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Tuesday, 28 November - Lyrath Hotel, Kilkenny

8.30am  Registration and light refreshments

9.15am  Opening Address
John Moloney, Teagasc Regional Manager

9.20am  SESSION ONE:
Sustainable Milk Production
Chaired by: Kevin Twomey, Dairy Farmer & Chairman of Dairy Stakeholders Consultation Group
Speaker: Sean Molloy, Glanbia

10.15am  SESSION TWO:
GRASS10: Grow More - Graze More - Earn More
Chaired by: Michael O’Donovan, Teagasc
Grass10 Competition - Judges Report
Aidan Brennan, Irish Farmers Journal
Panel Discussion:
Aidan Brennan, Irish Farmers Journal
Grass10 Dairy Farmer National Winner, Eddie O’Donnell

11.15am  SESSION THREE:
People in Dairy
Chaired by: Dr. Noel Cawley, Teagasc Chairman
Structural change and its implications
Paidi Kelly, Teagasc
Managing through leadership
Margaret Dorgan, Management Consultant
Getting ready for spring peak
Phil Purcell, Dairy Farmer, Kilkenny

12.45pm  Lunch

2.15pm  SESSION FOUR:
Technical Updates
Chaired by: Dr. Frank O’Mara, Teagasc
Selective dry cow therapy
Dr. Aideen Kennedy, DAFM
Correcting soil pH with Lime
Dr. David Wall, Teagasc
Managing risk in your breeding decisions
Dr. Andrew Cromie & Kevin Downing, ICBF
Controlling iodine levels in milk
Dr. Stephen Butler, Teagasc
Lessons from the Next Generation Herd
Morgan O’Sullivan, Teagasc
Wednesday, 29 November - Kilmore Hotel, Cavan

8.30am  Registration and light refreshments

9.15am  Opening Address
        Con Feighery, Teagasc Regional Manager

9.20am  SESSION ONE:
        Sustainable Milk Production
        Chaired by: Eoin Lowry, Irish Farmers Journal
        Speaker: Michael Hanley, Lakeland Dairies

10.15am SESSION TWO:
        GRASS10: Grow More - Graze More - Earn More
        Chaired by: Joe Patton, Teagasc
        Grass10 Competition - Judges Report
        John Maher, Teagasc
        Panel Discussion:
        John Maher, Teagasc
        Grass10 Dairy Farmer Regional Winner, Ed Payne

11.15am SESSION THREE:
        People in Dairy
        Chaired by: Prof. Gerry Boyle, Teagasc Director
        Structural change and its implications
        Paidi Kelly, Teagasc
        Managing through leadership
        Karen Brosnan, Management Consultant
        Getting ready for spring peak
        Mark Cassidy, Dairy Farmer, Meath

12.45pm  Lunch

2.15pm  SESSION FOUR:
        Technical Updates
        Chaired by: John Kelly, Teagasc
        Selective dry cow therapy
        Dr. Aideen Kennedy, DAFM
        Correcting soil pH with Lime
        Ger Courtney, Teagasc
        Managing risk in your breeding decisions
        Dr. Andrew Cromie & Kevin Downing, ICBF
        Controlling iodine levels in milk
        Dr. Stephen Butler, Teagasc
        Lessons from the Next Generation Herd
        Morgan O’Sullivan, Teagasc
Seán Molloy
Director of Strategy and Supplier Development, Glanbia

Seán is the Director of Strategy and Supplier Development for Glanbia Ireland (GI). Seán joined Glanbia in 2007 having worked for eight years as a Strategy Consultant with PricewaterhouseCoopers (PwC). Prior to PwC, having graduated from the Agricultural Science Faculty at University College Dublin, Seán worked in the Corporate Planning Department at Ornua (formally the Irish Dairy Board). Seán was appointed as an Executive Director to the Board of Glanbia Ireland in 2016. Sean’s presentation will be available on the Teagasc Website (www.teagasc.ie) after the conference.
Michael Hanley

Group Chief Executive, Lakeland Dairies.

Michael Hanley is Group CEO of Lakeland Dairies. A highly experienced dairy industry figure, he previously held various senior management positions with Lakeland Dairies since its formation in 1990, including deputy chief executive, general manager of Northern Ireland operations, general manager of dairy operations and manager of member relations. He is originally from a farming background and is an Agricultural Science graduate of University College Dublin. He is also Chairman of County Cavan Enterprise Fund. Lakeland Dairies is a farmer owned dairy co-operative processing over 1.2 Bn litres of milk annually into a wide range of dairy foodservice products and food ingredients for export to 80 countries globally. The co-operative operates across 15 counties on a cross border basis.

Michael’s presentation will be available on the Teagasc Website (www.teagasc.ie) after the conference.
Lessons learned from the Dairy finalists of the Grassland Farmer of the Year Competition 2017.

John Maher (Grass10 Campaign Manager, Teagasc) & Aidan Brennan (Dairy Specialist, Irish Farmers Journal)

Summary

• The objective of the Grassland Farmer of the Year Competition is to promote grassland excellence for all Irish livestock farmers.

• Each of the farms we visited had a “grass station.” This was an area where the farm monitored and managed grass. What you don’t measure you can’t manage, so measuring is the first step to improving performance.

• Almost every farm assessed in the Competition has many soils that were below optimal soil fertility. This is reflective of the huge challenge the grazing industry faces.

Introduction

Grazed grass is the cheapest and most widespread feed for ruminant production systems in Ireland (Finneran et al., 2010). As an abundant natural resource, grass provides Irish farming with a significant competitive advantage for milk and meat production (Byrne et al., 2015). Grass enables low-cost animal production and promotes a sustainable, green, and high quality image of milk production across the world. Recent industry reports (FoodHarvest 2020 and FoodWise 2025) have highlighted the important role grass can play in an expanding milk production industry. Through a combination of climate and soil type, Ireland has the potential to grow large quantities of high quality grass and convert it through the grazing animals into high quality grass based milk and meat products.

Our competitive advantage in milk production can be explained by the relative cost of grass, silage and concentrate feeds (O’Donovan et al., 2011). Therefore, the focus on increased production and efficient utilisation of grass should be the main driver for expansion of the livestock sector. An analysis of farms completing both grassland measurement in PastureBase Ireland and Profit Monitor demonstrated increased profit of €181/ha for every 1 tonne DM/ha increase in grass utilised. It should be noted that issues such as environmental sustainability (carbon footprint, nutrient use efficiency, etc.) are also improved by increased grass utilisation.

Future growth in pasture based milk production in Ireland will depend on an effective grass-based system. However, Irish farmers are not using grass to best effect and there is thus a need to (1) increase grass production; and, (2) ensure efficient utilisation of that grass.

Current Grazing Performance on Dairy Farms

Currently, it is estimated that about 7.8 tonnes grass DM/ha is utilised nationally on dairy farms (Dillon, 2016). The level of progress in pasture utilisation is outlined in the table below from Teagasc NFS data.
It is obvious from the Table that the level of progress to date is low, at about 0.2t DM/ha/year in grass utilisation. So there are major improvements required in the areas of pasture production and utilisation. Data from the best commercial grassland farms and research farms indicate that the current level of grass utilised can be increased significantly on dairy farms (greater than 10 t DM/ha utilised – i.e. 14 tons DM/ha grown and 75% utilisation rate).

It is important to recognise that improvements in the level of soil fertility, grazing infrastructure and level of reseeding are crucial in achieving higher levels of grass production and utilisation. However to achieve greater change in the level of grass utilised, farmers will need to upskill their grazing management practices. This means regular measurement of grass cover, using specialised grassland focused software to analyse grass production and, making and implementing grazing management decisions. These are key drivers to increasing grass production on the farm. New technologies are now available which make grass cover assessment and the decision making process much easier.

**Grass10 Campaign**

Grass10 is a new four-year campaign recently launched by Teagasc to promote sustainable grassland excellence. The Grass10 campaign will play an important part in increasing grass growth and utilisation on Irish grassland farms, thereby improving profitability at producer level and helping to ensure the long term sustainability of Irish beef, dairy and sheep production. Significantly, it can provide the platform or framework to enable various industry stakeholders to collaborate for collective action. Given the current performance in terms of grass growth and utilisation, the need for ‘collective action’ should be clear.

<table>
<thead>
<tr>
<th></th>
<th>2014-2012</th>
<th>2013-2011</th>
<th>2012-2010</th>
</tr>
</thead>
<tbody>
<tr>
<td>Dairy – all farms</td>
<td>7.15</td>
<td>7.03</td>
<td>6.97</td>
</tr>
</tbody>
</table>

**Table 1. Grass utilisation (tonnes DM/Ha) for Irish dairy farms**
(Source: Teagasc NFS, various years)
Objective

The objective of the campaign is to achieve 10 grazings/paddock/year utilising 10 tonnes grass DM/ha. In order to achieve this objective, we will need to achieve significant changes in on-farm practices, specifically:

1. Improved grassland management skills;
2. Improved soil fertility;
3. Improved grazing infrastructure;
4. Improved sward composition;
5. Increased grass measurement and usage of PastureBase Ireland.

Grassland Farmer of the Year Competition

With 2017 designated the Year of Sustainable Grassland, and an established link between increased grass utilisation and increased profitability, the Department of Agriculture, Food & the Marine, in collaboration with numerous industry stakeholders including Teagasc, recently launched a Competition as part of the Grass10 initiative to find the Grassland Farmer of the Year. Teagasc research indicates that grass utilisation can be increased significantly on Irish farms. With this background, Grass10 has launched a grassland competition to recognise those farmers who are achieving high levels of grass utilisation in a sustainable manner. Practises used by these famers to increase grass production and utilisation, include soil fertility management, sward renewal, grassland measurement and improving grazing infrastructure.

The objective of the Grassland Farmer of the Year Competition is to promote grassland excellence for all Irish livestock farmers.

Lessons from the Competition

Judging for the Grassland Farmer of the Year Competition commenced in September 2017. There were seven categories in total between the three sectors, dairy, beef and sheep and three regional categories of Munster, Leinster and Connaught/Ulster along with a young farmer category. For the purposes of this paper, we will focus on the dairy finalists.

There were nine dairy finalists in the Competition in total. Four were in Munster, four were in Leinster and one in Connaught. Obviously, all of the farms visited all had certain commonalities to be shortlisted for a visit by the judges:

1. They were growing a lot of grass;
2. They had to be measuring grass for a number of years;
3. They had to be achieving a large number of grazings.

The level of milk solids output was also considered. Table 2 outlines the average physical farm performance of the dairy finalists of the Grassland Farmer of the Year Competition.

<table>
<thead>
<tr>
<th>Farm Performance</th>
<th>2016</th>
</tr>
</thead>
<tbody>
<tr>
<td>Milk Solids/ha (kg MS/ha)</td>
<td>1,514</td>
</tr>
<tr>
<td>Stocking Rate on Milking Platform (LU/ha)</td>
<td>3.38</td>
</tr>
<tr>
<td>Overall Farm Stocking Rate (LU/Ha)</td>
<td>2.74</td>
</tr>
<tr>
<td>Six Week Calving Rate (%)</td>
<td>82</td>
</tr>
</tbody>
</table>
Further similarities surfaced when we arrived on the farms. The first thing to note was that, each of the farms we visited was neat, tidy and very well maintained. While this doesn’t have any real impact on grass growth or profitability, it does show that the farmers had respect for their workplace and understood that it is a place where food is produced. Therefore standards of farming had to be high. The year 2017 is designated the Year of Sustainable Grassland and these farmers are great ambassadors for sustainable farming. The key to sustainable farming is growing and eating high volumes of grass per hectare.

**Setting yourself up to grow lots of grass**

Each of the farms we visited had a “grass station.” This was an area where they monitored and managed grass. What you don’t measure you can’t manage, so measuring is the first step to improving performance. The grass station on most of the farms we visited was in the dairy and it was as simple as a farm map, a place to keep the plate meter or clippers and quadrat and a place to access the grass measurement software PastureBase (or Agrinet). Along with the map of the farm, most of the farmers also had a soil fertility map and a fertiliser map to record where the fertiliser is to be or has been spread. So these farmers had their farm mapped, they had the map displayed prominently so everyone working on the farm could see it and they used the map to make decisions easier. Decisions such as how many grazings to get out of the paddock or how many bags of fertiliser were required were made simple by referring to the maps.

**Soil fertility**

Good productive soils are the foundation of any successful farming system and key for growing sufficient high quality grass to feed the herd. However, almost every farm assessed in the Competition had many soils that were below optimal soil fertility. This is reflective of the huge challenge the grazing industry faces. The national average figures for soil fertility show that 65% of the soils are deficient in lime, 62% are deficient in phosphorus (P) and 57% are deficient in potassium (K). While all of the farms were better than the national average for soil fertility, none of the farmers had all of their farm at optimum level and this was an area of concern for the judges and also for the industry.

The Competition assessment did not rate the farmer on their soil fertility, instead it rated the farmer on their knowledge of soil fertility and the actions undertaken to try to address it. Each of the farmers had a plan in place to improve soil fertility and most had been implementing this plan for a few years. The starting point for this plan was to carry out soil tests to establish the status of their fields. The oldest soil sample test report received was from December 2015 and every farmer said they were going to soil sample again this winter. This suggests that the farmers are soil sampling every two years which the judges feel is the minimum interval needed to be able to react to changes in soil fertility status.
Soil pH was the first item to be tackled. Each of the farms was spreading lime where required. The quantity of lime being spread on some of the farms was high with some fields needing 2t/acre every year to bring it up to target pH of 6.3. Some of the farmers commented that they got a return from the lime in terms of extra grass growth and they felt that the farm was more responsive to fertilisers after the lime went out. Of course the big advantage of lime is that it makes other nutrients more available in the soil, so this is probably why they felt they got a response to it.

While the trends in soil pH were moving in the right direction, trends in P and K were not as positive. Phosphorus levels in particular were very disappointing on some farms and it was really felt by the judges that failure to correct the deficiency was going to limit grass production. It must be borne in mind that the farms in the Grassland Farmer of the Year competition were top performing farms achieving high output from grazed grass and not feeding high levels of supplement. While this is a good thing, it also means that offtake from the farms was high in terms of milk solids output. Therefore these farmers had to return nutrients to their soils. The starting point for this was with slurry, with all farms spreading most of their slurry in springtime. Secondly, compound fertilisers such as 18:6:12, 0:10:20 and 0:0:50 were common place with less emphasis placed on lower P and K containing compounds.

Grazing infrastructure

Proper subdivision of grazing land into paddocks is essential to successfully manage pastures and achieve desirable rotation intervals. Paddocks must be connected with an efficient roadway system so that the herd can move from a paddock to any other paddock on the farm. A well designed and carefully built farm roadway system has many benefits including less lameness, faster and easier stock movement, cleaner cows to milk, less roadway maintenance and more efficient paddock access.

A good water supply is extremely important for milk production, health and welfare of livestock. The water supply system must be good enough to supply adequate water needs in paddocks, parlour and dairy.

We assessed the grazing infrastructure on each of the finalist’s farm as part of the judging process. Generally speaking roadways, paddocks and water supply was good on the land close to the parlour. However, on the extremities of the milking platform often roadways and paddock structure were inadequate. While these areas were grazed less often, they are grazed at the shoulders of the year and at times when grazing conditions are more challenging, so good infrastructure is critical.

In terms of paddock size, most of the farms were aiming for 36 hours per paddock for better animal performance. On larger farms where field size was an issue, the farmers were making gaps in hedges to join fields together.

Grassland Management

PastureBase Ireland is informing us that farmers need to have a good control of current grass supply in order to manage grass well. Grass cannot be managed correctly without knowledge of farm cover, grass demand and grass growth. The crucial point on any farm is utilising the feed resource produced on the farm.

The average number of grass measurements by the finalists was 40 per year. This shows that the farmers are constantly monitoring grass growth and supply which enables them to graze grass at the right cover which in turn allows them to grow more grass as re-growths are faster. Table 3 outlines the average grazing performance of the dairy finalists of the Grassland Farmer of the Year Competition.
Table 3. Grazing performance of competition finalists in 2016.

<table>
<thead>
<tr>
<th>Grazing Performance</th>
<th>2016</th>
</tr>
</thead>
<tbody>
<tr>
<td>Grass production (t DM/ha)</td>
<td>15.5</td>
</tr>
<tr>
<td>No. grass measures completed/yr</td>
<td>39</td>
</tr>
<tr>
<td>No. of grazings/paddock/yr</td>
<td>8.2</td>
</tr>
</tbody>
</table>

The average number of grazings being achieved was 8 on the finalists’ farms. If we include the paddocks cut for silage as well as grazing, the figure is close to 10. Maximising the number of grazings achieved on each paddock is a very effective method of increasing farm grass utilisation. Every extra grazing/paddock achieved increases annual grass DM production by 1.5 t DM/ha (O’Donovan et al., 2015). PastureBase Ireland enables the farmer to keep track of grass growth per paddock, the number of grazings per paddock and the quantity of grass being consumed at each grazing. This highlights poor performing paddocks and deficiencies in grazing management.

The view from the judges is that none of the farmers visited were doing anything spectacular in terms of grassland management, including the overall winner. Rather, they were doing the basics brilliantly. None of the farms visited were feeding concentrates to get more milk, instead they were managing grass to increase milk solids per hectare and putting in feed when necessary. Decision making was driven by grassland measurement and not by animal performance.

Significant change is required in the grassland management practices of Irish livestock farmers to ensure that Irish grassland farming systems remain competitive and sustainable. Teagasc recognises that the co-operation and collaboration of a range of organisations and stakeholders is required to achieve the changes required right across the industry.

Grass10 wishes to acknowledge the support of our industry stakeholders in this new campaign.
Five key factors affecting growing and utilizing more grass on our farm

Eddie & Denis O’Donnell, Golden, Co Tipperary

Introduction

I am farming with my wife Fiona and my parents Denis & Nora in Golden, Co. Tipperary. We have 2 employees Jeremy Furlong and Philip Roche. We milked 318 cows in 2017 on 116ha of milking platform split between two farms which is made up of both owned and leased land. We farm another 44ha (owned and leased) which is used to graze the 100 livestock units of replacement stock we rear in four separate parcels. The land is mainly free draining soil with some heavier land on two of the locations. We farm a predominantly Friesian/Jersey crossbred herd through a grass based system targeting 500kg milk solids/cow with concentrate input approximately 500kg/cow per year. The objective is to produce milk sustainably from grass.

The grassland management employed on the farms is based around a number of cornerstones:

- Soil fertility;
- Reseeding;
- Infrastructure;
- Grass measurement;
- Management.

Soil fertility

It is an essential part of grassland farming to have the correct pH and to have the soil index for P and K at index 3 or 4. For this reason we soil sample the farm every two years and this helps us keep on top of changes as they occur. We have noticed K level dropping quickly in paddocks that are harvested for surplus baled silage, so we try to avoid taking bales or silage off lower K index paddocks. We put a fertiliser plan in place annually, and stick to it by spreading fertiliser when it has to be spread and the right amount of it. We have colour coded maps up in the dairy which indicate the soil index of the paddock so we can target more parlour washings and slurry to the lower index ones. This map also help us avoid taking bales from them by making sure the cows graze them at the correct pre-grazing yield thus leaving the right post-grazing height.

Re seeding

We have reseeded all of the milking platform and one of the young stock farms over the past seven years. We select the paddocks for reseeding from the cumulative growth chart at the end of the year and we aim to reseed in spring as we find this as the quickest turnaround time with the least risk. We are part of the grass variety monoculture trial in Moorepark and have sown only monocultures on the milking platform for the past five years and three way grass varietal mixes on the out farm. We grow many different varieties across the farm.

Infrastructure

There is no point in growing lots of grass if it can’t be consumed by the cow. We have put in extra roadways and water tanks on the farms over the last five years. As cow numbers have increased, demand for water obviously increased so we had to install bigger piping from the yard and extra tanks in the paddocks. The infrastructure plays a big part in grass utilisation especially in spring by
helping us get out to grass for almost every milking once cows start to calve. We also use reels to create single file spurs off the roadways at the ‘shoulders’ of the year to get the cows in and out of paddocks if underfoot conditions are wet.

**Grass measurement**

We began grass measuring on the farm in 2004. We walk the farm weekly during the early part of the grazing season and twice weekly during the main season when growth is highest. There are several reasons for grass measuring:

- We aim to use grass well;
- We need to know how much we have;
- It gives us higher milk solids yields;
- It helps to lower the cost of milk production;
- It facilitates ease of management in a simple system.

As we know what the farm is growing we can establish the correct stocking rate for our farm. It also identifies underperforming paddocks and we can predict when a surplus or a deficit is arising which helps us to avoid wasting grass by keeping the quality of grass in front of the cow consistent. We will complete up to 50 walks on PastureBase Ireland this year. Everyone on the farm can complete a grass cover. The crucial part of is the decisions that are made from producing the grass wedge or in the shoulders of the year the average farm cover.

**Management**

Management is all about timing on our farm. We have set cover targets for different stages of the year e.g. closing cover of 700 kg DM/ha on December 1st. We have targets for the percentage of the farm grazed at different times in spring and autumn. For example we aim to start the second rotation on April 1st. In order to do that, we need 40% of the farm area grazed by March 1st to have enough growing back for April 1st. A week can make a big difference on a grass based farm from running into a surplus or into deficit quickly so when you have information you need to react by removing surpluses or supplementing depending on the situation. We will graze each paddock more than 10 times this year. The only way our farm can do this is by having a number of 16-18 day rotations during the main growing season.

**Conclusion**

We feel that we’re not doing many things different from most farmers. However we feel that timing mixed in with all the ingredients above can make a farmer grow and more importantly utilise more grass on their farm. I’d like to thank our Teagasc Advisor Sandra Hayes who is always there if we have a question or query on anything. Discussion groups play a big part on our farm and we’re involved in four, and learn something from all of them. We are very lucky in Ireland to have a world class facility in Moorepark demonstrating and researching best practice.
Five key factors affecting growing and utilizing more grass on our farm

Payne family, Tulsk, Co. Roscommon.

Introduction
At what stage do new entrants to dairying stop addressing themselves as such? If it’s a point where they stop making mistakes, then we are most certainly still new entrants. We made the decision to convert our family farm of beef, sucklers and sheep to dairying in 2009 and milked our first cows in 2011. Together with my wife, our two kids and my parents, I now run a spring calving, grass based system of high EBI cows. Since starting to milk in 2011, we have grown our herd, developed and enhanced our skills of grassland management as well as learning from some of our mistakes. Our road to growing and using more grass has been driven by the factors listed below as well as many others.

Get your head in the game
One of the hardest parts of grassland management is persuading yourself it can be done. Continually, year on year, pushing yourself out of your comfort zone. Be it the first day at grass, rotation length, last day at grass or amount of fertilizer used, you only get one chance every year to learn something about your farm you didn’t know the same time the previous year. For us once we got bitten by the “grass bug”, chasing and grazing more grass and in turn cow performance became not only enjoyable but addictive. Looking back now on the few short years we have been milking, we don’t regret one grazing that we did but we regret many that we didn’t.

Team effort
We have an excellent Teagasc advisor, a very strong team of employees and are active members of discussion groups. These are all key to grass being a strong part of the mentality in the workplace, the energy levels are kept high with staff keen to learn and push things, we are continuously challenged by targets from our advisor and within the groups we have great farms to benchmark against and share knowledge with. All employees on the farm are trained and capable of doing a farm walk. Communication is key between all staff members and all grass decisions are made as a team and advice is sought when needed.

Measure to manage
You can know all the theory, you can have the fertiliser spread at the right times, the cows calved compactly and the perfect farm roadways but without knowing what grass is on the farm, is like going to war not knowing how many soldiers you have. We complete a closing cover shortly after cows are housed and an opening cover in mid-January. Once cows go to grass in early February we measure once and sometimes twice a week for the remainder of the year. We have measured more than forty times per year for the past four years. This is the information that has allowed us to make the correct decisions at the right time to keep the best quality feed in front of our cows.

Soil fertility
Soil samples are taken annually on the milking platform and bi-annually on all other fields. These up to date soil samples allow us to apply the correct amounts of the appropriate fertilizer to build
indices. It is also important to identify the areas of the farm that are already at optimum soil fertility and manage them to their full potential of grass production. The grazing platform now has an average pH of 6.5 with all paddocks testing in the 6's except one at 5.9. Paddocks with optimum soil fertility, but continually underperforming for yield, are considered for reseeding.

**Infrastructure**

Infrastructure at its core is an aid to assist with that mental decision that you can graze on or after a particularly wet day or in a certain odd or awkwardly shaped field. Our farm was set up for a smaller number of cows than is on it now, so paddock sizes have been increased which as a result has meant we have good access to nearly all the fields. Every year we invest in new spur roads to allow for more extended on/off grazing, as well as upgrading and repairing parts that get regular flow.

**Conclusion**

The future plan is to continue to ask questions of ourselves as to how we can grow and utilise more grass on our farm and sell it in the form of milk solids in as sustainable a manner as possible. Stricter management of mid-season rotation length is an area where we can make improvements. We are always looking to learn and with access to the wealth of research in Teagasc we must be willing to adopt what research we can on our farm. Since we started milking in 2011, the farm has gone through big changes and challenges but it’s with thanks to all the people involved along the way that has allowed continued growth. Second to the people our ever-increasing reliance and knowledge of grass has become the foundation of the business upon which everything is built.
Structural change and its implications for Irish dairying

Paidi Kelly, Teagasc Animal and Grassland, Research and Innovation Programme, Moorepark, Fermoy, Co. Cork

Summary

• In 2017 dairy cow numbers in Ireland will average close to 1.4 million, a 350,000 cow increase compared to 2010 levels and current trends are for continued growth.

• Future expansion is likely to rely on accessing land through leasing or collaborative models, new investment in farm facilities and relying on more hired labour. Hence more due diligence and planning is needed.

• Reviewing how work is organised and executed on the farm is crucial as herd size increases, many adaptations need to be made to ensure a good quality of life for both farmers and employees as cow numbers increase.

• This expansion and structural change is creating a sizable demand for employed labour – to attract people to work on your farm you need to be seen as an employer of choice offering a work place of choice.

Introduction

This paper will review the structural change to Irish dairy farming over the recent expansion period and will outline key points for consideration if looking to run both a profitable and enjoyable businesses.

Structural change is nothing new to Irish dairying. While milk quotas meant national production remained constant for 30 years, there was significant change at farm level. Since milk quota introduction in 1984 the trend has been for a reduction in the number of farmers but an increase in the cows per farm. This meant that average herd size has been gradually increasing and a greater and greater proportion of the milk is coming from larger scale farms. In 2014 37% of the national milk pool was being produced from farms selling >450,000 litres (milking approx. 90 cows), up from just 3% in the Year 2000.

However the pace of this restructuring has changed significantly due to milk quota removal. Firstly Ireland’s milk production has increasing rapidly for the first time since 1984. 6.7 billion litres of milk was produced in 2016, a 35% increase on the 2007-09 base level of production used to set the Food Harvest 2020 target of 50% extra milk. Record levels of milk are being produced again in 2017 so the 50% target looks like it will be achieved well ahead of 2020.

This extra production has come from an extra 350,000 cows (2017 average cow numbers likely to be 1.4 million) as well as an increase in productivity per cow. By the end of 2016 there was a 42% increase in milk solids production against the 2007-09 base, due in part to farm level improvements in fat and protein %. This indicates that improvements in both scale and operating efficiency (better genetics and grassland management) are contributing to the increase in production.
While milk production has increased nationally, more important is the change seen to key factors which drive competitiveness at farm level; debt per kilo of milk solids has actually reduced during this period and cost of production has decreased slightly as the extra production is predominantly coming from grazed grass. Maintaining a strong focus on producing milk from grazed grass is essential to keep Irish dairying competitive at a global level.

**Structural change**

The increase in cow numbers has led to a significant increase in average herd size which was 76 cows last year, up from an average of 58 cows in 2010. The growth was particularly significant from 2014 to 2017; over 200,000 cows were added to the national herd in this short time (see Figure 1). There has been a particularly significant increase in herds milking greater than 100 cows. In 2016 nearly half of all cows were milked in herds of greater than 100 cows. This number increased by over 50% from 2013 to 2016 indicating a rapid change in farm structure. There were approx. 4,200 farmers milking greater than 100 cows in 2016 and average herd size amongst this group is 155 cows. In 2005 there were just over 1,000 farmers milking 100 cows or more in Ireland so dairy farming at large scale is something that is relatively new to the industry. The increase in the number of farmers milking greater than 100 cows is one of the key drivers of the dramatic increase in demand for both full and part time employees.

For the first time in 40 years, the number of dairy farmers in Ireland has stabilised. In 2010 there were just over 18,000 dairy farmers in Ireland and in 2016 this was still the case. The number of new entrants getting into dairy farming is happening at a similar rate to farmers choosing to retire. Further expansion of Irish dairy farming is on-going. More dairy heifer calves were born in Ireland in 2016 than any of the previous years leading up to milk quota removal, so a further increase in cow numbers is likely in 2018. The profitability of dairying v’s other farming sectors is leading to continued conversions to dairy farming which will further drive milk production increases. Government policy on long term leasing tax incentives is encouraging more farmers to consider leasing their land long term.

In the Teagasc ‘People in Dairy Report’, an increase of cow numbers to 1.6 million by 2025 was
predicted with the milk pool growing to approx. 8.3 billion litres. It is quite possible that actual growth could far exceed this prediction (there were 1.55 million dairy cows in Ireland in 1984 just before milk quotas were introduced). To facilitate this expansion, it is projected that over 6,000 people will need to enter Irish dairying over this period creating significant employment opportunities in rural Ireland. Hence Irish dairying needs to carefully manage this re-structuring process to ensure we remain competitive in future years.

In the remaining part of this paper, we will explore five key considerations for Irish dairy farmers given this dramatic change in farm structure. These are:

1. Carefully plan further expansion;
2. Dairy farming can provide a good lifestyle;
3. Managing the increased workload;
4. Become an employer of choice offering a work place of choice;
5. Will succession happen in or outside the family?

1. Carefully plan further expansion

It could be argued much of the more straightforward expansion in the country has taken place. Many farmers had scope to increase stocking rate on the milking platform while still maintaining a high reliance on grazed grass. On many farms, development costs for extra cows was kept down by being able to convert dry stock housing to that suitable for dairy cows.

If further expansion is a goal in the future (the reason for which should include lifestyle and financial targets and should be shared amongst the family), then there are likely to be a number of challenges. It is likely that further land for expansion will be acquired via collaborative farming models or land purchase. This requires building effective relationships with land owners and carefully planning the financial implications of acquiring more land. Further expansion is also likely to mean relying much more on other people in terms of either full or part time employees, using contractors for machinery work and/or contract heifer rearing. This requires excellent communication and organisational skills. Hence the skills required to achieve further expansion may be very different to the skills needed to expand to date.

2. Dairy farming can provide a good work life balance

The extra 350,000 cows in the country have obviously created a huge amount of extra work on farms. How this work is managed has a huge effect on the business in terms of the farmers work life balance, the time he has to make important management decisions etc. Dairy farming is a business that can deliver a very attractive way of life, if the work practice adopted match the scale of farming. This may involve re-thinking our approach to work on some farms.

The nature of farming means long, difficult working hours are inevitable at certain times of the year, but probably less so than we currently accept. Work practices such as regular start and finish times, earlier finishing times (ideally before 6pm), a reduction on the overall workload being taken on by individuals, and taking more regular time off away from the farm need to become more common to make dairy farming more attractive. It will be challenging to implement these practices at a time when the workload on farms is actually increasing as cow numbers rise, hence the need to review all work practices on farms as herd size changes (see Point 3 – managing the increased workload).

Indeed it could well be argued that there should be no such thing as a ‘one person’ farm – regardless of the number of cows being milked; for the simple reason that every person requires a break. What kind of time off would the next generation like to see in farming to encourage them to consider it as a career? Would every second weekend off be the minimum that they would accept? If so, then even a ‘one person’ farm would require at least 1.2 labour units for the year to allow the owner/operator to take time off.
3. Managing the increased workload

Traditionally it’s been possible for farmers to complete most of the work on a dairy farm themselves. Increased herd size, along with improvements in six week calving rate which concentrates the spring workload, means this is no longer possible for many.

It is crucial to review the farming system, farm facilities and work processes on the farm and ask are these suited to the scale you are farming at?

Features of labour efficient farms:

• Simple farm system that can be easily communicated and operated by others;
• Minimum number of enterprises on the farm (e.g. sale of all surplus calves and contract rearing replacements);
• Suitable cow type that requires minimum individual attention;
• An appropriate calving date and stocking rate for the farm that minimises the need for supplementary feed (reducing both workload and farms costs);
• Good grazing infrastructure that facilitates easy movement of animals to and from grazing by a single operator;
• Adequate well organised farmyard infrastructure that facilitates the easy movement of stock, particularly at calving and calf rearing.

While hiring either full or part time labour is one method of managing the increased workload (see Point 4), it will also be crucial for dairy farmers to build effective working relationships with others to reduce the work that the farm team must complete.

Contractors are playing a major role in reducing the workload on many farms. More and more non-dairy farmers are considering contract rearing as a means of improving their own farm incomes. Both these groups are crucial stakeholders for Irish dairy farmers to build up effective relationships with. Clear and open communication and regular payment are two key aspects of ensuring these stakeholders remain interested in working with dairy farmers.

4. Become an employer of choice offering a work place of choice

If Irish dairy farmers are going to attract the people necessary to continue expanding, then there are two key questions to be asked:

• What are you like to work for?
• What is your farm like to work on?

These two questions are central to the future success of the industry. To date the industries main focus has been on technical aspects of efficiency – cows and grass. Going forward dairy farmers also need to think about skills like communication, delegation, organisation and planning etc. These skills are not only important for dealing with employees, contractors etc. but can also lead to more effective and harmonious work relations between family members.

It also requires a change in mind-set to view your farm as a place of work for another person, as opposed to the place where you grew up, inherited and hope to pass on in time. Having facilities that can effectively cater for cow numbers on the farm is crucial but so are adopting proper work practices like rostering, white boards for communications, written instructions for key processes on the farm e.g. operating the milking machine etc. It’s also crucial to consider people have different ways of working; being flexible around how a job is done, as long as it’s done right, is an important trait to have as a manager.

If dairy farmers are enjoyable people to work for and dairy farms are enjoyable places to work on, then the industry will be in a very strong position to attract the people it needs in the future. There is no doubt that this will be a challenge at a time when unemployment rates are reaching record lows once again.
It’s important to have an open mind in terms of the wide variety of people who may be interested in some form of employment on dairy farms. Many dairy farmers have struck up successful working relationships with local non-dairy farmers who are interested in earning extra income. It is important to note that to have regular access to good people, you may need to offer them more work than absolutely necessary so that they don’t get frustrated by a lack of work and seek employment elsewhere.

Any person with the right attitude can learn the skills needed to work on a dairy farm, even if coming from a non-farming background. While Teagasc no doubt has a large role to play in up-skilling potential farm employees, so too must every employer take an interest in the skills of their employee. Hence as an employer, farmers must acknowledge their own role to play in up-skilling employees.

5. **Will succession happen in or outside the family?**

A new structure to Irish dairying is that the person who owns the farm no longer must be the person that farms it. Milk quota removal and increased scale has created more viable farming businesses of larger scale where there is a potential income for two people. Even though quotas have been abolished for only a short length of time, there are a number of successful examples right across the country of people working together in leasing, partnership and share farming arrangements which deliver benefits to both parties.

This should deliver huge hope both to young people who have a passion for dairy farming but don’t have ready access to a dairy farm, and also to all Irish dairy farmers who may not have a successor in the family. There is a new generation of ambitious, skilled and motivated young people entering Irish dairying who are ideal candidates to work with in the future.

**Conclusion**

Irish dairy farming has changed dramatically and will continue to change for the foreseeable future. Future expansion requires high levels of planning when working with farm owners and new employees. Farming at larger scale requires a different approach to how work is done on the farm, and by whom. To attract people to a career in dairying we must ensure it provides an attractive lifestyle, that dairy farmers are enjoyable people to work for and the dairy farms are enjoyable places to work on. Lastly changing farm structures means we need to re-think our approach to farm succession and be open to the benefits of collaborative farming.
Managing through leadership

Karen Brosnan, Margaret Dorgan, Management Consultants

Introduction:
As farms in Ireland expand, the demands on the farm system for greater efficiencies of cost, processes and labour are challenging farmers to review their operations and to lead and manage more effectively. Leadership is a journey that starts with knowing and managing oneself so that one can in turn, manage others. The starting point of effective leadership is effective communications, so that the farmer can bring people with him/her on their journey. It is important that a farmer considers what his purpose and goals are so that he can communicate to a potential staff member what he feels are the strengths of the farm, and what that staff member might gain by working there. Communication of goals and expectations create the structure for staff to align themselves and deliver.

Food Harvest 2020 details a strategy that incorporates the development of leaders and skill sets in agri-food, new working relationships, collaborations and convergences, and greater partnership between industry and science, along with the creation of new product streams and the enhancement of productivity and competitiveness. It asserts that over the coming decade, current knowledge dissemination infrastructure for the agri-food sector could be further harnessed as a resource for continuous life-long education among the farming community. (Food Harvest 2020, p.4). This national strategy drives a leadership journey of personal and staff management, it also supports and embeds positive people management behaviours.

Ensuring a culture of continuous development and open communications allows farmers and staff to clear up issues and focus on effective farm management. An effective people management approach can dramatically impact your business results. It improves performance, productivity and safety, by supporting staff’s understanding of what is required of them. It keeps staff focused, satisfied, engaged and committed to their work, thereby benefitting from retaining staff, increased farm safety and a positive working environment. All of these outcomes can be measured by having clearly set out objectives and processes when engaging a new labour unit.

This paper is divided into 2 sections; a review of best practice approaches from other farms and business outline leadership skills required to manage staff well. The second section provides 3 simple tools to develop (i) on-farm communications, (ii) evaluation/reflection skills & (iii) staff engagement. These are simple, practical approaches to engaging with staff at different stages of their employment. The tools include step-by-step approaches outlining how to introduce tasks to new employees in order to set performance expectations, how to deliver on-the-job training to employees, and how to evaluate employee performance based on the conversations and agreements made when they start in their jobs.

Section 1 – Leadership Skills and Styles

Developing Leadership and Management skills
A critical step in leading and managing employee/s is to continually work on improving the communications that take place on your farm. Whether it is to induct new staff, to discipline or to train employees, to motivate them, or to implement a new system of practice, communication is the key factor in any successful farming operation.

The importance of communication needs to be viewed as a core value or guiding principle in your
farming business. Effective communication is something that should be expected as standard and in turn rewarded. Simple steps to improve communication on your farm can be taken by regular ‘ask not tell’ conversations, which can remove communication barriers, and help farmers to maintain composure and remove misconceptions that may have been generated.

Gaining a strong understanding of both their leadership style and communication methods will help farmers relate to their employees and improve farm productivity, as well as the job satisfaction level of employees. Better communications can be achieved by implementing the use of different communication instruments such as visual aids (e.g. laminated standard operating procedures, profit monitor print-outs, milk recording data etc.) and regular meetings with staff to help strengthen the understanding of expectations and farm processes.

Farmers need to commit to making effective communication a priority and one of the core skills of their leadership and management capacity. Once effective communications are established, other areas of management, such as staff safety, managing cultures and creating job satisfaction will more easily fall into place. Becoming an effective leader and communicator is an on-going journey and by developing these skills you will be working to develop healthy work relationships and increase farm performance and profit.

**Different Styles of Management / Leadership:**

One of the main factors that influences people management and communications on farm is the leadership style of the owner/farmer/farm manager. In order to lead best practice for your business it is imperative to acknowledge and be aware of your own style of management. Per Hay and McBer, most people are a combination of the management styles below. A direct conversation with yourself will identify the most appropriate approach to getting the results you need from your employee.

- Pace-setting – “Do it myself” Manager
- Participative / Democratic – “Everyone has input” Manager
- Authoritative – “Firm but fair” Manager
- Directive / Autocratic – “Do it the way I tell you” Manager
- Affiliative – “We are all friends’ Manager
- Coaching – “Developmental” Manager

**Motivation:**

People feed on purpose and autonomy. Leading business thinkers from Daniel Pink, Gary Hamel and Simon Sinek concur on this point, when people feel motivated and engaged, when they have some freedom to choose and feel like they are working towards a larger purpose they in turn are more motivated to jump in. The cost of not keeping people motivated is significant to your bottom line as people are more likely to leave your employ and bad mouth you as an employer in turn damaging your business's reputation. Motivation through accountability leads to: Improved performance, increased participation, morale and commitment.

**Managing Performance:**

A strategic approach to people management will include a detailed application of the list below. In order to really get the most out of your employee you need to plan clearly in advance. Ask prompt questions of yourself such as. What does success look like? What are my daily, weekly, monthly, quarterly targets? What is my style of delegation? How effective am I in communicating? Many farmers have integrated planning and organizing tools on farm. Some are providing training on teamwork, communications, people management as part of staff development, however in the authors experience they are the exceptions rather than the many. There are opportunities to ensure that staff have a structured input during their employment and therefore understand what they
are being measured on, where they have performed well, and what the gaps are. The following tool outlines questions and steps to take to enable conversations that structure and measure staff performance and motivation:

Section 2 - Leadership and Communications Tools

1. Managing Expectations through Face to Face Communications

| Meeting 1 | Initial Conversation | • What’s possible for both parties?  
• What are the rules of engagement?  
• What do you look for and reward, and what is not tolerated?  
• Clarify Expectations e.g. training requirements / opportunities. |
|-----------|----------------------|------------------------------------------------------------------|
| Meeting 2 | Daily Conversation   | • Tasks for the day ahead  
• Instruction / Feedback  
• Updates |
| Meeting 3 | Weekly Conversation  | • What worked this week (give praise)?  
• What needs focus for next week? |
| Meeting 4 | Monthly Conversation | • Feedback session:  
• What progress is being made?  
• Identify areas for development  
• What you need from each other?  
• Where is praise due? |
| Meeting 4 | Exit Conversation    | • What did staff learn from their experience?  
• What needs to be acknowledged / skills gained and targets met?  
• When necessary, discuss and agree reference for next employer. |

2. Evaluation Questions

Take the time to evaluate yourself, your staff and your processes, this can be done with members of your discussion group, your partners in the business, and your staff at formal or informal meetings e.g. at a staff meeting or at breakfast after milking.

Farmer/Farm partners/Discussion Group:
• Who in your discussion is group doing well in the area of people management?  
• What other sources (other than discussion group) or examples of success can the farmer learn from?  
• What am I not prioritising that is in front of my face?

Farmer/Staff
• At the end of your time here with us what do you want to say you achieved while working on this farm?  
• What would you do with this business that I am not currently doing? What needs improvement in this business that I haven’t addressed. What would you prioritise?
3. Five step Path to effective engagement of new employee

<table>
<thead>
<tr>
<th>Step</th>
<th>Process</th>
<th>Outcome</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. Initial Assessment</td>
<td>Discussion on both expectations i.e. terms of engagement and desired outcomes</td>
<td>Signed and date document of agreement</td>
</tr>
<tr>
<td>2. Induction</td>
<td>On farm orientation / procedures and processes</td>
<td>Standard Operating procedures. Health and Safety procedures etc</td>
</tr>
<tr>
<td>3. Training Options</td>
<td>Discuss and identify appropriate in-service training</td>
<td>Dates agreed for: Meetings with discussion groups, Teagasc/Cellcheck training etc</td>
</tr>
<tr>
<td>4. Delegation</td>
<td>Handover of tasks and monitor progress</td>
<td>Appraisal form to capture progress of skills and areas for development</td>
</tr>
<tr>
<td>5. Continual or Final assessment</td>
<td>Ensure expectations are continuously reviewed and in line with initial joint objectives</td>
<td>Sign off on on-going or final appraisal form and Written reference</td>
</tr>
</tbody>
</table>

**Conclusion:**

Standards in Irish farming are undoubtedly developing for the better. Technical skills such as effective grassland management and the ability to increase the production of milk solids are becoming routine. The national cell count is reducing and the eradication of BVD is now within reach. Courses on entrepreneurship, finance management and farm business management are readily available.

While Teagasc provide programmes on staff management, there remains a gap on farm, in measurements and tools to support the continuous development of skills such as listening, self-awareness, emotional intelligence and coaching.

All these skills are key to a farmer developing his leadership and management capacity. Unless these soft skills are prioritised as central to business and organisational management development, there is a danger they will be overlooked in favour of easier wins, eg lower cell count, or greater milk proteins and fats. In order to maximise their potential and their profit, farmers must buy-in.
Getting spring ready

Phil Purcell, Ballykeeffe, Kilmanagh, Co. Kilkenny

What I’d like to address in my presentation is how myself and my wife Miriam prepare for the calving season on our farm. In 2018 we will calve 228 cows. Fertility is generally good on the farm so we’ve a concentrated calving pattern. Around 170 of the cows will calve in February and the remainder over the next 7 weeks.

Background

The farm comprises 112 hectares of land of which 62 hectares form the milking platform. Approximately 20 hectares of the land farmed is leased. In 2017 we kept an average of 200 dairy cows on the farm (peak milked was 192). For the last number of years we’ve kept around 70 replacement heifers and sold the remainder of the calves born at around 2 weeks of age. The heifer calves we keep remain indoors until March 1st and are then put out to grass and fed once a day until they are weaned.

This year I estimate we will sell 1.05 m litres of milk at 4.26% fat and 3.66% protein (this works out at 428 kg milk solids sold per cow). I estimate that we’ll grow 13 tonnes of grass dry matter per hectare with the cows fed 700 kg meal per head.

The herd is from a British Friesian background with Holsteins used across the herd in recent years. The average EBI of the herd is €96. Fertility has been good for the past number of years with 10% empty after a breeding season lasting 11 weeks. We run an Angus stock bull with the herd for the last 3 weeks of the season. I’d expect that this year we’ll have some surplus stock for sale for the first time following a period of expansion and tidying up the herd as while we’re calving 224 cows, we plan to milk around 190 cows next year. In 2017 the calving interval was 362 days with 86% calved in 6 weeks. The expected calving pattern for 2018 is presented in Figure 1.

Figure 1. Expected number of cows calving by month in 2018.

At peak we’ll calve around 15 cows per day in mid-February. To help take some of the pressure off the system, we’ll turn the yearling replacements out to grass in mid-February and the calves will go out in early March. The labour force available to me for the coming season comprises me and one full-time Professional Diploma in Dairy Farm Management student Conor. There is a small amount of family help available particularly during Conor’s weekends off.
**Key areas**

In my experience, there are a number of key areas that help to make the calving season more manageable:

- Defined roles;
- Animals and;
- Facilities.

**Defined roles**

Even though Conor and I do most of the work on the farm, we have defined roles around calving time. We do this because everybody then knows what they need to do and there is no time wasted worrying about what has been done or what needs doing. The typical routine on the farm during the calving season is as follows.

<table>
<thead>
<tr>
<th>Role</th>
<th>Person</th>
</tr>
</thead>
<tbody>
<tr>
<td>Milking – AM</td>
<td>Phil</td>
</tr>
<tr>
<td>Milking – PM</td>
<td>Conor</td>
</tr>
<tr>
<td>Calving &amp; newborn calf work</td>
<td>Phil</td>
</tr>
<tr>
<td>Calf feeding &amp; rearing</td>
<td>Phil</td>
</tr>
<tr>
<td>Stock feeding</td>
<td>Conor</td>
</tr>
<tr>
<td>Grassland management</td>
<td>Conor</td>
</tr>
<tr>
<td>Calf sales</td>
<td>Kilkenny marts rep (every Tuesday morning)</td>
</tr>
</tbody>
</table>

I like to milk myself every morning to see how the cows are doing at least once every day. I’d like to add that I believe that having some time off around Christmas is an important part of getting spring ready on this farm. We’ll dry off the herd in early December and do the minimum around the Christmas and New Year period before things start up again.

**Animals**

The cow is fed according to her body condition score taken in December. Thin cows are separated and managed to achieve a condition score of 3.25 at calving. The vaccination programme on the farm includes Salmonella and IBR in the autumn and Rotovac/Corona vaccine in early January. All of the cows calve in the calving pens in groups.

After they’ve calved, they’re removed and join the ‘red herd’. This is the group of cows whose milk is held for calf feeding. This group is milked after the cows that are supplying milk for sale off the farm. Every morning Conor and I will go through the ‘red herd’ and draft out the cows that are ready to join the main herd. By running them as a separate group, we’re minimising the risk of mistakes being made.

Once they’ve calved, the calves are snatched shortly after birth. Calves are iodined, tagged and usually teat fed with 3 litres of the calf’s dam’s colostrum. This is the one job that I like to do myself to be absolutely sure that it’s done correctly.

**Facilities**

There is nothing special about the facilities on our farm. What makes the job a bit easier in the spring includes the following:

- A 24 unit milking parlour where freshly calved cows are milked after the main herd in spring. An electronic drafting system was installed 3 years ago and we use this to draft cows into the red herd and back to the main milking group when ready;
- For the first time in a number of years we’ve sufficient feeding space to feed all of the cows at the one time. We’ll use this to feed the cows at night this spring to minimise the number of night-time calvings.
- Cows can be subdivided into up to 8 separate groups. This allows us to feed them selectively to maintain or improve condition before calving and to keep the red and milking mobs separate after calving.
Getting spring ready

Mark Cassidy, Cookstown, Kells, Co. Meath

The purpose of this presentation is to summarise my thoughts on getting ready for the calving season ahead. The idea of calving over 90% of my 340-strong dairy herd in 6 weeks is daunting but with plenty of preparation I’ve learnt to cope with the tsunami of calves that’s ahead of me and survive calving without too much stress.

Background

To put the place in context, I farm 121 hectares of land of which 100 hectares are milking platform. 66 hectares of the land I farm is leased. In 2017 I had an average of 304 dairy cows on the farm (peak milked was 311). All male calves and beef heifers sold shortly after birth. The heifer calves are moved for contract rearing within a week of birth and don’t return home until two months before they calve.

This year, I estimate we will sell 1.5 m litres of milk at 4.74% fat and 3.90% protein (this works out at 439kg milk solids sold per cow). Because of the high solids content, milk price should average 41.25 c/litre this year. I calculate that we’ll grow 16.5 tonnes of grass dry matter per hectare with the cows fed 400 kg meal per head.

The herd is a kiwi cross type herd with an average EBI of €122. Fertility is good with 9% empty after 15 weeks breeding – we sell the later calvers and bring in around 70 heifers every year. In 2017 the calving interval was 365 days with 91% calved in 6 weeks. The expected calving pattern for 2017 is presented in Figure 1.

Figure 1. Expected number of cows calving by month in 2018.

So as you can see we’re expecting a lot of the herd to calve quickly – 50% in the first two weeks – when we’ll be calving up to 20 cows a day.

Key areas

Preparation for calving begins now. For my farm there are four key areas that are really important in making sure we’re ready for calving. These are:

- Animals;
- Facilities;
- Personal and
- People.
Animals

The cow is fed according to her body condition assessed in December. Thin cows are separated and managed to achieve a condition score of 3.25 at calving. All of the cows calve on wood chip beds on the farm. They’ll be on the beds for up to a week before calving. After they’ve calved, they’re removed and join the milking mob.

The calves are moved shortly after birth. Calves are iodined, tagged and stomach tubed with 4 litres of pooled colostrum. We place huge emphasis on having healthy stock, so this routine is religiously carried out. It’s important that all calves remain healthy as we don’t have the space or the time to build up calf numbers longer that we need to. All cows are vaccinated for calf scours in January.

Everyone must disinfect before entering the calf shed. Access to the calf shed is restricted, I have a “No entry disease precautions” sign on the door. Nobody from outside the farm is allowed past the door EVER. Especially calf buyers and vets!

Facilities

Facilities on the farm are pretty basic.

- A 28-unit milking parlour where freshly calved cows are milked after the main herd in spring;
- Topless cubicles (300) where the cows are wintered in groups according to condition score and age.
- Roofed cubicles (67) for in calf heifers.
- The wood chip beds which can accommodate up to 60 close to calving cows.
- The calf shed which can accommodate 72 calves in groups of 6.
- Calves are batch fed on teats, whole milk once a day, with milk pumped to each feeder with a metered nozzle.
- Replacement heifers are gone within a few days to the heifer rearing farm.
- All other calves go from here to the mart for sale as soon as possible.
- Doing the best you can with what you have got, yard lights that work and are in the right place, gates hung and opening easily, not tied and not falling on people!
- Gated walkways so cows or calves can’t run around an open yard.

Personal

- Fitness training - I run obstacle course races and I train for calving season in the same way.
- Mental health - stress is reduced by being prepared.
- I look back at last season’s stress points and put a plan in place to prevent them happening again.
- I use a checklist to keep track of on farm preparations which start in December.
- It’s a great motivator and I can be confident that I’m ready, facilities are ready and that everything that will be needed for calving season is on the farm by 1st Feb. This reduces extra pressure during the calving season.
- I take the pressure off myself by picking jobs and making them Somebody Else’s Problem.

People

Everyone knows their role on the farm well before calving starts. For all of the major roles that we have there is a standard operating procedure. I’ve a team of 6 people including myself that work on the farm during the busy part of the calving season which runs from early February until St. Patrick’s Day.

- Milking – during the calving season there are always two people in the parlour to milk the cows – once a day from the start of calving until March 1st. Their role is to milk and draft out and manage the freshly calved cows. These two people are rostered from a team of three.
- Calf shed – one person feeds all of the calves on the farm during the spring. This person is rostered from a team of two people who fulfil this role.
- Grass & newborn calf management – this is my main role during the springtime. I’ll ensure myself that all newborn calves get sufficient colostrum etc. as detailed above. My second job in the spring is setting up the grass sections for the cows to graze.
- I’ve also an absolutely vital support team on hand to support the work we do with the animals on the farm.
- The contractors who look after all of the machinery work from feeding silage to spreading fertiliser and slurry throughout the spring time.
- The calf seller who takes all calves destined for sale to the mart every Monday morning throughout the spring.
- The contract rearer who takes replacement calves.

**Staff Morale**

Food - There is nothing worse on a cold miserable day in March than to be hungry. Every day during calving season all people working on the farm are given lunch, with at least one fry up during the week, that and a nice cup tea makes a tough day much more doable.

Time Off - All workers are part time and work through the Farm Relief Service. They need to be rostered on to suit other commitments that they have -- other work, kids, study, etc. I want to give everyone 1 day off after 2-3 days on to keep them fresh.

For next spring I’m hoping to have a separate team of 3 milkers for the weekend, to give the weekday team a well-deserved break. And a night-time calving person for 2-3 nights to give myself a break. Every box in the work planner in Appendix 1 will have a name/names in it!

It might not always work out but, there needs to be some slack in the system or it will snap!

### Appendix 1. Work schedule planner for Spring 2018 on the Cassidy farm.

<table>
<thead>
<tr>
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| AM milking           | 2 people milking | Night Calving | 1 person in yard | Push in silage | 1 person |
| PM milking           | 1 person milking | Calf Feeding  | 1 person in Calf shed | | |
Selective dry cow therapy

Aideen Kennedy*, Noel, Byrne, Jim Flynn, Niamh Ryan* and Sinead McParland
Teagasc, Animal and Grassland Research & Innovation Centre, Moorepark, Co. Cork
*Formerly Teagasc Animal and Grassland Research & Innovation Centre

Summary

• Antimicrobial resistance (AMR) presents a threat to both human and animal health. Appropriate use of antimicrobials is necessary to limit AMR.
• Infusion of teat seal is effective in minimising the risk of acquiring new infections during the dry period, but requires strict hygiene.
• Whole herd blanket dry cow therapy (DCT) may represent unnecessary use of antimicrobials when administered to cows with low SCC at drying-off. Selective administration of DCT to infected cows only, with teat seal only administered to uninfected cows represents more prudent usage.

Introduction

The dry period is well known as a critical period in mastitis control. It is the optimum time to cure existing udder infections and also encompasses the period of highest susceptibility to acquiring new infections. Irish dairy herds generally employ blanket dry cow therapy (BDCT), administering long acting antimicrobials into all quarters of all cows at drying off. Since the establishment of the CellCheck mastitis control programme, and the improved adoption of practices such as regular milking machine maintenance and improved udder hygiene, udder health has improved nationally and many animals are now uninfected at drying off. As a result of these favourable trends and the growing fears over antimicrobial resistance, it has been suggested BDCT is no longer required.

What is Selective Dry Cow Therapy (SDCT)?

Unlike BDCT where all cows receive antibiotics, selective dry cow therapy (SDCT) involves targeted use of antibiotic treatment only in those cows shown to have an intra-mammary infection at drying off. In quarters shown to be uninfected at drying off, teat seal only is administered. The addition of teat seal to a SDCT protocol ensures that all quarters have some protection against new infections during the dry period. Strict hygiene is essential in the administration of teat seal since failing to thoroughly disinfect the teats could allow the accidental introduction of bacteria and have disastrous consequences for mastitis control. Herds with bulk tank SCC consistently below 200,000, with a <2% clinical case rate in the 3 months prior to dry-off and with routine individual cow milk recording data available may consider SDCT. A research trial to investigate the potential of SDCT is currently on-going at Teagasc Moorepark.

Selective Dry Cow Therapy Study

The SDCT trial was run in the Clonakilty research herd across 2015 and 2016 and was repeated in the Clonakilty, Moorepark and Curtins research herds in 2017; the study is presently on-going. At drying-off cows were deemed eligible for inclusion if their SCC had not exceeded 200,000 and they
had not presented with a clinical case of mastitis throughout the previous lactation. Following these eligibility criteria, 36%, 46%, and 56% of the Moorepark, Curtins and Clonakilty herds (364 cow lactations) were eligible for inclusion in the study.

Eligible cows were randomly assigned to treatment 1 (TS only) or treatment 2 (TS plus antibiotic; the active ingredient cefalonium is maintained in quarters for up to 10 weeks post-infusion). To determine SCC and bacteria present, quarter sampling was conducted at drying off (pre-treatment) and at multiple dates post calving. Across the 3 years of the study, 35 cows were found to have an infection at dry-off during treatment administration. Weekly post-calving milk recording data provided additional SCC measurements.

**Results**

Initial results indicate that the SCC of teat seal only cows was greater than those cows that received both antibiotic and teat seal. Teat seal only cows were 2.9 times more likely to have an SCC reading >200,000 within the first 120 days of lactation. However, the majority of cows (>80%) in both treatments maintained SCC <200,000 as indicated in the figure below. The difference between the two groups across lactation was in the order of 26,000 somatic cells. Within the first 2 weeks of lactation, 5.7% of quarters of cows given teat seal only were infected with bacteria compared to 2.1% of quarters of cows given antibiotic plus teat seal.

All herds have maintained a bulk tank SCC <200,000 throughout the study to-date (one herd recorded a bulk tank SCC of 243,000 in February 2017), indicating that using teat seal only did not impact at the herd level.

Altering the threshold for selection by assigning cows to teat seal only which never exceeded 100,000 SCC in the previous lactation did not impact on results. In those analyses teat seal only cows still had higher SCC across lactation and a higher proportion of quarters infected with bacteria than the cows given both teat seal and antibiotic.

The trial is on-going.

**Figure 1: Proportion of cows in each treatment group that had an SCC recording of >200,000 at different time-points post calving**
Is SDCT the correct option for your herd?
If your herd is consistently recording bulk tank SCC <200,000 and you have individual animal milk recording data, but you are nervous about implementing SDCT, speak with your local vet or Cellcheck advisor (www.animalhealthireland.ie) about implementing a plan. To build confidence, this year start with a small number of cows. As you grow in confidence with your teat seal only technique you will be able to include additional cows in the coming years. The most important advice when administering teat seal only is to implement strict disinfection of teats. Failure to do so could lead to disastrous consequences for mastitis control.

Heifer Teat Seal
Heifer mastitis is considered a problem if more than 15% of the heifers have intra-mammary infections around the time of calving. Housing heifers in a clean environment and minimising stress are commonly recommended as heifer mastitis control measures. In spring 2015, Teagasc conducted a study on four separate research farms to determine the association between teat seal administration to heifers pre-calving and infection levels in the subsequent lactation.

Four to six weeks pre-calving, all heifer teats were disinfected and teat seal was infused in two quarters; the remaining quarters were left untreated and acted as controls. Quarter level sampling was conducted at similar time-points to the SDCT trial. Teats not administered teat seal were between 1.99 (P< 0.05; mid-lactation) and 3.85 (P<0.001; first milking) times more likely to have bacteria present than those administered teat seal. As with older cows however, strict hygiene is essential when administering teat seal to heifers.

Conclusion
Results from this study indicate that reduced antimicrobial use is possible in Irish mastitis control programmes. Further research will be required in order to strike an optimum balance between maintaining a high standard of udder health while also promoting responsible antimicrobial use. While antimicrobials continue to be important in safeguarding the health and welfare of our animals, it is of utmost importance we use antimicrobials prudently, to obtain maximum benefit both therapeutically and economically, while also limiting development of AMR. Further research into reducing anti-microbial use is planned for spring 2018.
Correcting soil pH with lime for grassland production

David P. Wall\textsuperscript{1} & Ger Courtney\textsuperscript{2}

\textsuperscript{1} Crops, Environment and Land Use Programme, Teagasc, Johnstown Castle, Co Wexford,
\textsuperscript{2} Teagasc Advisory Office, Killarney, Co Kerry,

Summary

- Lime is key for maintaining good soil pH and fertility and achieving high rates of grass growth and production targets on Irish dairy farms.
- Soil testing and planning of lime applications are essential for effective maintenance of soil pH levels on grassland farms.
- Large pay back for lime applications on grassland farms, as €100 investment in lime = €600 in extra grass

Introduction

Soil fertility is a key component in growing sufficient grass to feed the herd on an annual basis. Irish soils are acidic by nature due to our high annual rainfall. Soil acidity (low pH) reduces the availability of major soil nutrients such as nitrogen (N), phosphorus (P) and potassium (K). Soil acidity will reduce the uptake and plant efficiency of applied nutrients in fertilisers and organic manures. Soil test results show that 90\% of grassland soils have a poor balance in terms of pH, P and K to maximise grass production. Nationally >65\% of grassland soils require lime to neutralise soil acidity (i.e. soils with low pH levels) however, in some counties in excess of 80\% of soils require lime. Grassland farmers should aim to maintain mineral soils between pH 6.3 to 6.5 and peaty soils between pH 5.5 to 5.8. This is the first step towards increasing soil fertility and improved grass production to meet the feed demands of the livestock over the growing season.

What effect does lime have in the soil?

Lime is a soil conditioner and reduces soil acidity by neutralizing the acids present, allowing the micro-organisms and earthworms to thrive and break down plant residues, animal manures and organic matter. This helps to release stored soil nutrients such as N, P, K, sulphur and micro-nutrients for plant uptake. For example, grassland soils receiving regular lime applications have been shown to release up to 80kg/ha additional N compared to soils with low soil pH. Important grassland plant species such as ryegrass and clover will persist for longer following reseeding where soil pH has been maintained close to the target levels through regular lime applications.

Effect of lime on soil fertility and grass production

Recent research demonstrates the importance of lime in relation to soil P availability and the improved efficiency from applied P fertilizer. Figure 1 shows the change in soil test P levels when lime is applied by unlocking stored soil P (purple bar) and increasing the efficiency of freshly applied fertilizer P (green bar) compared to applying high quantities of P fertilizer alone (red bar). This clearly shows that soil pH correction is the first step to consider when building-up soil P levels for high grass production systems.
Figure 1. Average change in soil test P (Morgan’s) across 16 soils (av. pH 5.5) treated with Lime (5 t/ha of lime), P fertilizer (100 kg/ha of P), and P + Lime and incubated over 12 months in controlled conditions.

Figure 2 shows the grass yield response to lime and P fertilizer in grassland. The application of 5t/ha ground limestone (purple bar) produced approximately 1 t DM/ha additional grass and had similar grass yields compared to the application of 40 kg/ha P fertilizer alone (red bar). However, the addition of lime + P fertilizer in combination (green bar) produced the largest grass yield response (1.5 t/ha more grass than the control). These results show how effective lime is for increasing the availability of both stored soil P (from previous fertilizer and manure applications) and freshly applied fertilizer P.

Figure 2. Relative grass DM yield response in grassland treated with Lime (5 t/ha of lime), P fertilizer (40 kg/ha of P), and P + Lime over a full growing season.
Return on investment in lime

As with any business, achieving a positive return on investment is critical when using any input. When the pH of grassland soils is maintained close to the optimum range increasing grass yield by at least 1.0t DM/ha/year is achievable. In addition to P and K release from the soil, N supply worth up to €80 euro may also be achieved to boost spring growth. If this extra grass production is utilized by the grazing livestock, it has the potential to reduce farm feed bills by ~€150/ha year. Over a 5 year liming period, this represents a 6:1 (grass €150/t: lime €25/t) return on investment in lime, not including the potential for reducing fertilizer costs into the future.

Management tips when applying lime to grassland

- The target soil pH for grassland on mineral soils is 6.3 and on organic (peat) soils is 5.5.
- On grassland soils with high molybdenum (Mo) levels, increasing soil pH above 6.2 can lead to increased Mo levels in the herbage. High intakes of Mo in ruminant animals can lead to an increased risk of copper deficiency. It is therefore recommended to maintain soil pH at 6.2 on these soils or consider supplementing animals with copper.
- Apply lime based on the soil test report. Where lime recommendations exceed 7.5 t/ha it is best to split the application rate and apply up to 7.5 t/ha initially and the remainder in year 3.
- Lime can be applied at any time of the year, however, mid-summer and autumn are ideal as soils are still firm and there are increase spreading opportunities following silage harvesting and grazing.
- Ground limestone is the most cost effective source of lime. It will start to work once it is applied and washed into the soil.
- Use magnesium (Mg) limestone where soil Mg levels are low to replenish it in the soil.
- Granulated limes are a finely ground limestone (<0.1mm) hastening the reaction with soil acidity to increase soil pH in the shorter term. Recent research shows that these products are more suitable for maintaining soil pH (i.e. where the initial soil pH is close to the target i.e. ≥ 6.0).
- Maintaining soil pH will result in increased release of soil N from organic matter up to a value of €80/ha/year
- On some heavier and organic soils, it is best to apply a reduced rate of lime on a more regular basis to control soil acidity rather than as one large application as this avoids “softening the soil”.
- It is recommended to leave at least 3 months between liming and the application of urea or slurry to reduce the risk of N loss through volatilization. To overcome this, apply urea / slurry first and apply lime 10 days later.
Managing risk in your dairy breeding programme

Andrew Cromie, Kevin Downing (both ICBF) & Donagh Berry (Teagasc).

Background
The success of the EBI as a tool to increase dairy farm profitability (Ramsbottom et al., 2012) has raised concerns regarding the over-use of individual bulls within our National breeding programme and the risks that this could pose for farmers and the industry if the indexes on these bulls were to fall over time. Indeed, the recent drop in EBI for a number of high profile young genomic sires has resulted in some farmers questioning the benefits of genomics as a technology to accelerate genetic gain, while others have questioned the effectiveness of the EBI as a tool on which to accurately rank AI sires for overall dairy farm profitability.

In this paper, we will review recent trends in EBI and how they now relate to herd and overall industry performance. We will also consider a number of potential options for helping to manage risk in your breeding programme including:

- The use of daughter proven bulls as opposed to genomic bulls;
- The use of teams of AI bulls;
- The use of tools such as “Sire Advice” offered by ICBF HerdPlus.

Finally, we will also discuss some of the upcoming changes that are due to be incorporated into the EBI from December 2017.

Benefits of EBI
The Economic Breeding Index (EBI) was first introduced in 2002 as an overall profit index for ranking animals based on future dairy performance. Looking at trends in EBI (Figure 1) indicates that the rate of genetic gain in EBI has accelerated rapidly over the last number of years, driven primarily by two key initiatives; (i) the establishment of the G€N€ IR€LAND National breeding programme by ICBF and the partner AI companies in 2005 and (ii) the introduction of genomics in 2009.

![Figure 1. Genetic trends for EBI, milk and female fertility sub-index for females born over the period 1996 to 2017.](image-url)
Whilst the above trends clearly suggest an increase in profitability at farm level, it would be important to validate these trends against actual data collected on farms. To answer this question, ICBF and Teagasc have recently completed a major data analysis of herd EBI, herd calving, herd fertility and herd milk co-op performance for 2,801 herds from the ICBF database. Only herds that had complete data for all 7 years of the study were included in the analysis, so as to ensure the most accurate picture of any trends in changing herd performance.

Looking at the outcomes from this work (Table 1) clearly indicates the positive impact that increasing EBI has had on the milk and fertility performance of our National dairy herd. For example, average EBI has increased steadily from €2.3 for cows calving in 2010 to €69.2 for cow calving in 2017, an increase of some €66.9 over the period or €133.8 profit per cow if considered in the context of additional profit/lactation.

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<td>- Number calvings</td>
<td>77.7</td>
<td>83.5</td>
<td>86.3</td>
<td>90.2</td>
<td>92.9</td>
<td>100.1</td>
<td>107.6</td>
</tr>
<tr>
<td>- CI Days</td>
<td>393.5</td>
<td>393.8</td>
<td>388.7</td>
<td>385.8</td>
<td>387.2</td>
<td>383.3</td>
<td>381.2</td>
</tr>
<tr>
<td>- Six week calving rate</td>
<td>55.3</td>
<td>56.2</td>
<td>59.5</td>
<td>62.1</td>
<td>61.3</td>
<td>62.0</td>
<td>63.9</td>
</tr>
<tr>
<td>- % calving 22-26 mths</td>
<td>N/A</td>
<td>67.4</td>
<td>70.2</td>
<td>73.4</td>
<td>70.5</td>
<td>72.0</td>
<td>74.8</td>
</tr>
<tr>
<td><strong>Total milk solids</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Increase in F+P kg/Herd</td>
<td>28,228</td>
<td>30,713</td>
<td>31,042</td>
<td>33,014</td>
<td>34,730</td>
<td>41,097</td>
<td>43,808</td>
</tr>
</tbody>
</table>

Relating these trends in EBI increase to actual milk production performance indicates that milk solids sales/cow has increased significantly over the period, from 363.4 kg Fat + Protein per lactation for cows calving in 2010, to 407.1 kg for cows calving in 2016, an increase of some 34kg. Similar improvements are also evident for female fertility performance, with average calving interval having declined steadily from 393.5 days for cows calving in 2010 to 381.2 days for cows calving in 2016. Compactness of calving has also improved significantly, up from 55.3% in 2010 to 63.9% for cows calving in 2016.

These trends clearly confirm, that as a tool, EBI is working at farm level and farmers can have confidence that by selecting AI sires (and replacement females) on that basis, they will increase the performance and profitability of their herds in the future.

**Managing Risk; Daughter Proven or Genomic Bulls?**

Whilst the data from Table 1 clearly indicates an increase in milk and fertility performance with increasing EBI, it does not differentiate between source of AI bulls that are contributing to the genetic gain. This is a highly relevant question at present, as some farmers are suggesting that one
way of managing risk in the context of your breeding programme is to use more daughter proven bulls (with higher EBI reliability) in your breeding programme, relative to GS bulls.

Looking at data from Table 2, clearly indicates the increasing impact of young genomic (GS) bulls in terms of each year’s AI bred heifer calf crop, up from 64% for calves born in 2010 to 84% for calves born in 2017. These results would appear to suggest that, as a tool, genomics is working at farm level, especially when mapped across the data from Table 1.

Table 2. Trends in AI bull usage, based on dairy female heifer crop born each year from 2011 to 2017.

<table>
<thead>
<tr>
<th>Year</th>
<th>GS Bulls</th>
<th>Irish proven bulls</th>
<th>Irish proven bulls</th>
<th>Total</th>
<th>GS bulls as % total</th>
</tr>
</thead>
<tbody>
<tr>
<td>2011</td>
<td>59,415</td>
<td>22,347</td>
<td>10,694</td>
<td>92,456</td>
<td>64%</td>
</tr>
<tr>
<td>2012</td>
<td>77,307</td>
<td>13,698</td>
<td>10,571</td>
<td>101,576</td>
<td>76%</td>
</tr>
<tr>
<td>2013</td>
<td>80,692</td>
<td>11,714</td>
<td>26,351</td>
<td>118,757</td>
<td>68%</td>
</tr>
<tr>
<td>2014</td>
<td>95,504</td>
<td>2,778</td>
<td>25,349</td>
<td>123,631</td>
<td>77%</td>
</tr>
<tr>
<td>2015</td>
<td>113,179</td>
<td>7,788</td>
<td>19,531</td>
<td>140,498</td>
<td>81%</td>
</tr>
<tr>
<td>2016</td>
<td>133,966</td>
<td>2,266</td>
<td>20,170</td>
<td>156,402</td>
<td>86%</td>
</tr>
<tr>
<td>2017</td>
<td>135,030</td>
<td>3,718</td>
<td>21,060</td>
<td>159,808</td>
<td>84%</td>
</tr>
</tbody>
</table>

However, a more accurate way to assess this question would be to categorise herds from the analysis presented in Table 1, into whether the herd is primarily using young genomic bulls (GS) or whether they are using bulls that are daughter proven, with this latter category including both Irish and foreign bulls that have daughters milking in Ireland.

Table 3. Comparison of EBI and herd performance for herds using mainly GS or DP bulls in their breeding programmes.

<table>
<thead>
<tr>
<th>Parameter</th>
<th>Genomic</th>
<th>Daughter Proven</th>
</tr>
</thead>
<tbody>
<tr>
<td>No. cows/ herd</td>
<td>96.2</td>
<td>76.4</td>
</tr>
<tr>
<td>Herd EBI</td>
<td>€92</td>
<td>€73</td>
</tr>
<tr>
<td>% calf 2011-14 calf crop GS</td>
<td>72%</td>
<td>13%</td>
</tr>
<tr>
<td>Milk production 2016</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Litres /cow</td>
<td>5,176</td>
<td>4,853</td>
</tr>
<tr>
<td>Fat kg/cow</td>
<td>223.9</td>
<td>204.3</td>
</tr>
<tr>
<td>Protein kg/cow</td>
<td>187.4</td>
<td>174.6</td>
</tr>
<tr>
<td>F+P kg/cow</td>
<td>411.3</td>
<td>378.9</td>
</tr>
<tr>
<td>Fertility 2016</td>
<td></td>
<td></td>
</tr>
<tr>
<td>CI Days</td>
<td>378.0</td>
<td>379.1</td>
</tr>
<tr>
<td>6-week calving rate</td>
<td>67.7</td>
<td>63.9</td>
</tr>
<tr>
<td>Heifers calved at opt age</td>
<td>81%</td>
<td>66%</td>
</tr>
</tbody>
</table>

Looking at data from Table 3 clearly indicates that herds that are primarily using genomics bulls (for these herds 72% of their AI-bred dairy female calf crop born from 2011 to 2014 were to young GS bulls) have significantly better EBI (+€19), milk solids (+33 kg F+P) and female fertility performance (3.8% in terms of 6-week calving) compared to herds that are primarily using daughter proven bulls.
bulls (only 13% of their comparable calf crop were to GS bulls). These results are based on 2016 performance only, as these are the cows that will have formed the basis of the herd from the four years of calf crop, 2011 to 2014.

The differences presented in Table 3 clearly challenge any suggestion that farmers looking to manage risk in their breeding programme should revert to using daughter proven bulls. Young GS bulls are higher in terms of EBI (in theory they are 3-4 years ahead of the daughter proven bulls – which is reflected in the difference in EBI between the groups of herds) and as a result should continue to form the core of our National (and individual herd) breeding programmes in the future.

Managing Risk; Teams of Bulls

The principle of using teams of bulls (as a means to manage risk in your breeding programme) has been well researched and advocated by Teagasc and ICBF over the past number of years. The principle is based on the fact that for any given reliability (see Figure 2) a bull’s EBI can change. For example, a well proven bull (i.e., 90%+ EBI reliability) can change by +/- €50 while a young GS bull (i.e., 55-60% EBI reliability) can change by as much as +/- €120. However, by using the bulls in a team (especially young GS bulls) the risks of some bulls going up and some bulls going down, evens out resulting in a higher reliability for the overall bull team. The net outcome of this research (first undertaken in 2011) has been that farmers have been advised to use a minimum of 5 high EBI bulls evenly in their herd breeding programmes, as this then equated to an average EBI reliability for the bull team of 90%.

Figure 2. Potential change in EBI for an individual AI bull based on reliability.

The recent drops in EBI for some high-profile AI bulls has resulted in some farmers questioning whether a minimum of five bulls is sufficient, in the context of managing risk within their breeding programme. In addition, these initial calculations were based on the use of 5 unrelated sires within the bull team. Experience since the introduction of genomics has been that this is not the case, and very often farmers find themselves using half-brothers within their bull teams. As a result of these questions, Teagasc and ICBF have very recently reviewed the underlying research regarding bull teams, to consider additional factors such as; (i) relatedness between sires in the bull team, (ii) an increase in the EBI reliability of the bull team from 90% to 95%, and (iii) the impact of increasing herd size (including wider industry application) when considering the minimum bull team number.
As part of this work, ICBF have also reviewed the current adherence to the principle of bull teams, as this is a critical component in the context of understanding our current status with respect to managing risk within our breeding programmes through the use of bull teams.

i. **Adherence to the principles of bull teams.** Looking firstly at data from calves born in the year to date (Table 4) indicates that 5,973 dairy herds had more than 10 AI bred calves born in 2017. The average number of bulls used in these herds was 7.5, which is significantly above the minimum of 5 advocated by Teagasc and ICBF in the context of helping to manage risk in an individual herd-owners breeding programme.

### Table 4. Adherence to the principles of bull teams, based on AI bred calves born for the year to date.

<table>
<thead>
<tr>
<th>Herds*</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Number herds</td>
<td>5,973</td>
</tr>
<tr>
<td>Number bulls used</td>
<td>7.5</td>
</tr>
<tr>
<td>% to most heavily used bull</td>
<td>34%</td>
</tr>
<tr>
<td>% to most heavily used 3 bulls</td>
<td>69%</td>
</tr>
<tr>
<td>% herds where usage of 3 most heavily used bulls ≤ 50%</td>
<td>18%</td>
</tr>
</tbody>
</table>

Whilst this is a major positive, the same cannot be said with respect to the even usage of bulls, with on average, the most heavily used AI bulls in these herds accounting for some 34% of the total calves born. The three most heavily used bulls sired 69% of the calves born and only 18% of herds adhered to the principles of even usage of bulls (based on an average number of bulls used of 7.5 for the year to date). These trends are a major concern in the context of managing risk in our breeding programmes and highlight a very significant challenge that we must address if we are to maximise the benefits of new technologies such as genomics in delivering maximum EBI gain for our individual farmers and industry.

ii. **Updated guidelines for bull team usage.** Given the above trends regarding over-use of individual bulls within our National breeding programme, updating guidelines regarding the use of teams of bulls is now critical for farmers and the industry. These new guidelines have just been finalised by Teagasc and ICBF and are given in Table 5. They consider the following additional aspects relative to the previous work and guidelines; (i) the impact of using related bulls within the bull team, (ii) an increase in reliability for the bull team from 90% to 95% and (iii) consideration of herd size, as well as wider industry application.

### Table 5. Guidelines for bull team usage.

<table>
<thead>
<tr>
<th>Herd size bracket</th>
<th>Median herd size</th>
<th>Minimum number of bulls</th>
</tr>
</thead>
<tbody>
<tr>
<td>1-50</td>
<td>25</td>
<td>7</td>
</tr>
<tr>
<td>51-100</td>
<td>75</td>
<td>7</td>
</tr>
<tr>
<td>101-150</td>
<td>125</td>
<td>8</td>
</tr>
<tr>
<td>151-200</td>
<td>175</td>
<td>10</td>
</tr>
<tr>
<td>201-250</td>
<td>225</td>
<td>11</td>
</tr>
<tr>
<td>251-300</td>
<td>275</td>
<td>12</td>
</tr>
<tr>
<td>301-350</td>
<td>325</td>
<td>13</td>
</tr>
<tr>
<td>351-400</td>
<td>375</td>
<td>14</td>
</tr>
</tbody>
</table>

1. Herd size relates to the planned number of inseminations e.g. a herd of 80 cows could plan to AI 110 cows and heifers.
Data from Table 5 indicates that for the majority of herd-owners using AI (101-150 herd size bracket, after considering use of AI on heifers) the minimum number of AI bulls recommended is 8, with each of these bulls then used evenly within your herd breeding programme. Working with Teagasc and its industry partners, ICBF will be putting in place a major campaign launching in early 2018, to promote adherence to these new guidelines, especially as they relate to the even usage of bulls.

**New ICBF HerdPlus Sire Advice Tool**

One potential tool that can be used to help manage risk in your breeding programme is the HerdPlus Sire Advice application. This online tool mates selected AI bulls to animals in a herd and outputs this to a breeding chart or Technician handheld. It automatically prevents inbreeding while maximising genetic gain and minimising the variation between production and fertility.

This resource has been available to HerdPlus members since it was launched in 2007. In the intervening ten-year period, usage has been modest with about 2,500 herd owners running the programme in Spring 2017 (see Figure 3). This represents only about 27% of the HerdPlus membership and it’s a figure that ICBF are intent on increasing in 2018.

**Figure 3. Trends in HerdPlus Sire Advice Usage (2010-2017).**

To help facilitate this future growth, ICBF have undertaken to revamp the current application to make it more user friendly while building in extra functionality to make the programme more relevant to a wider audience. One particular aspect of this, is the adherence to the principles of even use of bull teams as analysis of this statistic relative to all users (as per Table 4), indicated only a marginal improvement in this important risk management strategy.

Work is well underway on development and it is envisaged that this will be released in January 2018 in good time for the breeding season.

Some of the new features of the programme are as follows:

- Minimum Bull pack reliability criteria
  - This functionality will clearly help farmers achieve a 95% reliability through increased usage in the numbers of bulls used.
• Functionality for crossbreeding
  o Herds what wish to choose crossbreeding will have their bulls matched to their cows to maximise heterosis.
• Include contract reared animals
  o Animals that are in a contract reared herd will be visible in the owner’s screen when running the application
• Allow for contract and beef matings
  o Herds that wish to contract mate their cows to specific AI bulls or use beef semen can now do so.
• Genomic Inbreeding
  o Females that have been genotyped will automatically get mated to the chosen sires based on their DNA as opposed to their pedigree ancestry.
• Avoidance of carrier matings
  o This will prevent matings where both animals are carriers of undesirable genes that could potentially cause problems e.g. embryo mortality or genetic defects.
• Usage of Bull Packs
  o A facility will be available for farmers to choose a Bull Pack marketed by an AI company e.g. Fertility Pack.

**Figure 4. Screen shot of new Bull Selector Screen.**

The screenshot of the Bull selector screen (see Figure 4) shows how ‘sliders’ have been incorporated to help farmers easily narrow down their search criteria to choose bulls suitable for breeding in their herd. As well as online help screens, free tutorials will be offered to help farmers complete their sire advice.

**EBI developments for 2018**

As part of our on-going improvements to the ICBF dairy genetic/genomic evaluations systems and processes, there will be a number of new developments for 2018. These include:
1. An update of the economic values based on latest data from Teagasc regarding the values and costs of milk production systems in Ireland;

2. The implementation of a Test Day Model for routine genetic evaluations of milk production traits, as opposed to the current approach which is based on 305-day yields;

3. An updating of the training population on which the genomic predictions for young sires (and females) are derived.

The collective impact of these changes are minimal, with the average EBI of bulls on the ICBF Active Bull List expected to increase by €30 (this is due primarily to the increase in milk price and value of fat kg within the EBI, compared to previous estimates taken in 2014). The average correlation amongst all Active AI sires is 0.97, with relatively little re-ranking amongst the high EBI sires on the ICBF Active Bull List.

Summary

In order to maximise genetic gain for farmers and the industry we must broaden our focus beyond just EBI, to incorporate other measures that can help manage risk within our breeding programmes. Paramount to this is the even use of bull teams, with a minimum of 8 bulls now advocated for a typical 100 cow herd. A useful tool in helping to facilitate this move to the even use of bull teams, is the ICBF Sire Advice Tool, and we would encourage herd-owners to engage with this tool now, in advance of their next breeding season. Finally, risk mitigation strategies that are focused on using daughter proven bulls will not deliver the same profit in the long term as strategies based on the even use of high EBI teams of GS bulls.
Controlling iodine levels in milk

Stephen Butler, Francis Curran and David Gleeson
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Grass grown in Ireland is generally deficient in iodine, but excessive supplementation with iodine results in excessive iodine concentrations in milk. A recent industry-wide initiative to reassess the iodine nutrition of lactating dairy cows is having a beneficial effect on milk iodine concentrations.

Iodine
Iodine is an essential trace element for both humans and animals. The only known roles of iodine are related to its incorporation into the thyroid hormones, thyroxine (T4) and triiodothyronine (T3). These hormones control oxidation rate and protein synthesis in all cells, and hence regulate the rate of energy metabolism in the body. Approximately 80 to 90% of dietary iodine is absorbed, and most of the iodine not taken up by the thyroid gland is ultimately excreted in urine and milk.

Deficiency and toxicity symptoms
Clinical iodine deficiency results in goitre (enlargement of the thyroid gland), which is easily recognised and is specific for iodine deficiency. The first indicator of iodine deficiency in a herd is goitre in new-born calves. Iodine deficiency may also result in hairless, weak or dead calves, reduced reproductive performance marked by irregular oestrous cycles, poor conception rates, abortions and retained placenta.
The upper limit for iodine tolerance in cattle is 50mg/kg DMI. Nasal discharge, conjunctivitis, coughing, hair loss and dermatitis have been observed following excessive iodine consumption for prolonged periods (years).

Recommendations for iodine intake
International dairy cattle mineral nutrition reference literature indicates that the dietary iodine requirements for lactating dairy cattle are similar in both confinement (USA, UK) and pasture-based systems (New Zealand; Table 1). Rogers and Gately (1998) recommended that dairy cows (dry or lactating) are supplemented with 12 to 60mg/cow per day, with 12mg meeting the requirements of most animals where supplement is needed, and that any increase in supplement above 12mg is only required in animals diagnosed with severe deficiency.

Table 1. Summary of the recommended lactating cow requirements for Iodine in different countries.

<table>
<thead>
<tr>
<th>Country</th>
<th>Iodine requirement (mg/kg DMI)</th>
</tr>
</thead>
<tbody>
<tr>
<td>USA, UK</td>
<td>0.5</td>
</tr>
<tr>
<td>Germany</td>
<td>0.5</td>
</tr>
<tr>
<td>New Zealand</td>
<td>0.5</td>
</tr>
<tr>
<td>Ireland</td>
<td>0.9 to 3.6</td>
</tr>
</tbody>
</table>

1 National Research Council (2001). Nutrient Requirements of Dairy Cattle, 7th revised edition. Used as reference value in both USA and UK.
Iodine in the diet of Irish dairy cows

Iodine intake in grazed grass and in the total diet was assessed in a Teagasc survey of seasonal variation in mineral nutrition on 44 dairy farms conducted during the 2013 grazing season across the main dairy regions of Ireland. On average, a pasture only diet would have provided 0.25mg iodine per kg DM (range: 0.04 to 0.98mg). Based on the National Research Council guideline of 0.5mg/kg DM, a pasture-only diet would have provided 50% (range: 8%-190%) of the lactating cow iodine requirements. Of the grass samples analysed, 87% contained less than 0.5mg iodine per kg DM. Hence, supplemental iodine is necessary for the majority of pasture-based cows in Ireland. While grass was iodine-deficient in the 2013 survey, the total diet supply of iodine was generally excessive. When concentrate supplements were fed (especially during March and May), iodine was generally over-supplied in the total diet, with average estimated intakes exceeding 400% of requirements (Figure 1).

Figure 1. Grass iodine content and total iodine intake (mg/kg DM) at five time points in March, May, August and October 2013 and January 2014 (total only).

The National Research Council (2001) recommendation is 0.5mg iodine/kg DM for lactating cows (indicated by the green bar on the y-axis). The current Irish recommended lower (12mg/day) and upper (60mg/day) iodine supplementation rates equate to 0.9mg/kg DMI and 3.63mg/kg DMI (blue and red bar on the y-axis, respectively).

Implications of excess iodine intake on milk iodine concentrations

Iodine toxicity is especially important for new-born infants, who are more sensitive to iodine toxicity because of an immature thyroid gland. Infant milk formula (IMF) is a key market for the growing Irish dairy industry, but milk produced when cows are fed surplus iodine in supplemental concentrate is generally unsuitable for inclusion in IMF. Iodine concentrations in raw milk (bulk tank) should be maintained between 20 and 150 μg/kg. This ensures that cows are maintained in adequate iodine status, and that the milk produced is safe for a diverse product portfolio.
Reassessment of Irish recommendations

Until spring 2017, the animal compound feed industry in Ireland had adopted using 60mg iodine per day as the ‘normal’ supplementation rate rather than 12mg iodine per day as originally recommended. In January 2017, all manufacturers of compound feed in Ireland were requested to revert to the recommended rate of 12 mg/d. In Moorepark research herds, supplemental iodine intake and milk iodine concentrations measured in September 2017 are illustrated in Figure 2. Herd 1 and Herd 2 were receiving close to the target iodine supplementation rate (dashed red line), but Herd 3 was receiving surplus supplemental iodine. Consequently, the bulk tank milk for Herd 1 and Herd 2 were well below the upper limit for milk iodine concentration (dashed blue line), but Herd 3 was exceeding the upper limit.

Figure 2. Supplemental iodine intake and bulk tank milk iodine concentrations in three research herds during September 2017.

The results clearly indicate that it is feasible to maintain milk iodine concentration between 20 and 150 μg/kg by providing approximately 12 mg iodine per day. Initial feedback from processors in 2017 indicates that the iodine specifications for the IMF market has been easier to achieve than in previous years, reflecting the prompt changes to the iodine inclusion rate implemented by the majority of feed manufacturers in line with Teagasc guidelines. Co-operation from dairy farmers, the feed industry, dairy nutritionists and veterinarians is required to continue using the recommended 12mg per day of iodine, facilitating profitable and sustainable growth of the Irish dairy industry.

Acknowledgments

We gratefully acknowledge the farmers that participated in the 2013 mineral survey. The research was supported by Teagasc core funding and the Dairy Levy Trust.
Lessons from the Next Generation Herd

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Summary

• The Next Generation Herd study at Teagasc Moorepark is evaluating the performance of two divergent Holstein-Friesian groups ranked on Economic Breeding Index (EBI).
• Economic analysis undertaken using biological data generated in the study indicates superior profit per lactation from cows selected for high EBI.
• Performance differences are in line with expectation based on EBI. Thus, EBI is delivering more profitable dairy genetics.

Introduction

The goal of the EBI is to identify animals whose progeny will be most profitable under future Irish production systems. The establishment of a Next Generation Herd represents a futuristic national herd, and is a strategically important resource providing a “forward view” of the performance implications of high EBI herds under varying grazing strategies, and also to enhance the future development of the EBI.

The Study

The Next Generation Herd was assembled during 2012. Maiden heifers, in-calf heifers, and heifer calves were sourced from commercial dairy herds and from within Teagasc dairy herds. Before purchase, all animals were subjected to genomic testing and rigorous health screening. There are two distinct EBI groups; 90 ELITE (extremely high EBI; €154 (ICBF, May 2017)) and 45 national average EBI (NA; €51 EBI) females. The herd is exclusively Holstein-Friesian and genetic diversity has been maximised. Of the 90 ELITE heifers assembled for the trial in 2012, 40 sires, 83 grandsires and 27 maternal-grandsires are represented. The ELITE females are firmly inside the top 1% in the country based on EBI. The first animals (all parity 1) calved in the spring of 2013. In 2016, the herd represented a mature herd profile, comprising animals of parity 1 to 4.

Table 1. Summary statistics of the Next Generation Herd.

<table>
<thead>
<tr>
<th>EBI</th>
<th>Sub-Indices (€)</th>
<th>Milk</th>
<th>Fertility</th>
<th>Calving</th>
<th>Beef</th>
<th>Maintenance</th>
<th>Health</th>
<th>Management</th>
</tr>
</thead>
<tbody>
<tr>
<td>ELITE</td>
<td></td>
<td>37</td>
<td>80</td>
<td>33</td>
<td>-12</td>
<td>13</td>
<td>1</td>
<td>2</td>
</tr>
<tr>
<td>NA</td>
<td></td>
<td>17</td>
<td>13</td>
<td>26</td>
<td>-8</td>
<td>2</td>
<td>1</td>
<td>0</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th></th>
<th>Milk kg</th>
<th>Fat kg</th>
<th>Prot kg</th>
<th>Calv Int</th>
<th>Survival</th>
</tr>
</thead>
<tbody>
<tr>
<td>ELITE</td>
<td>-18</td>
<td>+7.2</td>
<td>+4.2</td>
<td>-4.2</td>
<td>+2.3</td>
</tr>
<tr>
<td>NA</td>
<td>+46</td>
<td>+4.1</td>
<td>+2.5</td>
<td>-0.9</td>
<td>+0.2</td>
</tr>
</tbody>
</table>

The two EBI groups were evaluated across three contrasting seasonal pasture-based feeding treatments: 1) intensive grazing; CONTROL, 2) high stocking rate with tighter grazing residuals; LGA, and 3) intensive grazing with additional concentrate feed (+4 kg daily) offered throughout lactation; HC. Mean parity structure and calving date were maintained similar across each EBI group in each year of the study.
Results
Based on the first four years of the study, the NA cows consistently out yielded the ELITE cows in terms of milk volume. The ELITE cows, however, had a higher milk solids yield due to higher milk fat and protein content (Table 2). Response rate to concentrate supplementation was similar in both groups at 0.86 kg and 0.99 kg of milk per kilogram of concentrate in the ELITE and NA groups, respectively. Response rate to concentrate supplementation in terms of milk solids production did not differ between the ELITE (0.07 kg /kg) and NA (0.07 kg /kg) groups. Somatic cell count (116,000 cells/ml and 130,000 cells/ml), incidence of mastitis (9% and 14%), and incidence of lameness (9% and 11%) did not differ between the ELITE and NA groups, respectively. On average the ELITE cows were slightly lighter but had higher body condition score throughout lactation. Total dry matter intake (TDMI) did not differ. Milk solids production per kilogram TDMI did not differ between ELITE (0.96 kg/kg) and NA (0.96 kg/kg), suggesting little differences in production efficiency. TDMI per hundred kilograms of body weight was higher in ELITE cows (3.3kg/100 kg BW) compared to NA (3.2 kg/100 kg BW), suggesting differences in the partitioning of energy ingested. Large differences in fertility performance were observed. Survival Analysis confirms greater longevity of Elite cows, with 60% and 40% of the ELITE and NA cows surviving to the end of 4th lactation, respectively.

Table 2. Study outcomes 2013 - 2016

<table>
<thead>
<tr>
<th></th>
<th>ELITE</th>
<th>NA</th>
</tr>
</thead>
<tbody>
<tr>
<td>Milk yield (kg/cow)</td>
<td>5413</td>
<td>5612</td>
</tr>
<tr>
<td>Fat (%)</td>
<td>4.47</td>
<td>4.19</td>
</tr>
<tr>
<td>Protein (%)</td>
<td>3.72</td>
<td>3.55</td>
</tr>
<tr>
<td>Milk solids (kg)</td>
<td>443</td>
<td>434</td>
</tr>
<tr>
<td>Average body condition score (1-5)</td>
<td>2.92</td>
<td>2.74</td>
</tr>
<tr>
<td>Average weight (kg)</td>
<td>504</td>
<td>514</td>
</tr>
<tr>
<td>Total Dry matter Intake (kg)</td>
<td>17.6</td>
<td>17.5</td>
</tr>
<tr>
<td>Pregnancy rate to first service (%)</td>
<td>60</td>
<td>46</td>
</tr>
<tr>
<td>6 week in-calf rate (%)</td>
<td>73</td>
<td>58</td>
</tr>
<tr>
<td>12 week in-calf rate (%)</td>
<td>92</td>
<td>81</td>
</tr>
</tbody>
</table>

Preliminary economic analysis was carried out using the Moorepark Dairy Systems Model, a stochastic budgetary simulation model, integrating biological data for each EBI group, and incorporating animal inventory and valuation, milk production, feed requirement, land, labour, variable and fixed costs. Biological data generated in the Next Generation Herd Study, was extrapolated to simulate a 40 ha unit for each EBI group. Replacement rate (17% ELITE, 27% NA) was established using the involuntary culling rate (8% ELITE, 19% NA) observed in the study (Table 2), plus a voluntary culling rate of 10% of the remaining animals in each EBI group. Milk production of each parity group (29c/l base price) over the 4 year study period was applied to the simulated parity structure of the ELITE and NA herds modelled. As a consequence of a more mature parity structure in the ELITE, combined with earlier calving date, milk solids production per cow was 30kg greater in the ELITE. Simulated profit differences (Table 3) observed (in excess of €200 per cow and €600 per ha in favour of ELITE cows) are very much in line with expectation based on EBI.

Table 3. Economic simulation of study outcomes - 40ha unit

<table>
<thead>
<tr>
<th></th>
<th>ELITE (110)</th>
<th>NA (110)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Net Profit per cow (€)</td>
<td>844</td>
<td>622</td>
</tr>
<tr>
<td>Net Profit per ha (€)</td>
<td>2322</td>
<td>1709</td>
</tr>
</tbody>
</table>

Conclusion
The results provide confidence that EBI is working to identify more profitable dairy genetics. Irish dairy farmers must continue to genetically improve their herds, thus, improving milk solids production, fertility and longevity. The latter is still the greatest challenge to maximising profitability from seasonal pasture-based production.