Irish Grassland Association

Quarterly Newsletter Issue No. 30 Winter 2015

"To advance the knowledge of good grassland management in Irish farming"

"Grass silage in Ireland – developments and future needs"

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Contents

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Irish Grassland Association President's Address

Dear Member,

Let me give you a quick taster of the latest edition of the Irish Grassland Association's Newsletter. It is another full edition.

For starters we have a preview of our upcoming dairy conference. It takes place on Thursday 7 January 2016 in Limerick. The theme of this year's event is overcoming volatility in dairying. Addressing the conference will be some of the countries' leading dairy farmers, agri-consultants, researchers and agribusiness personnel. Early booking for Dairy Conference tickets is strongly advised as places will be limited and this event sells out early every year. Further details and how to register for discounted rates (page 6).

Taking a look back at our most recent events we have a report on our student conference (page 8) and the AutoGrass Milk event (page 10). The student conference was held on Monday 12 October on two farms, Brian Nicholson's, Johnstown, Co Kilkenny and Pat and Padraig Walshe's, Durrow, Co Laois. Tommy Moyles details the key drivers for these farmers.

The Irish Grassland Association in conjunction with its AutoGrassMilk partner Teagasc hosted an open day on the farm of Aidan and Anne Power, Co. Tipperary on Wednesday 7 October. This event showcased the use of a robotic milking system in an intensive grazing farm. Some of the key issues involved in combining automatic milking with grass based systems, and practical tips and lessons learned from Aidan and Anne Power are outlined by Deirdre Hennessy.

We take a second look our student bursaries. Cormac McElhinney (bursary winner) gives us a snapshot of the first International Silage Conference to be held in the southern hemisphere which took place in Piracicaba, São Paulo, Brazil from 1-3 July this year (page 12).

Pat Donnellan follows on from his recent article on the BDGP scheme with a farmer focus article. We find out what the scheme means to Edward Butler (suckler farmer, Danesfort, Co. Kilkenny (page 13). Denise Weeks and Matthew Murphy ('A Year in my Wellies') give us their latest updates (page 14).

In our opinion section Padraig Kiely gives us his view on grass silage in Ireland including developments needed in Irish silage production (page 16).

We have two technical articles one on winter finishing of cattle and another on seed testing. Mark McGee from Grange outlines the factors that affect feed efficiency in beef finishing systems (page 20).

John Joe Byrne (DAFM) gives an overview of seed testing in Ireland and details the seed testing services at the Official Seed Testing Laboratory (page 23).

We continue our series of articles on the important topic of Health and Safety. I would urge you to take time to read Andrew Reilly's article on Safe Animal Handling (page 26).

Finally, under our news section Ciara Feehely (Vita) details how the humble spud is vital in the developing world and in particular to the rural farming families of Africa, where its cultivation under the Vita Potato Programme is lifting them out of the poverty net (page 28). We have dates for your 2016 diary (page 30). We are also seeking nominations for our lifetime merit award (2016). Details of previous winners and how to nominate (page 31).

I hope you enjoy this edition of our newsletter and I wish you and yours a merry Christmas and a happy new year!

Yours Sincerely,

Karen Dukelow

Karen Dukelow
Irish Grassland Association President 2015/'16

Preview: Irish Grassland Association 2016 Dairy Conference 'The Ability To Overcome Volatility'

Rosalyn Drew,
Irish Grassland Association
and Drummonds

THURSDAY 7TH JANUARY 2016 at the RADISSON BLU HOTEL, LIMERICK

The annual Irish Grassland Association National Dairy Conference, sponsored by Yara, takes place on Thursday 7 January 2016. The theme of this year's event focuses on some of the strategies required to overcome volatility in dairying. Addressing the conference will be some of the countries' leading dairy farmers, agri-consultants, researchers and agribusiness personnel.

Over the past decade milk price volatility has become an increasing feature of the Irish dairy industry. Farmers who recognise the challenges it presents and adapt accordingly will continue to operate profitable and viable farm businesses. This conference will focus on the key areas of grassland management; financial management; and cow nutrition and fertility to overcome the volatility they face outside the farm gate.

The latest recommendations and guidelines for maximising the use of grass, supported by data generated from farmer-users of the PastureBase programme will be discussed by Dr. Michael O'Donovan, Teagasc Moorepark. Cork-based dairy farmer Shane Crean will detail his transition to a grass-based system of milk production and his plans for the grazing season ahead on his farm.

Dr. Finbar Mulligan of UCD will review the latest research and guidelines for the management of spring calving dairy cows on low input grass based diets pre- and post-calving. This will be complemented by Dr. Mary Herlihy of Teagasc Moorepark who will review the key findings from her farm-based study of cows after calving. Mary will discuss the trends in body condition score change and reproductive performance that she observed on Irish dairy farms.

Developing a business strategy that will ensure dairy farms remain financially viable even in times of low milk prices is an area that is sure to be of interest to all dairy farmers. Three speakers: Noel Gowen of Grasstec, Tadgh Buckley, AIB and Barry Murphy, FDC Accountants will each present their thoughts on current market outlook, who is making progress, and strategies dairy farmers should adopt for 2016.

Finally two farmers will review the progress made on their farms over the past few years. They will also outline the future plans for their farms and describe the strategies that they intend to adopt to achieve their plans.

On the morning of the 2016 Dairy Conference, there is an exclusive opportunity for 130 Irish Grassland Association members who book tickets to meet at a free private breakfast gathering prior to the conference. The 2016 guest speaker is Dr. Edmond Harty, DairyMaster. He will address the topic 'The importance of innovative ability in times of volatility'. This element of the day is very popular and tickets have sold out within three days. Online booking is the quickest method to secure your tickets (plus you will also avail of the best discounted conference tickets detailed below). If you have any queries you can call the Office Manager, Maura Callery, on 087 9626483.

Dr. Edmond Harty

Early booking for Dairy Conference tickets is strongly encouraged as places will be limited and this event sells out early every year. A special 20% discounted registration fee (€40 for Irish Grassland Association members and €80 for non-members) applies to registrations up to and including Monday 28 December. You can register and avail of these prepaid discounts online at **www.irishgrassland.com.** Conference registration fee includes attendance at the conference, copy of the conference papers, refreshments on arrival and a 2 course lunch. Please note that as part of our initiative to attract new members, the conference registration fee for non-members also includes one year's FREE membership to the IGA (for all new direct debit memberships). So, if you are a non-member and thinking of attending, then don't miss out on this excellent offer!

We would like to thank our sponsors YARA

Irish Grassland Association Student Conference Review

Tommy Moyles
(IGA Council Member)

The Irish Grassland Association (IGA) held its student conference on two farms last Monday, 12 October, one sheep and one dairy.

Sheep Farm: Brian Nicholson, Johnstown, Co Kilkenny

The students received a rundown on the farm from Brian and his Teagasc adviser, Terry Carroll. The adviser highlighted the importance of reseeding and told students that a new reseed and a 30-year-old permanent pasture are two completely different crops. The new reseed will grow vigorously earlier in the year and will deliver better animal production. Meanwhile, an older permanent pasture will not grow productively until early summer. He added that reseeding is similar to buying land, only cheaper! Carroll reminded those present that grass farmers have many similarities. The one thing that differentiates them from each other is the type of protein they sell – meat or milk.

Management skills drive farm profitability with the key areas on Brian's farm being:

- Stocking rate
- Prolificacy
- Grassland management

Despite targeting prolificacy, Brian would prefer not to see triplets. He aims to have 1.8 lambs/ewe to 2 lambs/ewe. "Triplets create work and higher mortality," said Brian. "I aim for optimum production." Brian really got the students' attention when he said he estimated his average working week on the farm to be 35 hours. He and his family take one holiday every year. Brian employs one part-time labour unit three days a week. During lambing and when the farm is particularly busy, an extra labour unit is employed. "For the duration of lambing, there is always someone present in the yard," said Brian. "We have three eight-hour shifts here. When you're on, you're on and when you're off, you're off." His advice to prospective young farmers was to give themselves peace of mind by establishing their farms well. He focused on grass, housing facilities and stock – in that order.

When questioned on whether he should increase ewe numbers or take on extra heifers to contract-rear, he said that he would weigh up his options after this year. "Your time is more crucial, there is no point running around like a busy fool."

Dairy Farm: Pat and Padraig Walshe, Durrow, Co Laois

Pat has been home on the farm just over two years now having completed an Agricultural Science degree in UCD. Padraig gave the background on how the farm was built up and the challenges it faces. "Stagnation in farming is going backwards, as a business can't stand still," said Padraig, "There are high land rental prices in the area and our farm is surrounded by a main road, forestry and Durrow town."

To grow their farm from their limited land block, they have gone into partnership with another farmer. Pat is focusing on keeping the farm simple and does this by growing as much grass as possible on the milking platform, which is currently stocked at 3.4 cows/ha. "It's not a simple matter of just increasing numbers without looking at all factors," said Pat. "More cows don't always make more profit." The Walshes place great value on discussion groups. Padraig and Pat are in two discussion groups each. Pat advised the students to "farm your own place as best as you can and put yourself in a position to avail of any opportunities that may arise."

Brian Nicholson speaking to students about his grassland management

Padraig Walshe host farmer with Rosalyn Drew Irish Grassland Association council member

Review: Farm walk on the farm of Aidan and Anne Power, Co. Tipperary

Deirdre Hennessy,
Teagasc Moorepark

The Irish Grassland Association in conjunction with its AutoGrassMilk partner Teagasc hosted an open day on the farm of Aidan and Anne Power, Co. Tipperary on Wednesday 7 October. This event showcased the use of a robotic milking system in an intensive grazing farm. The Powers milk 95 cows through two milking robots on their 43 ha dry, hilly farm. Aidan described the importance of cow trafficability to a system like this and how allocation of grass is the engine that drives it to delegates. Teagasc Moorepark researchers presented some of the preliminary findings of the AutoGrassMilk research project and answered questions. Some of the key issues involved in combining automatic milking with grass based systems, and practical tips and lessons learned from Aidan and Anne Power are outlined here.

Grassland Management

- It is important to know the size of every paddock on the farm.
- Estimate cover at least weekly and in each paddock as cows enter it.
- In the AB system as on Aidan and Anne's farm, daily grass allocation is approx. 50:50 for A and B.
- In an ABC system allocate one third of the daily allowance in each block
- In the first year of conversion to AMS, err on the side of being too tight in herbage allocation. If the allocation is too lax it upsets cow movement. After a while cows will learn the time of gate change between blocks and will begin to automatically move block themselves.
- Weather can affect the rate of cow movement, for example, cows can get lazy in hot weather.
- Use the previous grazing as a guide to accuracy of grass allocation.
- Need flexibility – back fencing, plenty entrances to paddocks, flexibility with fences.
- Extra cow tracks can make a big difference. They should be approximately 2.5 m wide. If they are just used in spring and autumn they can be created simply by using a wire and taken down for the rest of the year.

Cow Management

- Start training cows and heifers when they are dry by walking them through the robot and giving them concentrate.
- Allow 2 to 3 days for heifers to walk into the unit without encouragement.
- Once calved and milking it will take another 4 – 5 days to train to milking (noise, clusters on and off, etc.).
- If a heifer is cross Aidan puts the calf outside the unit, the heifer stays calm once she can see the calf next to her.
- Aidan and Anne keep freshly calved cows together for the first few days and milk them as a batch to help the heifers settle and to collect the individual cows colostrum for her calf.
- You need to watch the cows and particularly the heifers in the yard to ensure they understand the grazing gate which leaves them out to grass.

- There is a risk that heifers could get stuck in the yard and not get through the grazing gate at the start. Once they go through it a few times (4-5 days) they are usually fine for the rest of the year.
- Check cows twice a day; don't just look at the computer.
- Generally once cows are trained they do not need to be retrained the next year.
- Give cows time to learn the system.

Aidan and Anne Power - Lessons Learned

- Very important to go through the data twice a day on the system.
- The first year is difficult getting used to the system and the data but it is very manageable when you get used to it.
- Learn how to do the basics like changing liners, simple repairs.
- Need to stay on top of grass quality – stagger topping and taking out bales between blocks so quality is the same in all.
- Give cows time to learn the system.
- Requirement to collect cows from the paddock varies depending on time of year. In general they tend to be slower to come in in the autumn as milk yield declines.
- There tends to be more alarms from the system in spring with fresh calvers.
- With time, operator will learn a lot about the alarms and issues associated with the alarms.
- The first year is difficult as you, and the cows, get used to the system.
- Spend time with the grass management, cow management, AMS maintenance and data assessment every day, persist with this in the first year and by the second year the system will operate much more fluently for both farmer and cows.

System Management & Summary

- Automatic milking systems (AMS) can be integrated into a grazing system. In the first year one to commit time and patience with a hands-on approach to the management of AMS information/data, cows and grass.
- International research recommends a 3-way (ABC) rather than a 2-way (AB) system of grazing as it has been shown to enhance cow movement and increase the utilisation of the AMS.
- Teagasc research indicates that in late lactation reducing milking frequency reduced time spent waiting to be milked in the yard and slightly reduced milk yield by 0.7 kg/cow/day. In addition the milk production response to autumn concentrate in an AMS is similar to conventional system.
- A double AMS compared to a medium spec conventional milking system, both with 140 cows, is estimated to be less profitable over 10 years. However, the decision to invest in an AMS is influenced by more than just profit, such as less physical labour, more flexibility in the working day and the overall reduction in the length of the working day.

Further information

AUTOGRASSMILK: **http://autograssmilk.dk/**

TEAGASC: **http://www.agresearch.teagasc.ie/moorepark/automation-and-technology/index.asp**

Philip Donoghue opening proceedings

Aidan and Anne Power and Family

Irish Grassland Association

teagasc Agriculture and Food Development Authority

AUTOGRASSMILK

Attendance at XVII International Silage Conference, Piracicaba, Brazil, 1-3 July, 2015

Cormac McElhinney,
Teagasc

SECTION 2 REVIEW

I received an Irish Grassland Association student bursary to attend the first International Silage Conference to be held in the southern hemisphere took place in Piracicaba, São Paulo, Brazil from 1-3 July. Over 250 delegates from 39 countries attended the conference and 26 oral theatre presentations and 183 scientific posters were shared. The proceedings of the conference are available at http://www.isc2015brazil.com/pictures/Proceedings-of-the-XVII-International-Silage-Conference-Brazil%202015.pdf

Major areas of interest included silage microbiology and safety, additives, gasses and volatile organic carbon, agronomic management and processing, feeding value, silo and silage management, and mycotoxins. Our own study from Teagasc, Grange looked at the characteristics of mycotoxins in farm silages in Ireland. This study found that the type and concentration of mycotoxins were similar among baled and pit silage in Ireland and that the concentration of mycotoxins did not exceed E.U. legislative levels. The paper was well-received and very important feedback was obtained from the attending delegates.

The following is a snapshot of some interesting research presented at the conference:

- A study from Switzerland (P 180 – 181) looked at the influence of different slurry application methods on grass silage quality In this study different slurry application techniques (broadcast, band-spread and trailing shoe) were tested and it was found that the different techniques influenced the number of clostridia spores on the forage as well as the silage quality. Additionally, the time of slurry application had an effect on both clostridia values and silage quality.
- Researchers from Germany (P182-183) looked at the effect of aerobic exposure before and after ensiling on maize silage quality The found that the time taken until maize is fully sealed from air influenced dry matter losses and aerobic stability. Delaying sealing by 4 d caused high dry matter losses and low aerobic stability. The longer the duration of aerobic exposure after opening, the more pronounced was the microbial development.
- The effect of the addition of an exogenous protease on the fermentation and nutritive value of maize silage stored at two temperatures was examined in a project from Denmark (p162-163). They found that exogenous protease enzymes increase starch digestibility in some maize silages where vitreous starch in flint kernels may be slow to digest. However, during extended ensilage at warmer temperatures the digestibility of this starch also improves.
- A team of researchers from INRA in France presented findings on a study investigating the digestibility and degradability of starch and cell walls in maize silage (P470-471). This study showed that the classification of maize silages in relation to rumen degradable NDF/starch ratio could be helpful when formulating ruminant diets or evaluating nutritive value of maize silage in future feed evaluation systems.

Interactions and discussions outside the conference theatre complemented the scientific programme. Two dairy farms and one beef farm were visited as part of the conference tour and these were operated as follows:

1. **Taina dairy farm**
   This is a 200 cow farm based on Holstein breed cows grazing tropical grasses [Jiggs (46% dry matter (DM); 15.4% crude protein (CP)) and Brachiaria (36% DM; 6.4% CP)]. Average milk yield is 22.6 kg milk/cow/day. The farm area is primarily used for haylage (58 ha) and grazing (29 ha). The soil is very sandy in nature and its organic matter content has been gradually increased from 0.5 to 3.0%.
2. **Ferraz beef farm**
   This beef farm is based on Nellore beef cattle (250 cows; calves sold at 7 months) extensively grazed on 350 ha Brachiaria tropical grass. They also have 350 ha of sugarcane and 350 ha of forest. Cows are supplemented only with minerals; weaned calves supplemented with chopped sugarcane, urea and concentrates.
3. **Sao Jorge dairy farm**
   The Soa Jorge dairy farm is a total confinement system with animals permanently housed in a cross ventilation shed. The farm's cropping system is; 100 ha maize and sorghum silage (35 ha is irrigated) and, 20 ha tifton haylage. There are 300 Holstein cows producing 36 kg milk/head/day at 170 days in milk.

Farmer Focus: Edward Butler, Danesfort, Co. Kilkenny

Pat Donnellan
(IGA Council Member and ICBF)

Edward and Olivia Butler with their children Miriam (two) and Ellen (four) on their farm in Danesfort, Co. Kilkenny.

Given that the new BDGP Scheme was launched this year and has caused a considerable amount of debate amongst farmers, we felt it appropriate to focus in on a farmer that has joined the scheme and find out what it means to him.

Edward Butler is a suckler farmer from Danesfort, Co. Kilkenny. His 70 cow herd is well known in the area as it often hosts farm walks and discussion group events. Edward's father Richard has always been extremely involved in the farm and has always had a particular interest in the breeding side of their suckler operation.

So it comes as no surprise that given the close scrutiny that new stock bulls have received from them pre-purchase over the years, that the new Genomics scheme was something that really caught Edward's eye, 'Genomics is something I look forward to'.

He runs 3 stock bulls on the farm; two Simmental and one Limousin. The herd has all the hallmarks of one that has been placing extra emphasis on introducing new and improved genetics on a constant basis given that of the 4 & 5 star females in the herd, 14 are cows and 35 are heifers. The herd is totally self-sufficient in terms of breeding its own replacements so the same cow lines are going back generations into the herd.

Edward's Simmental bull, Clonagh Dynamo Star, is sired by Banwy T-Rex (S699). He has a Replacement Index of €198 (5 stars within and across breed). He has a milk figure of +15 kg (5 stars) and a fertility figure of -1.6 days (4 stars). His first daughters are due to calve next spring with an average Replacement Index of €127 (5 stars).

Beef Data and Genomics Programme

A lot of discussion has taken place about the BDGP scheme since it was launched. Edward has a very straightforward opinion about the scheme; *'I consider it a very innovative, positive scheme and I didn't hesitate in signing up for one minute. There are huge potential benefits both for me on my own farm and for the national suckler herd. I feel that the scheme has secured vital data flows for the next 6 years which were started in 2008 with the old suckler scheme. The continuous collection and accumulation of data coupled with the power of genomics will make the Euro-Star indexes a powerful breeding tool. We have always bred our own replacements here. I have a Simmental bull with a Replacement Index of •198 (pictured). The first of his daughters will be calving down next spring at 24 months and I am very impressed with his stock. I would never buy a bull without having first checked his index. Of course, the bull still has to be visually assessed for functionality, docility and overall quality; but the Euro-Star index has to be taken into account as well. A big problem is that too much emphasis is being put on the visual appearance of beef animals and little or no emphasis on their genetic merit. I think if the pedigree show scene started to put some emphasis on the genetics of animals it would help to change this.'*

Genomics

Genomics is a recent development in genetic evaluations which uses the DNA of an animal (from tissue, hair, blood or semen) in addition to other performance data on relatives. This results in a higher reliability genetic evaluation at a younger age, even before the animal has produced any offspring.

The use of genomics over the past 5 years has greatly impacted the dairy industry world-wide. While traditionally one had to invest 4-5 years into a young bull to get an accurate picture of his breeding values based on his progeny's performance, with genomics one can predict an animal's breeding value soon after birth with high accuracy. The use of genomics to identify top sires early has resulted in an estimated 50% improvement in the genetic progress of dairy cattle. Recently the same process has been applied to dairy heifers, thus allowing a farmer to select the top replacement heifers. This year the Beef Genomics Scheme will provide Ireland with the necessary foundation to begin applying the power of genomics to the beef industry.

Clonagh Dynamo Star

Once genomic breeding values for beef cattle are available a farmer would be able to genotype his potential replacement heifers and bulls and quickly identify the predicted top and bottom performers.

Edward is positive about the potential of genomics; *'I have read up quite a bit on it. To think that you can take a DNA sample from a young heifer calf and get a more accurate prediction of how that heifer will potentially perform as a cow in your herd in the future, is something to really look forward to.'*

A Year in my Wellies

DENISE WEEKS, DAIRY BUSINESS DEGREE GRADUATE, CO. LIMERICK

At the beginning of October, I started working for Shane Maxwell in Lismore, Co. Waterford. The farm manager Esther Walsh was recently featured on Ear to the Ground. Over 800 cows are being milked at present across two milking platforms. The two farms are seven miles apart. I am based on the farm with the mature herd. At present there are 350 cows on a 134 hectare (ha) milking platform. Next spring the plan is to increase numbers to 420 cows.

October was an excellent month for grass growth on the farm. Growth remained above 30 kg dry matter (DM)/ha/day for the month. The cows went in by night at the beginning of November due to the poor weather conditions. Grazing still continues by day, weather permitting. The average farm cover on the 10th of November was 704 kg DM/ha. At this stage 75% of the farm has been closed for the spring time. Paddocks that received slurry in early October are currently being grazed. These paddocks have a cover of between 1300-1500kg DM/ha. At present the plan is to keep the cows grazing until the last week of November. We are trying to strike a balance between fully grazing out paddocks and setting the farm up for the spring, avoiding poaching and keeping the cows fully fed. If any of these areas begins to suffer our closing date will change.

At present the cows are doing 1.35 kg milk solids (MS) on 2kg of meal. The farm has a 50 bale rotary. At this time of year milking is taking 1 hour and 15 minutes and 1 hour in the evenings. The mature herd is on target to supply 457 kg MS/cow this year. The second herd has a much younger herd profile - 40% are heifers. The younger herd will supply around 410 kg MS/cow. All the cows are still milking at present but one herd will be dried off by the 25th of November. The younger herd have a very short calving period. They will all be calved in 6 weeks next spring. Any cow that calves outside the first six weeks moves to the other farm. Having two milking platforms offers great flexibility. The two platforms are essentially the one farm but the herd is split by calving date and age. As we will milk on until Christmas with the mature herd, any later calving cows from the younger herd will move to the mature herd as the younger herd is dried off.

On the home farm we are milking 180 cows. We have dried off some early calvers and cows who need to put on condition before calving. Calving down every cow at a body condition score (BCS) of 3.25 is the target for the next year. We did a BCS on the whole herd a few weeks ago and will batch cows based on condition. We picked out 22 of the 180 cows to dry off early. Our in-calf heifers are in excellent order and weighed 468 kg on average on the 13th of November.

We plan to have all the cows dry by the 18th of December. Grazing at home finished in early November. We have tried stretching out grass for longer by housing at night in early October before but have found it difficult to keep the cows content and grazing out properly. Instead we prefer to keep the cows out full time until we have reached our target cover. This year we shut the farm with an average farm cover of 480 kg DM/ha. At present, farm cover is 650kg DM/ha. It's not what Teagasc recommends but every farm is different and we have found what works best for us.

This time of year is a good time to start planning for 2016. Recently we had a herd health meeting with a vet to plan out our vaccination and dosing schedule for the year. It was a really worthwhile exercise. Herd health is a big cost on farm. We are trying to be proactive rather than reactive and consider vaccinations our insurance policy for the herd.

Even though it's still only November as I write this, I am already looking forward to Christmas. It is one of the few days in the year the whole family spends the whole day together in our house. I think it's important to have a decent break and recharge the batteries before calving kicks off in early February. This time of year is a great time to get in some relief help and take some evenings off. Catching up with friends from college can often prove a challenge as we are spread all over the country. Recently a number of us met up at Macra's Queen of the Land festival in Tullamore. This was my second year attending. Macra is a great way to meet people and get off the farm for a few hours.

A Year in my Wellies

MATTHEW MURPHY, NEWFORD HERD, ATHENRY, GALWAY

Our focus has changed in the last week from tending to animals outdoors to tending to animals indoors. We tried to minimise stress around weaning by carrying out the primary husbandry tasks before the weaning process begins; our male calves were castrated a month before weaning, all calves received their vaccines pre weaning and also dosing for worms was carried out pre weaning. This led to a pretty trouble free weaning process and we managed to keep our weanlings out until 18th November. We started to close our paddocks on 5th October and the cover on these paddocks has now accumulated to 1400kg/DM/ha. We actually managed to grow 35 kg DM/ha for the 2nd week of November and our closing cover is at 825 kg DM/ha which is probably higher than we had budgeted for. We have closed the farm in 3 blocks or sections, 1/3 of the farm was closed by 15th October, another 1/3 by the 1st November and the farm was all closed on 18th November. Obviously the first 1/3 is the area that we will graze first in spring.

We grew just over 9 t grass DM/ha for 2015 up until 30th September. We have been monitoring weanlings closely since housing for any signs of pneumonia and we have had just 1 case so far. These weanlings are due to be clipped and dosed for worms next week and will be dosed for fluke closer to Christmas. Cows will be clipped and condition scored next week and will also receive a lice treatment and fluke dose closer to Christmas. Our silage results came back and we are pretty pleased with the outcome: 1st cut came back at 22% dry matter, 10% protein, and 70% DMD, second cut was 34% DM, 12% protein and 68% DMD and our surplus bales removed from grazing paddocks during the summer came back at 26% DM, 14% protein and 78% DMD. We are currently feeding these bales back to our weanlings. Bull calves are getting 2 kg concentrates/head/day and heifer calves are getting 1.5 kg/head/day. Finishing cattle are currently on 7 kg concentrate /head/day and ad-lib first cut silage. Our ration is made up of a simple 3 way mix; barley, maize meal, and soya hulls. I got the opportunity to travel to the Agri-technia show in Germany a couple of weeks ago. I thoroughly enjoyed the trip and it was great to see the new machines that are coming down the road. I spent some time looking at one-pass reseeding machines and was especially impressed with the guttler machine. While machinery is completely off limits here in Newford, it's nice to see what's coming down the line.

Grass silage in Ireland – developments and future needs

Padraig O'Kiely,
Teagasc Grange

Developments in silage technologies

Ruminant production in Ireland is based on livestock grazing grass. However, the seasonality of grass growth means that as we strove to increase both the performance and stocking density of cattle and sheep on our grassland the requirement for a reliable and sufficient supply of reasonable quality and moderately priced conserved feed became progressively greater. This was needed mainly as the primary feed source during the winter but also to allow the livestock system cope with fluctuations in the supply or usability of grass for grazing. Up until the 1960s, surplus grass conserved in a single large harvest of hay during mid-summer met this requirement. However, further increases in animal performance and stocking density depended on greater independence from prevailing weather conditions than was feasible with hay and the advent of silage-making technologies provided a successful solution. Today, over 85% of Irish farms produce silage and the full cost of making, storing and feeding more than 1 million hectares of grass silage each year exceeds €500 million. This is a significant component of the total annual cost of feeding our national cattle herd and sheep flock.

Initially, the enabling technologies for wide scale adoption of silage were mechanisation of silage harvesting, polythene sheets for sealing the harvested grass from air, and 'self-feeding' as a labour efficient mechanism of feeding livestock. Farmer-owned direct-cut machines such as single- and double-chop harvesters were popular at the start but these were gradually replaced by contractor-owned precision-chop harvesters and balers/wrappers. The two latter systems now account for about two-thirds and one-third of all silage harvesting, respectively.

The change from direct-cut silage systems to precision-chop, pick-up wagon and baled silage systems that have separate mowing and harvesting operations has facilitated achieving successful field wilting when drying conditions are good. Quick and adequate wilting has two major benefits. Firstly, it results in the satisfactory preservation of a crop that would otherwise have preserved badly. Secondly, it results in a reduction in effluent production and this, allied to better facilities for collecting effluent, has almost eliminated incidences of pollution due to 'effluent leakage'. The reduction in effluent output has also likely reduced the extent of corrosion of the alkali concrete in silos, thereby extending their lifespan.

High output harvesting systems have greatly speeded up silage making on farms and this presents both challenges and opportunities. In the past, silage-making on a farm often took several days and it was not infrequent for over a week to elapse before the silo was sealed. During this time an often relatively small-sized tractor continually rolled the grass as the silo was being filled, generally producing adequate and even packing. Self-propelled forage harvesters can now complete the silage harvest on most farms within one day. This, in turn, means that much less time is available to evenly distribute and compact grass as it is placed into the silo. The use of heavy industrial loaders operated by skilled drivers can still produce adequate compaction, but attention to detail

is required to ensure even compaction is achieved. A major benefit of this more rapid harvesting is that the grass is placed in air-free conditions more quickly, and this positively contributes to achieving well preserved silage that will be less prone to heating during feedout provided compaction is even. A further benefit of high output harvesters is that grass regrowth commences at the one time and it is therefore easier to spread slurry on a relatively bare stubble.

Besides the obvious benefit of polythene sheeting helping provide air-free conditions during ensilage, and thus eliminating considerable top surface waste on the silage, it also initiated the era of outdoor rather than roofed silos. Black film produced from virgin polyethylene has been the standard silage cover in Ireland and the polythene sheets produced for walled and clamp silos have conformed to agreed industrial standards. More recent alternatives to standard polythene film provide a more robust barrier to air ingress, but it is not clear that this is necessarily an improvement if the more traditional standard system is optimally operated. The plastic sheets covering walled and clamp silos need to be held tightly in place to prevent billowing since this would inevitably draw air in to the silage. These sheets were originally weighed down with farmyard manure but both the need to avoid pollution and to improve labour efficiency led to a change towards the sheets being kept in place by tyres. The latter, however, although effective, still requires a lot of labour input for placement and removal.

The adoption of more efficient designs of livestock housing and manure management systems coupled with the need to optimise feed intake led to a shift from self- to easy-feeding silage for cattle. This change was originally facilitated by removing silage from the feed face using mechanical forks and grabs on front-end loaders, and these in turn have been succeeded by shear-grabs that provide the opportunity for better management of the silage feed face. The introduction of feeder wagons has accompanied the easy-feeding of silage and other ingredients, with total mixed rations being used on some farms.

For a period during the early 1980s most silage was made using an additive. At that time both organic and mineral acids dominated the additive market, with molasses being the main alternative. During the intervening period the proportion of silage made using additives has declined to less than 5% of all silage, and with the small market for additives now being dominated by bacterial inoculants. Additives were traditionally used in Ireland mainly to aid in satisfactorily preserving relatively wet crops of grass, and a decline in their use was to be expected in parallel with a number of other changes. These include the general overall improvement in some silage-making practices (e.g. ryegrass crops, rapid filling and sealing of silos), the introduction of baled silage (where additives are not normally used), the increase in the extent of wilting being achieved, the inconvenience that applying additives presented to some contractors and the greater emphasis on reducing costs that did not demonstrate a worthwhile return on investment. In addition, the trend towards later harvesting on some farms has resulted in good preservation being more readily achieved with the grass at this more advanced growth stage and this, in turn, reduced the opportunity for a worthwhile return on investment from applying additives.

During the 1970s two cuts of silage were routinely taken on many farms and on some more intensive dairy and beef farms three or even four cuts were taken per year. However, a requirement to achieve high animal performance at reduced feed cost resulted in a progressively greater emphasis on extending the grazing season as a strategy to increase the proportion of annual feed intake coming from grazed grass. A consequence of this was that less silage and fewer silage cuts were needed. In many cases a precision-chop system is now used for first-cut silage with any subsequent grass that is surplus to grazing requirement being conserved as baled silage. This pit silage plus baled silage strategy suited spring-calving dairy herds during the era of milk quotas where national average lactation lengths of **circa** 265 days readily facilitated the aligning of lactation with the grazing season, and where a high yield of a later harvested but therefore lower digestibility first cut produced a lower cost silage for the extended dry cow period. A more planned strategy for spring-calving dairy herds of deliberately creating adequate quantities of higher digestibility (above 73% dry matter digestibility – DMD) grass for silage production, and of targeting a 305 day lactation, will be required in the post-quota era. A silage DMD target of 75% will be required for autumn-calving herds where maize silage is not available. Grass silage digestibility also needs to improve on beef farms and there are rarely circumstances where it is appropriate for silage DMD values to be below 65%. Instead, values above 70% need to become the norm for growing and finishing cattle, and with values of **circa** 75% for top performing animals. Achieving all the above targets will require the utilisation of highly productive swards within grassland management systems that optimise both the grazing and silage production components.

Silage yield and quality

Where the provision of grazed and ensiled grass are integrated within our livestock production systems it is necessary to accumulate a larger reserve of silage than is required for a single winter of average duration. This is to underpin the successful operation of the systems when weather conditions restrict grass growth or limit access to it by grazing cattle during an 'early winter' or 'late spring', or alternatively during either drought or prolonged wet weather conditions in summer.

The digestibility of silage is the main characteristic that determines its nutritive value and, disappointingly, not alone has it not improved during the past three decades but it has declined to an annual national average DMD value between 60-64%. Sub-optimal soil fertility (and sometimes impeded drainage) is an important contributor to this decline. Low soil phosphorus (P), potassium (K) or pH reduce the yield of grass available to harvest when the sward is at an optimal growth stage (and they additionally reduce the yield response to inorganic and organic nitrogen fertiliser) and, in many cases, the management response will be to defer harvesting by some weeks until sward yield has increased to a level considered necessary to justify harvesting. However, since each one week delay in harvesting results in a 2-3% unit drop in sward digestibility, this later harvested silage will result in reduced silage intake, feed efficiency and performance by cattle. These animals then need to be fed supplementary concentrates (relatively expensive) to undo the effect of the drop in silage digestibility and restore their performance to the level achievable with high digestibility silage. In addition to the above, sub-optimal soil fertility also makes it difficult to maintain the persistence of perennial ryegrass in swards. This increases the frequency and thus the cost of reseeding, and facilitates the development of non-ryegrass swards that are more difficult to preserve as silage.

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The well known general relationships between grass growth stage and digestibility can be misaligned if there is an accumulation of dead vegetation at the base of the sward. This dead vegetation, which can have a DMD below 50% and can reduce sward digestibility by 6-7% units, accumulates if silage swards are not grazed to a stubble height of 5 cm or lower when 'closed' in late autumn or early spring. The message, therefore, is that sward regrowths need to start from a 'bare stubble' when they are to be used for producing highly digestible silage. Furthermore, the grazing in spring of fields assigned for first-cut silage production needs to be completed sufficiently early to allow an adequately long duration for the full benefit of applied slurry and inorganic fertiliser accrue, and for adequate yields be produced by the time the grass is at the optimal growth stage for harvesting. Continuing to permit grazing through April too often results in first-cut silage harvesting then being deferred well into June in order to accumulate a commercially viable yield to harvest, but with a resultant compromise in silage digestibility. One additional challenge posed by spring grazing fields assigned for first-cut silage relates to them being sequentially 'closed' over the course of a three week rotation. This often results in slurry and inorganic fertiliser not being applied to the silage fields until after that grazing rotation is completed, and this is not ideal. It also results in quite a difference in when grass starts growing for silage production, and if the timing of first-cut silage harvesting is decided on the basis of the yield in the field that was the last to be grazed then the growth stage of the other fields may be more advanced than optimal for achieving a high silage digestibility.

Although the national rate of reseeding grassland is relatively low in Ireland, the perennial nature of most of the ryegrass reseeds means that a majority of fields used for silage production now have a high content of perennial ryegrass. This can provide silage yield and nutritive value benefits in some situations, and the superior sugar content of ryegrasses compared to the other species found in many old pastures also makes it much easier to preserve them properly as silage.

The incidence of bad preservation in silage is now probably less than in former times, although weather mediated year-to-year variation still occurs. However, if farmers change their grassland management in order to improve silage digestibility it is likely that these silages will be more difficult to successfully preserve. This will result in an increased requirement for rapid and adequate field wilting or for the even application of an adequate rate of effective silage preservative. It will consequently result in an increase in the need for accurate objective information on the ensilability of these crops at harvest time in order to make good tactical business decisions on the appropriate management response.

Overall, much greater emphasis needs to be placed on knowing the yield, digestibility and ensilability of crops prior to harvesting, as well as knowing the quantity and chemical composition (both nutritive value and preservation characteristics) of silage conserved. Focussed emphasis is also needed on restricting losses

during harvesting, ensilage and feedout so that as much animal production potential as feasible is retained from the silage fields.

Developments needed in Irish silage production

- Farms need to have a formal plan that covers all aspects of the silage production and feeding processes. The plan should be reviewed each year to ensure it remains fit for purpose.
- Management decisions undertaken as part of implementing this plan need to be based on having accurate quantified information on soil fertility, optimal seed mixtures to use when reseeding, nutrient inputs required and achieved from inorganic and slurry fertilisers, grass yield and ensilability at harvest, tonnage of silage available to feed, silage nutritive value and preservation characteristics, etc.
- Soil P and K status need to be maintained at Index 3 and pH at approximately 6.3 (mineral soils) to enable high yields be achieved when grass is at the optimal growth stage to harvest.
- Ryegrass swards can provide a higher yield and digestibility than some old pastures, and they are much easier to preserve as silage. Whenever ryegrass swards are established then the grassland management system must ensure they persist for at least a decade. In the future, the option of using productive and persistent multi-species swards will need to be considered.
- Swards intended for first-cut silage need to be evenly grazed to a stubble height of 5 cm or lower by the time they are being closed. If this is in spring they need to be closed sufficiently early to allow a long enough duration for satisfactory yields accumulate by the time the grass is at the optimum growth stage for harvesting.
- Grass needs to be harvested at an earlier (i.e. leafy rather than stemmy) growth stage in order to increase silage digestibility from its current very low average value.
- Some flexibility is required in harvest date, including commencing harvesting a few days earlier than planned, to account for prevailing weather conditions. Deferring harvesting when broken weather is forecast is risky as it can lead to major losses in digestibility if the wet weather continues for an extended duration. If there is not a secure forecast of settled weather following the spell of broken weather it would often be better to harvest the crop (ground conditions permitting), apply adequate effective preservative if necessary, and safely collect the effluent that would be produced.
- If wilting is to be undertaken then it needs to be both rapid and effective. This requires exposing the maximum amount of grass practicable to solar radiation.
- Greater use of silage additives will be required when grass of a less mature growth stage is harvested. Single additives are not usually excellent at all possible functions, so tactical decisions on whether aiding silage preservation, extending aerobic stability or reducing effluent output is the priority function required of an additive will need to be made the day before harvesting. The Irish market requires additives that more robustly deliver at least on the first two of these functions than most of those currently being sold.
- Silage pits are usually well sealed on Irish farms, and this achievement needs to be maintained. However, greater care is needed with baled silage to ensure the integrity of the plastic seal is fully maintained throughout storage. Damage from wildlife or mechanical handling are the main culprits for compromising this integrity.
- Major losses in feed value often occur during silage feedout, and the readily achievable reductions in such losses provide a worthwhile reward to good feedout management. This management revolves around minimising the duration of access of silage to air at the feed face or in the feed trough. In this regard, any farmers building a new silo might consider making them narrower so that the smaller feed face will be removed more quickly, thereby shortening the exposure of silage to air.
- Cattle and sheep must be offered silage in a manner that allows them genuinely eat to appetite, and this has implications for the feed space allocation required. **Ad libitum** access to silage is necessary in order for the nutritional potential of the silage to be realised by the animal.
- Health and safety dangers lurk during silage making and feedout, and the plan for silage making and feeding needs to institute actions that minimise risks to people and livestock associated with machinery operation, moving around on top of a silo, silo gases, gases from slurry when mixed with silage effluent, spores or toxins from silage, noxious weeds, etc.

Feed Efficiency in Beef Finishing Systems

Mark McGee,
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Introduction

Feed provision accounts for over 75% of direct costs of beef production. Economic sustainability of beef production systems depends on optimising the contribution of grazed grass to the lifetime intake of feed and on providing silage and concentrate as efficiently and at as low a cost as feasible. As primary feed costs on beef farms relate to indoor (winter) feeding periods, and particularly feeding of finishing cattle, this means that even small improvements in feed (cost) efficiency at these times has a relatively large influence on farm profitability.

Factors affecting Feed Efficiency

Live weight and live weight gain

For finishing cattle, approximately two-thirds of feed consumed is used for body maintenance (i.e. to maintain physiological functions). As maintenance is largely a function of weight, a heavier animal requires more feed to maintain itself, and furthermore, for a fixed rate of live weight gain, the feed energy required is higher for heavier animals. Consequently, feed efficiency is better with lighter, fast growing animals.

Duration of finishing period / slaughter weight

Growth in animals is defined as accretion of protein, fat and bone. With increasing slaughter weight, the proportions of non-carcass parts, hind-quarter, bone, total muscle and higher value muscle decrease, while the proportions of non-carcass and carcass fats, fore-quarter and marbling fat all increase. As carcass weight increases, the proportions of bone and muscle decrease and the proportion of fat increases, but the rates of these changes differ amongst breed types. Daily live weight gain over the finishing period is not constant. In general, it is higher at the beginning and declines, often progressively, with increasing duration of finishing period. For example, in Grange, daily live weight gain of steers offered a high concentrate diet over 132 days was 25% lower for the second half of the finishing period compared to the first half. The proportional fall in daily live weight gain over the finishing period is largely a function of the fatness of the animal and thus, is generally greater at high feeding levels and with more mature animals. As fat deposition requires more energy than protein deposition, more feed is required to produce a kilogram of fat. The practical implications of this are that feed efficiency deteriorates, and the feed cost per kg live weight and carcass gain increases, with increasing length of finishing period. Avoiding overly long finishing periods and ensuring that animals achieve minimum carcass fat score without impairing carcass value are ways to reduce feed requirements and costs.

Breed type / Genetics

In general, beef breeds and beef crossbreds are more feed efficient than beef x dairy breeds, who in turn, are more efficient than Friesian and Holstein. A study at Grange comparing Holstein/Friesian and suckler-bred beef cattle (slaughtered as bulls at 15 months of age or as steers at 24 months of age) showed that overall, the beef breeds gained about 23% more live weight during the finishing period per unit of energy consumed than dairy breeds. However, because of the higher kill-out proportion and the greater proportion of meat in the carcass of beef compared to dairy breeds the percentage of meat produced per unit of energy consumed was on average 51% greater for the beef than dairy breeds. Within the beef breeds, late-maturing breeds are more feed efficient than early-maturing breeds, especially in terms of muscle (meat) production. There is also large variation in feed efficiency within each breed. Recent research on feed efficiency - residual feed intake - at Grange has shown differences in dry matter (DM) intake of over 20% within populations of growing cattle for the same performance.

It is important to bear in mind that comparison of intake and efficiency data for cattle breed types must be interpreted in the context of the production system operated and animal age / slaughter end point of the comparisons, as the ranking could vary with changes in these factors.

Gender

Bulls are inherently more feed efficient than steers, who in turn, are generally more efficient than heifers. Research in Ireland and elsewhere comparing steers and bulls of similar breed, reared under similar management on the same diet and slaughtered at the same age showed that growth and feed efficiency traits were 10 to 20% better for bulls than steers. Differences in favour of bulls were generally more pronounced at higher feeding/feed energy levels and with

increasing slaughter weight. In practice, bulls and steers (heifers) are generally reared in different production systems involving different levels of feeding, particularly in winter, different lifetime ratios of grazing to indoor feeding and different ages and weights at slaughter. This means that the effects of "gender" are confounded with production system factors. The combination of these factors largely determines differences in performance obtained between bulls and steers (heifers) commercially.

Compensatory growth potential

Compensatory growth is the ability of an animal to undergo accelerated growth when offered unrestricted access to high quality feed after a period of restricted feeding or under-nutrition. Exploitation of this biological phenomenon is recommended for feeding weanlings (or 'store') cattle over the expensive indoor winter period following which they are turned out to pasture in the spring to graze cheaper produced grass. However, compensatory growth may also be expressed during the indoor finishing phase by cattle (especially those with high growth potential) that experienced sub-optimal development earlier. For animals previously grazing pasture this sub-optimal animal growth may be due to inadequate supplies/nutritive value of grazed grass.

Concentrate feeding level

Grass silage is the basal forage on the majority of beef farms in Ireland. Most of the variation in net energy content of grass silage is associated with its digestibility. Deficiencies in nutrient supply from grass silage are overcome by concentrate supplementation. For a fixed rate of gain less concentrates are required with higher digestibility silage. It is well established that the performance of beef cattle increases with increasing grass silage digestibility; each 1% unit increase in silage digestibility increases carcass gain by ca. 33 g/day where silage is offered as the sole feed and by ca. 21-29 g/day when silage is supplemented with concentrates at 0.20 to 0.40 of total DM intake. Conversely, each 1 unit decline in digestibility of grass silage requires an additional ca. 0.4 kg concentrate daily to sustain performance in finishing cattle. As level of supplementary concentrate feeding increases, the effect of forage digestibility diminishes, to the extent that at high (0.80 of the diet) concentrate feeding levels silage digestibility has little effect on carcass gain.

Increasing the level of concentrates in the diet reduces forage intake (i.e. substitution rate) and increases live weight and carcass weight gains, although at a diminishing rate i.e. a curvilinear growth response. Consequently, high digestibility grass silage with moderate concentrate supplementation can sustain a large proportion of cattle performance achieved on high concentrate diets. In general, the growth response to concentrate supplementation is higher in animals of high growth potential than those of lower growth potential (see earlier).

Optimum level of concentrate feeding

In order to determine the optimum or breakeven level of concentrate supplementation, for finishing cattle, estimates of carcass efficiency (kg concentrates per kg carcass), forage substituted (kg DM per kg carcass gain) and the true costs of forage and concentrates are required. Table 1 provides guidelines on the cost per kg of carcass gain for steers at various concentrate prices and feeding levels, assuming that the remainder of the diet is high digestibility grass silage. The results show that the cost per kg carcass increases with increasing concentrate feeding level. Assuming a breakeven point of 400 c/kg carcass, the optimum concentrate feeding level is between 5 and 6 kg when concentrates cost Ð300/t. This increases to ~7 kg when concentrate costs fall to Ð250/t, and continues to increase progressively as concentrate costs fall further.

Table 1: Cost (c/kg) of carcass gain for steers

Feeding level	**Concentrate costs** (€/t)					
(kg/day concentrate)	**175**	**200**	**225**	**250**	**275**	**300**
3	117	147	178	209	239	270
4	119	155	190	225	261	296
5	124	165	207	249	290	332
6	159	214	268	323	378	433
7	172	242	312	382	452	522
8	180	280	380	480	580	680
						Silage substituted valued at 15.0 cents/kg DM

Where silage dry matter digestibility is poor (e.g. 60%) and/or in short supply, and animal growth potential is high, feeding concentrates *ad libitum* (plus minimum roughage inclusion, ~10% of total DM intake, for rumen function) should be considered. However, of particular concern when feeding concentrates *ad libitum,* especially cereals, is the rapid fermentation of high levels of starch to organic acids resulting in acidosis. Therefore, feeding management is more important under these circumstances.

Concentrate type

Although feed nutrition databases indicate that the feed energy value of wheat is 3-9 % superior to that of barley, in practice the difference is negligible for beef cattle. In experiments carried out in Teagasc Grange, carcass weight gains and feed conversion efficiency to carcass gain were not significantly different between rolled barley and rolled wheat (6 kg fresh weight - equivalent to 0.52 of total DM intake) offered with grass silage *ad libitum.* Processed maize grain is usually included in cattle rations to increase performance and, mainly due to anecdotal evidence, to increase the rate of fat deposition, and thus achieve earlier 'finish'. The effect of replacing half the barley in a barley-based concentrate ration with maize meal (plus sufficient soyabean meal to ensure adequate dietary protein) on the performance of young dairy and suckler bulls offered concentrates *ad libitum* over 170 and 86 days, respectively, was evaluated, at Grange. In the dairy bull study, intake was higher for the maize meal-based ration but there was no difference in carcass weight between the two rations, whereas, in the suckler bull study, intake was similar between the two rations but carcass weight was higher for the maize meal-based ration. Maize meal inclusion in the diet did not enhance carcass fat deposition in either study. Also, flaked-toasted maize was evaluated in the suckler bull study; animal intake, growth and carcass traits did not differ from the barley-based control ration.

In addition to cereals, a wide variety of feed ingredients are available and used extensively in beef rations in Ireland. In practice, this means that beef rations formulated to have similar energy and protein concentrations, can range from being high in starch (of varying rumen degradability) to being high in digestible fibre. A study at Grange showed that cattle offered concentrates formulated to have similar energy and protein levels, but contrasting in ingredient composition had similar intake, growth, feed efficiency and carcass traits. Ingredients ranged from, rapidly fermented starch (barley-based), to slowly fermented starch (maize-based), to rapidly fermented starch + fibre or fibre only (pulps-based) and, were offered either as a 5 kg/day supplement to grass silage or *ad libitum* (plus 5 kg fresh weight grass silage). This implies that (net) energy (and protein) levels of beef rations are more important than ingredient content *per se.*

Current research at Grange, funded by the Department of Agriculture and the Marine, is evaluating specific by-product feed ingredients including, maize dried distillers grains, wheat dried distillers grains and soya hulls. In cattle feeding studies using a barley-soyabean meal concentrate as a 'control', ingredient inclusion level (i.e. 200, 400, 600, 800g/kg) in a barley-based concentrate, and concentrate feeding level in the diet (i.e. supplement to grass silage - ca. 0.40 of diet DM intake - and *ad libitum*) was assessed. Results showed that maize dried distillers grains had a superior feeding value (ca. 111%) to wheat dried distillers at both concentrate feeding levels. (Relative feeding value was based on dietary feed conversion ratio).

When offered as a supplement to grass silage both maize and wheat dried distillers grains had a superior feeding value compared to the barley-soya based control ration, with highest values obtained at the 800 g/kg inclusion level. In contrast, when the concentrate was offered to appetite, maize distillers had a fairly comparable feeding value (99% to 95% across all inclusion levels), whereas the feeding value of wheat distillers ranged from 107% to 80%, compared to the control ration. Under the conditions of this study results indicated that the optimal inclusion level of dried distillers grains in the concentrate was ca. 800g/kg when the ration was offered as a supplement to grass silage and ca. 200g/kg when the ration was offered *ad libitum*. For soya hulls, results based on intake, growth rate and carcass weight suggested that the optimum inclusion level in a barley-based concentrate was ca. 200g/kg, both when the ration was offered as a supplement to grass silage and *ad libitum*.

Protein supplementation

For finishing steers or heifers offered well-preserved, high digestibility grass silage there is no response to additional protein with barley. Similarly, with young finishing bulls offered high digestibility grass silage, adding soyabean meal to a barley-based concentrate gave no improvement in intake, live weight gain, carcass gain or carcass fat score. The barley had 11.5 to 12.9 % crude protein/kg DM. There is evidence that finishing cattle are likely to respond to supplementary protein in barley-based concentrates only when grass silage has moderate to low digestibility and/or low protein content.

Analysts Lab

The Official Seed Testing Laboratory

John Joe Byrne,
Director of the DAFM
Official Seed Testing
Laboratory in Ireland

The Official Seed Testing Laboratory provides seed testing services to the seed trade, farmers, tree nurseries, the general public and other divisions within the Department of Agriculture Food and the Marine (DAFM).

History of Seed Testing in Ireland

Ireland's Official Seed Testing Station was established in December 1900. The previous summer the British Board of Agriculture held an enquiry into the conditions under which agricultural seeds were sold in Britain and Ireland. Thomas Johnson who was Professor of Botany in the Royal College of Science in Dublin gave evidence to the enquiry about the quality of seed available in Ireland. Professor Johnson's initial interest in seed testing dated back to when he was studying in Germany. He noted with interest the setting up of a small number of seed laboratories and the great benefits that accrued to the seed industry and to agricultural in general. On his return to Ireland in 1895 he started a small seed testing lab within the College. His evidence to the enquiry indicated that the quality of seed offered to Irish farmers varied widely. Contamination with weed species and low seed germination and their subsequent impact on agricultural output were issues of major concern. The need for an official seed testing station was established by the Board of Agriculture. The Seed Testing and Plant Diseases laboratory was the first laboratory set up by the Department of Agriculture and Technical Instruction. Prof. Johnson was the first Director of the official laboratory, which was initially based in the Royal College of Science in St. Stephen's Green, Dublin. In 1911 as demand for the service increased the laboratory moved a short distance to more extensive laboratories in the new College of Science buildings in Merrion Street. In the run up to the 1916 commemorations it is interesting to look at the laboratory archives and note that the laboratory did not receive any seed samples for testing from Thursday April 30th 1916 until Thursday May 5th 1916 due to the Rising. The Laboratory moved to Abbotstown in 1990 when the Merrion Street buildings were converted for use by the Department of the Taoiseach. In 2005 the Laboratory moved again to its current location at the DAFM Laboratories complex at Backweston, Celbridge, Co Kildare.

History of Seed Standards

The Weeds and Agricultural Seeds (Ireland) Act 1909 gave officers of the Department of Agriculture and Technical Instruction powers to sample and test seed offered for sale by retailers. Seed marketing legislation remains in force today in the form of EU Seed standards which are enforced by DAFM Seed Certification Division.

International Seed Testing Association

Ireland was one of 26 founding members of the International Seed Testing Association (ISTA) at the International Seed Testing Congress held in Cambridge, UK in 1924. ISTA members work to achieve the vision


Removing sample from incubator for seeedling evaluation

of 'uniformity in seed quality evaluation worldwide'. The Association produces internationally agreed rules for seed sampling and testing, accredits laboratories, promotes research, provides international seed analysis certificates and training, and disseminates knowledge in seed science and technology. This facilitates seed trading nationally and internationally, and also contributes to food security. ISTA continues to provide annually updated uniform seed testing methods and a laboratory accreditation service to member labs worldwide. The Irish Lab IE01 is one of 127 ISTA accredited laboratories across the world.

Seed Sampling

The reliability of the result of a seed test is dependent on the sample submitted. It is very important that submitted samples are representative of the seed lots from which they are drawn, otherwise test result information will be inaccurate. In the case of certified seed, trained officers of the DAFM using specified procedures conduct sampling.

Seed Species tested

The majority of the samples tested in the laboratory are barley, wheat and oat samples as seed of these species are gown and certified in Ireland. A sample from each official seed lot must be tested as part of the certification process. The seed of forage and fodder crop species such as grass, clovers, maize, fodder rape, beet, etc. are grown abroad and usually certified in the country in which they are produced. However seed retailers regularly submit forage and fodder crop seed samples for testing to check that germination levels continue to meet the required standard achieved when the seed was originally certified. The laboratory also receives samples of forage and fodder seeds from our colleagues in the Seed Certification section of DAFM. These are random samples taken to ensure seed offered for sale complies with required standards. The laboratory also tests tree seeds and wildflower seeds.

Seed Tests offered

The main seed tests required for certification and seed marketing purposes are germination and analytical purity. Varietal purity is checked primarily in the growing seed crop. The lab also offers a number of advisory tests including moisture, thousand seed weight, vigour for oilseed rape and maize, and various seed health tests for cereals and legumes.

The Germination Test

Of all the quality measurements of seed lots, none is more important than the potential germination of the seeds. The object of the germination test is to determine the maximum germination potential of a seed lot. The laboratory germination test aims to control the environment in order to give the most regular, rapid and complete germination for the majority of samples of a particular species.

Germination is defined by ISTA as "the emergence and development of the seedling to a stage where the aspect of its essential structures indicates whether or not it is able to develop further into a satisfactory plant under favorable conditions in the field". Any seedling without an essential structure; showing weak or unbalanced development; decay or damage affecting the normal development of seedling is not considered in calculating the germination percentage. Factors that can affect the performance of seed in germination tests include; diseased seed, improperly stored old seed, mechanically damaged seed, seed stored under high moisture, and excessive heating of seed during storage or drying.

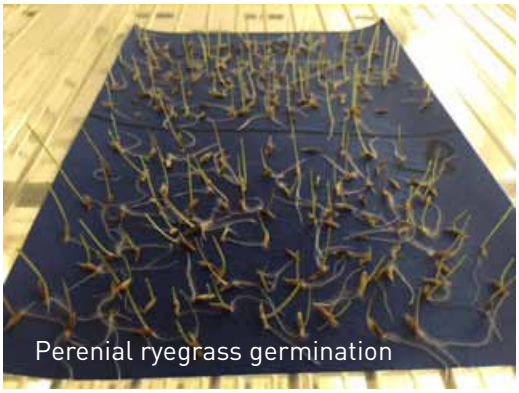
Essential seedling structures: A seedling, depending on the species being tested, consists of a specific combination of some of the following structures which are essential for its further development into a satisfactory plant:

- root system (primary root; in certain cases seminal roots);
- shoot axis (hypocotyl; epicotyl; in certain Poaceae mesocotyl; terminal bud);
- cotyledons (one to several);
- coleoptile (in all Poaceae).

The accurate evaluation following appropriate incubation time of each seed/seedling is dependent on the skills and experience of trained seed analysts. Multiple replicates of 50 or 100 seeds are germination tested. The results from each replicate are checked to ensure that they are within specific tolerances as specified by the International Seed Testing Association. This tolerance check ensures the reliability and accuracy of the germination test result.

EU legislation prescribes various standards which seed lots must conform to if they are to be offered for sale within the EU. Germination standards for the most commonly tested species are as follows:

- Barley 85%
- Wheat 85%
- Oats 85%
- Maize 90%
- Perennial Ryegrass 80%
- Italian Ryegrass 75%
- White Clover 80%


Perenial ryegrass germination

The germination report states the percentage of seeds which produced normal seedlings. The report will also state what pre-treatment (if any) has been used. This may include:

- The number of days chilling in order to break dormancy
- Chemicals used such as KNO_3 (potassium nitrate) & GA3 (gibberellic acid)

In certain species, e.g. clovers, the number of hard seeds may also be stated. Hard seeds are seeds which have failed to imbibe water during the germination test and may retain the ability to germinate under field conditions.

The Analytical Purity Test

The object of the purity analysis is to determine the percentage composition by weight of the sample being tested and by inference the composition of the seed lot and to identify the various species of seeds and inert particles constituting the sample. A prescribed weight of seed is examined by a trained analyst and the various constituents found are identified, weighed and reported. In seed testing we only identify down to species level therefore a purity test will give no indication of varietal purity.

All seed offered for sale within the E.U. must conform to purity standards. The following are the minimum standards for some commonly tested species:

Species	Minimum purity standard
Barley	98%
Wheat	98%
Oats	98%
Ryegrass	96%
Oil seed rape	98%

The purity test report states the percentage of pure seeds found in the examined prescribed weight. The report will also state what inert matter was found and may include the following:

- Broken seed, soil, scraps
- Other seed: All seed other than the stated species
- Ergot: Ergot is a fungus of the genus Claviceps
- Pests: Any live pests insects etc.

The Fluorescence Test

The objective of the fluorescence is to distinguish between *Lolium multiflorum* (Italian ryegrass) and *Lolium perenne* (perennial ryegrass).

Seeds are germinated upright in seed testing paper so that their roots are clearly visible. In most varieties of *Lolium multiflorum* the root traces of the majority of the seedlings show fluorescence under ultra-violet light, whereas in most varieties of *Lolium perenne* the root traces of the majority of the seedlings do not show fluorescence. The fluorescence test alone, however, is not always a sufficient basis for the identification of a species, because many of the varieties grown contain a certain number of plants which do not give a typical reaction for that species. As would be expected Hybrid ryegrass will usually show intermediate fluorescence and is difficult to distinguish from Italian Ryegrass. The test time is 14 days from initiation of the test.

Further information

Further details on submitting samples etc. can be found on the seed testing section of the Departments website www.agriculture.gov.ie

Safe Animal Handling

Andrew Reilly,
Livestock Safety Specialist
& Trainer, Cohort
Recruitment & Training.

The dynamics of livestock farming in Ireland is changing. The age profile of farmers is rising, the help available on farms is reducing and the animals are often more flighty and aggressive. Yet, more often than not the facilities used to handle animals are the same as when there was more help, fewer and quieter animals and you were younger and livelier.

At this time of year all the components of effective stock handling are put to the test. These are the handler (you), the animals and the handling facilities. Whether you survive this test can be a game of chance where you rely on experience and luck to get you through. There is no better time than right now to decide if it is worth running the risk of a serious accident or to see if there are steps you can take to reduce the risk. Bear in mind that an injury to you could jeopardise your future as well as that of your family and the farm itself. The stakes are high.

Facilities
At housing time the workload is large and you rely on your facilities to get the job done successfully. Take a walk through all the pens, chutes, crushes and gates used for handling livestock. Grease or oil all hinges and latches and check they are functioning correctly. Where repairs are needed don't put them on the long finger. Rehang gates, fix damaged rails and latches. Facilities must be robust and are your only barrier from dangerous animals. When all works correctly it is safer for man and beast.

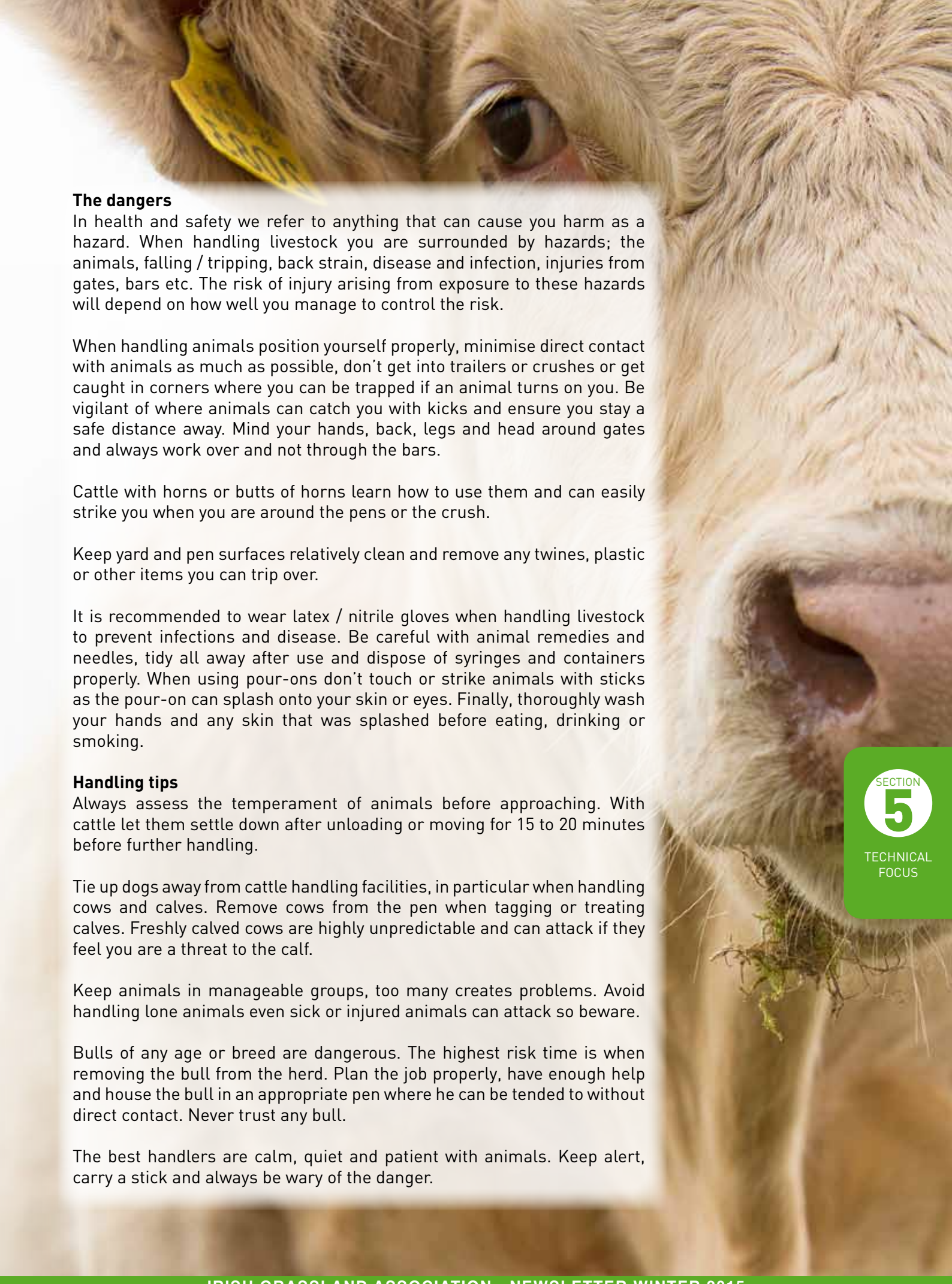
If your facilities are not up to standard everyone working there is being put at risk. Look into the feasibility of upgrading facilities. With funding currently available under TAMS II there may never be a better time. In addition to a safer working environment you will also be more efficient and save valuable time. With even a modest investment you could upgrade existing facilities with new skulling gates, calving gates, crushes, lighting or man passes. For bigger projects circular forcing pens, curved races and roofed facilities are the ideal. Give the planned works thought and get advice from your advisor. If done properly they should last for decades.

Planning the work
Many accidents with animals occur while working alone. With a scarcity of help on many farms there is a need to get creative to avoid doing high risk tasks alone. Talk to your vet about doing some tasks for you such as castrating weanlings. Get together with your neighbours, can they come to you when you need a hand and then you return the favour for them? Can you schedule handling tasks for when help is around like when family are home in the evenings, weekends or holidays?

With bad weather and limited daylight hours there will inevitably be work you must do alone. Always tell someone where you are working and when you expect to be back. Always have a mobile phone with you with the battery fully charged and put it in a pocket you can easily reach in an emergency. A basic first aid kit with bandages and disinfectants should be on hand for minor cuts and injuries. They can be purchased in your local pharmacy.

Are you up to the job?
Working with animals is physically tough. If you are not feeling well you should get checked out by your doctor. If you are on medicines that affect your reaction time or cause drowsiness, it may not be safe to do the work you normally do. Be realistic about what you are able to do.

Your agility level is vital; without the ability to move quickly away from an animal when required you are taking a risk that is too high. A loss of agility may be temporary due to an injury or getting progressively worse because of an illness or simply due to the ageing process. Don't presume you will be alright, too many have made that mistake to great cost.



The dangers

In health and safety we refer to anything that can cause you harm as a hazard. When handling livestock you are surrounded by hazards; the animals, falling / tripping, back strain, disease and infection, injuries from gates, bars etc. The risk of injury arising from exposure to these hazards will depend on how well you manage to control the risk.

When handling animals position yourself properly, minimise direct contact with animals as much as possible, don't get into trailers or crushes or get caught in corners where you can be trapped if an animal turns on you. Be vigilant of where animals can catch you with kicks and ensure you stay a safe distance away. Mind your hands, back, legs and head around gates and always work over and not through the bars.

Cattle with horns or butts of horns learn how to use them and can easily strike you when you are around the pens or the crush.

Keep yard and pen surfaces relatively clean and remove any twines, plastic or other items you can trip over.

It is recommended to wear latex / nitrile gloves when handling livestock to prevent infections and disease. Be careful with animal remedies and needles, tidy all away after use and dispose of syringes and containers properly. When using pour-ons don't touch or strike animals with sticks as the pour-on can splash onto your skin or eyes. Finally, thoroughly wash your hands and any skin that was splashed before eating, drinking or smoking.

Handling tips

Always assess the temperament of animals before approaching. With cattle let them settle down after unloading or moving for 15 to 20 minutes before further handling.

Tie up dogs away from cattle handling facilities, in particular when handling cows and calves. Remove cows from the pen when tagging or treating calves. Freshly calved cows are highly unpredictable and can attack if they feel you are a threat to the calf.

Keep animals in manageable groups, too many creates problems. Avoid handling lone animals even sick or injured animals can attack so beware.

Bulls of any age or breed are dangerous. The highest risk time is when removing the bull from the herd. Plan the job properly, have enough help and house the bull in an appropriate pen where he can be tended to without direct contact. Never trust any bull.

The best handlers are calm, quiet and patient with animals. Keep alert, carry a stick and always be wary of the danger.

Ireland 100 should Celebrate Our Greatest Legacy – The Humble Spud

Ciara Feehely
(Vita)

The potato, as we know, is more Irish than Guinness, The Dubliners and the Mountains of Mourne wrapped up together. It is imbedded in our national psyche, a part of our rich and tragic history. It was the reason behind our mass starvation in the mid – 1800s, causing families to be wiped out or forever severed by mass emigration to far-flung lands. We learnt from our heartbreak, and never again has Ireland been so reliant on just one crop.

And yet, the potato is and will continue to play a distinctive role in Ireland's recovery and future success. Potato farming in Ireland today supports much more than just the farm families that produce them. Potato crops drive the ever growing demand for crisps, chips and spirits, supporting thousands of jobs in manufacturing, retailing and distribution.

One of the world's most important foods, the potato is the one you want if you ever get stuck on a desert island, as it has all the vitamins and nutrients that you need to survive. It grows easily in diverse conditions, and requires much less water than other staples, such as rice or wheat.

And this amazing food source is vital in the developing world and in particular to the rural farming families of Africa, where its cultivation under the Vita Potato Programme is lifting them out of the poverty net by the thousands.

Vita is an Irish NGO working in Ethiopia and Eritrea and has collaborated with Teagasc, the Irish Potato Federation, Irish Aid, the Sisters of Mercy and a range of national and international agriculture and development experts to create an international potato coalition. This innovative partnership brings together the world's best knowledge, research and funding to support these farmers, more than 3,000 of whom are currently participating in the programme with 20,000 more about to join.

So how does the programme work? Tozene Nada is one of the first participants, hailing from Doko Yoyery in the Southern Highlands of Ethiopia. Tozene is an inspiring and innovative woman who showed a certain tenacity when she took over the running of the two-hectare family potato farm after her father- in- law died. Although both high altitude and hilly, Tozene's region is extremely abundant However, this visually stunning scenery is also greatly overworked due to the strains of having to support such a huge population.

Doko Yoyery is in a remote and at times quite inaccessible part of the region, about a two hour bumpy jeep ride from the small city of Arba Minch. With the large commercial agricultural traders of Addis Ababa an

unfathomable eight or nine hours' drive away, the main market for Tozene's potatoes, a staple food in this part of Africa, was the smaller local market.

"All the local farmers were harvesting potatoes at the same time as me," says Tozene, "and this meant that prices were at their lowest when I brought my produce to market. I needed to find a way to grow more potatos and store them for longer, until prices rose again."

Four years ago Tozene got involved with the Vita potato programme. Her inclusion changed everything for her. Until then she could expect a yield of about seven tonnes per hectare but now her yield has more than tripled to over 24 tonnes per hectare. This is as a result of high quality seed provided by the potato coalition to the co-op that Tozene and Vita helped form. The programme also provides ongoing, world class agronomy advice and the co-op can negotiate better prices for farmers. The newly built community potato store also means that potatoes can be released into the market when supplies are tight and prices rise.

Many farmers like Tozene now have personal small stores on their farms. This means that she can supply quality potatoes to the co-op to sell on her behalf, keep seed potatoes back to plant the following season, and store some potatoes for her own stove over the following months.

Tozene is adamant that the potato programme has changed her life for the better. "The Irish Potato has helped me to reunite my family and send my children to school," she says. And what about Tozene's kids? "They are happy," laughs Tozene, "because I have just invested in a television!"

And so, as Ireland commemorates one hundred years since the Easter Rising, we will remember the major milestones of the past – two great wars, conflict both on and off this island, booms and busts, television, radio and the internet – all of which has helped define who we are now. But we should also use this time to look at Ireland's contributions on the world stage into the future. We are blessed with our next generation, educated, articulate and brave, and with the national streak of creativity that has so far produced no less than nine Nobel Laureates. We have a tremendous record on international aid and human rights. But perhaps our greatest gift to the world is the least lauded - the humble, and very nutritious, spud.

If you would like to help The Potato Coalition continue working with families like Tozene's please contact Ciara.feehely@vita.ie or call (01) 8734303

Vita

Fighting hunger and climate change in Africa

DATES FOR YOUR DIARY 2016

Irish Grassland Association
Dairy Conference
7th January 2016
Radisson Blu Hotel Limerick

Sponsored by YARA

Irish Grassland Association
Dairy Summer Tour
20th July 2016

Sponsored by AIB

Irish Grassland Association
Beef and Sheep events

We have very exciting news to follow in our spring newsletter about our upcoming Beef and Sheep events in 2016. Dates and locations will be announced very soon.

NOMINATIONS SOUGHT FOR THE IRISH GRASSLAND ASSOCIATION LIFETIME MERIT AWARD 2016

The Irish Grassland Association Lifetime Merit Award was established in 2009 to acknowledge the unique life contribution of an individual to the understanding and application of grassland husbandry and technology. This prestigious award is a public endorsement on behalf of our Association and its members, to the great and important contribution made by the recipient to our industry and lives. Previous winners of this award are Paddy O'Keeffe, Sean Flanagan, Padraig O'Kiely, Norman Bateman, Seamus Hanrahan, Matt Dempsey and John Shirley.

We are now seeking nominations for the 2016 Lifetime Merit Award. If you would more information on this Award please contact Maura on 087 9626483.

If you would like to nominate a person for the award please email your nomination to secretary@irishgrassland.com before 1st April 2016.

Paddy O'Keeffe
Award Winner 2009

Dr.Sean Flanagan
Award Winner 2010

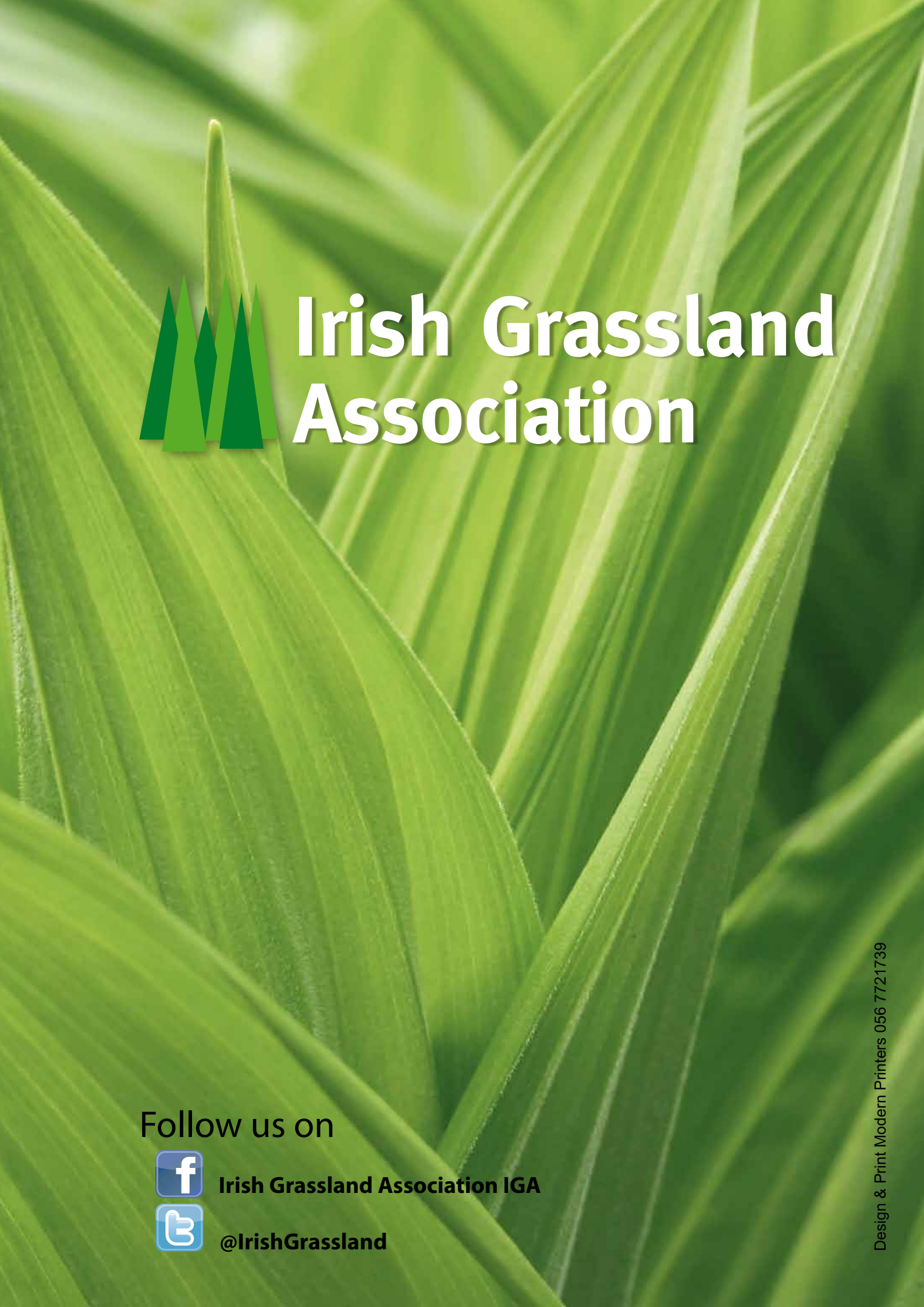
Dr.Padraig O'Kiely
Award Winner 2011

Norman Bateman
Award Winner 2012

Dr Seamus Hanrahan
Award Winner 2013

Matt Dempsey
Award Winner 2014

John Shirley
Award Winner 2015



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