minimise wind blow by extraction

Since 1990 most harvesting and extraction in Ireland has been done by specialised machines. Martin in contrast has used a chainsaw, tractor and winch. “I had a supply of shale so I made roadways through the stand of trees,” he says. “My idea was to avoid soil compaction. If I prevented this I'd reduce wind blow and be able to use the paths to extract timber.

“Canopy closure is also vital. The force of the wind doesn't cause wind blow (where trees fall over). It's holes in the canopy that funnel the wind that uproots the tree. My forest has no straight lines. It's all on selective and



crown thinning. I regard it as managing the crop so the wind becomes a help rather than a hindrance.” Has it worked? After 34 years Martin's trees were each 1.5 cubic metres. His is probably the only Sitka spruce forest on peat achieving this in Ireland.

## Firewood

For many years there was little de-





Michael Sommers and Martin Murphy.

mand for pulp material in west Clare. The big pulp mills are in the south east of the country and getting trees to them was uneconomical. "I wanted to sell the product myself so I went into the firewood business," says Martin. He went about marking, harvesting and marketing his trees.

When the trees were on the ground Martin winched them along his road

network to be stacked and 'season'. Sitka spruce is 55% moisture when cut fresh; not suitable to burn in open fires because it tends to spark. But once the moisture content is between 20% and 25% it's very suitable to burn.

"I cut trees into three-metre lengths and sold the logs," says Martin. "West Clare has a lot of wind, so I just used what we had here for free. And it

worked for me. Those buying the logs could cut them into whatever size firewood they wanted for their own stoves."

### Continued thinning

Martin states he had one major goal, to produce 6m knot-free sawlog. As trees got bigger Martin changed to "positive selective thinning" – competing trees, of similar quality to selected crop trees, are removed. Some of these logs were sold as sawlog and pallet. Bigger trees have been sold for telegraph poles and slated units.

### Clearfell

By March 2016, trees planted in 1982 were ready for clearfelling. This means removing all trees at the same time. It is tax free of income so it was the main payday. Martin says: "The only day price matters is at clearfell!"

However, the harvesting is not over. Martin is continuing to take firewood from the off cuts left behind. "There's timber still there I'm collecting it and drying it," he says. "People come to the yard for it."

### Re-establishment

One of the biggest costs associated with clearfelling is replanting. However, there were few branches on Martin's site because of the pruning he had done earlier on. Hence they don't need to be windrowed and taken off site.

Martin says he is surprised by the amount of natural regeneration. "I've a few years before I have to replant," he says. What I will do is look after the new saplings coming back and hopefully they will grow.

"I'll cut them back to get stocking to 2,500 stems per ha. Breeding with trees is the same as breeding livestock. The parents of these trees grew well in Clare so why not their offspring?"



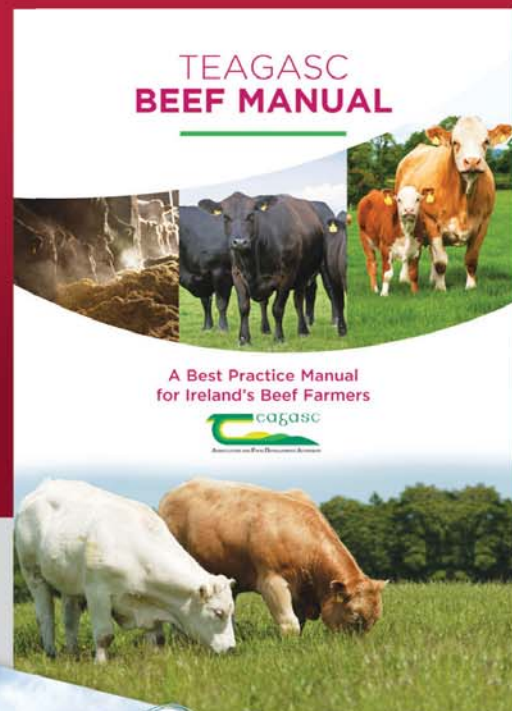
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