TEAGASC

May-June 2023 | Volume 34 | Number 3

Today's Farm

Business, production, environment and countryside issues www.teagasc.ie

Open Day season is coming:

Plan to come and see new research in dairying at Teagasc Moorepark, beef at the Newford herd and sheep at Gurteen College. Also: crop fungicides, recruiting labour, forestry, botanics and more…

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Cover: Hazel Costigan works with Ben Lahart and other colleagues at Teagasc Moorepark on feed additives which can potentially reduce methane emissions from dairy cows.

COMMENT

Mark Moore
Editor,
Today's Farm

Come and visit us

A whole series of Open Days will take place over the coming weeks and months. Teagasc pig research will be on show at Teagasc Moorepark on 9 May and on 11 May at Teagasc Ballyhaise.

You will be able to visit the Newford DairyBeef 500 herd at Teagasc Athenry on 23 May; Gurteen College for Sheep 2023 on 17 June and the biennial Teagasc Moorepark dairy Open Day will take place on Tuesday 4 July.

We make no bones about referencing these Open Days early and often in this edition of *Today's farm*. We hope you will plan to come and place these dates, where relevant, on your calendar.

By raising in these articles just a fraction of the research that will be on show, we hope to whet your appetite for the feast of material that you will encounter.

Tar ar cuairt chugainn

Tá séasúr na Laethanta Oscailte ag druidim go tapa linn. I gcás na dtrí phríomhfhiontar beostoic, an mhairteoil, na caoirigh agus an déiríocht, beidh laethanta oscailte ar siúl i mBaile Átha an Rí (tréad an Átha Nua), Coláiste an Ghoirtín (Caoirigh 2023), agus Lá Oscailte Theagasc na Cloiche Léithe 2023 a bhíonn dírithe ar an déiríocht agus ar siúl gach dara bliain. San eagrán seo tá áthas orainn labhairt faoi na himeachtaí sin agus faoi na rudaí a fheicfidh tú ann cé go bhfuil cúpla mí ann idir seo agus sin. Tá súil againn go spreagfaidh na hailt seo thú chun na dátaí a chur in áirithe ar d'fhéilire agus cuairt a thabhairt sa deireadh ar na Laethanta Oscailte a bheidh ábhartha duitse.

events

PIG OPEN DAYS

- **Date:** 9 May 2023.
- **Venue:** Teagasc Moorepark.

- **Date:** 11 May 2023.
- **Venue:** Teagasc Ballyhaise.

This is your opportunity to see first-hand the results of the comprehensive research programme undertaken by Teagasc, and to meet researchers, advisors and postgraduate students.

Attendees will be brought to different stations covering: managing the pig environment, improving pre- and post-weaning management and nutrition, managing disease, grower/finisher management and feeding, and sustainability.

Please register for these open days by contacting Niamh Allen at 025 42457 or niamh.allen@teagasc.ie

BEST PRACTICE IN MILKING COURSE – TIPPERARY

- **Dates:** 17 to 18 May 2023.
- **Event time:** 9am to 4pm.
- **Venue:** FRS Roscrea, Derryvale, Roscrea, Tipperary.

This course takes place over two days on 17 and 18 May from 9am to 4pm each day.

The theory exam takes place on 31 May in FRS Roscrea. This course is suitable for dairy farmers or anyone who wishes to work part-time or full-time as a dairy farm relief operator.

BEST PRACTICE IN MILKING COURSE –LIMERICK

- **Venue:** Pallaskenry Agricultural College, Pallaskenry, Co Limerick.
- **Event time:** 9am to 4pm, 24 and 25 May.

BEST PRACTICE IN MILKING COURSE – CORK

Venue: Teagasc Moorepark, Fermoy, Co Cork.
Event time: 9am to 4pm, 14 and 15 June.

BEST PRACTICE IN MILKING COURSE - CAVAN

Venue: Teagasc Ballyhaise Agricultural College, Ballyhaise, Co Cavan.
Event time: 9am - 4pm, 21 and 22 June.

About the best practice in milking course

This programme was developed in conjunction with Animal Health Ireland (AHI) and FRS Farm Relief Services (FRS) Network. The programme is designed to develop your skills as a milker to ensure that all cows are milked effectively and efficiently.

This course is unique as it brings together the theory element of milking and the practical implementation of the theory.

A customised DVD aids its delivery and acts as a reference guide after the course for the milker.

The tutors for the course have been specifically trained and course content approved by the experts in the area of milking best practice.

Course content

- Preparation for milking.
- Milking routine.
- Cluster attachment.
- Milk quality.
- Washing up.
- Mastitis prevention.
- Drying off.

You can book on the Teagasc website or contact Attracta Dooley, FRS, on adooley@frstraining.com or on (086) 130 0409.

- Please note attending this course requires 100 hours' prior milking experience.

AGRITOURISM 2023

Date: 22 May 2023.
Event time: 10am to 3pm.
Venue: Teagasc Food Research Centre, Ashtown, Dublin 15. Eircode: D15 DY05.

Promising perspectives of attracting international visitors to rural areas

Teagasc Rural Development Department, together with the Irish Self Catering Federation of Ireland (ISCF) are hosting an agritourism conference on Monday 22 May in the Teagasc Food Research Centre, Ashtown, Dublin 15, from 10am to 3pm.

BLOOM

Bloom is a general garden and lifestyle show with approximately 100,000 people attending over five days. In 2023, it will take place from 1 to 5 June 2023. Visit the Teagasc Bloom section on our website and come and visit the Teagasc stand. Scan the QR code, right, using your smartphone camera for more.

SHEEP 2023 will be the largest dedicated sheep industry event of 2023.

SHEEP OPEN DAY - GURTEEN COLLEGE, 17 JUNE 2023

Event time: 10am.
Venue: Gurteen Agriculture College, Ballingarry, Co Tipperary. Eircode: E53 TP93.

SHEEP 2023 will be the largest dedicated sheep industry event of 2023. Following on from very successful past events held on the Teagasc Athenry Campus, this year's event will take place in a new venue, Gurteen Agricultural College, Roscrea, Co Tipperary, E53 TP93.

Attractions on the day include:
- Extensive range of commercial exhibitors.
- Sheep breed competitions.

SALESIAN AGRICULTURAL COLLEGE OPEN DAY 24 JUNE

Hear about the courses offered at Salesian Agricultural College.
Venue: Salesian Agricultural College, Pallaskenry, Co Limerick, V94 V8N3.
Event time: 11am to 1pm.

TEAGASC MOOREPARK DAIRY OPEN DAY

Date: 4 July 2023.
Venue: Moorepark, Co Cork.

Teagasc/UCD Michael Smurfit Business School certificate course in business strategy

This course has been run since 2015 and has proven popular with farmers with all enterprise types. Key features are:

- **Accredited course:** on successful completion participants receive a level 8 certificate from University College Dublin.
- **Executive education:** the course involves interactive discussion between participants and lecturers based on Harvard Business School case studies and participants' own experience.
- **Residential course:** this allows you to concentrate on the course and network in the evenings.
- **You will gain business skills**… in areas such as strategy formulation, investment analysis, negotiation and people management. You will use these skills for the rest of your life.
- **You will create your own strategy.** By the end of the course you will have completed a strategy document for your business which will help you to reach your goals.
- **Teagasc support:** Teagasc advisors will mentor participants in creating their strategy.
- **Graduation:** those who complete the course will receive their certificate at a graduation ceremony in UCD.
- **World-class lecturers:** all core material is delivered by Smurfit Business School staff.
- **Purely business:** there is no technical content about production. This is a purely business course and is relevant whatever your mix of farm enterprises.
- **Class size is small:** this ensures good interaction and networking.

The class of 2022.

Once you have been running a farm business for several years you qualify to participate. There is no minimum academic standard required.

What commitment is involved?

Module one: three days in November.
Module two: two days in December.
Presentation of your strategy at UCD Michael Smurfit Business School: one day in January 2024.

"I found it excellent and it really tuned me in to what I needed to do to move my plan forward," said Meath dairy farmer Peter Mongey.

The cost to participate is €2,600 with a €200 discount for Teagasc clients. This includes three nights' accommodation in the chosen hotel.

Meals are provided. Full terms and conditions are available on request. In recent years, Macra Skillnet has covered about 30%.

For further information

Contact Mark.moore@teagasc.ie

Seaweed

Inflammatory bowel disease (IBD) causes inflammation and damage to the digestive tract. The term is usually used to describe Crohn's disease and ulcerative colitis – both of which, if left untreated, can result in permanent damage.

More than 40,000 people in Ireland are estimated to suffer from IBD, six million people globally. IBD can be very painful and disruptive and, in some cases, life threatening. The exact cause of the disease remains a mystery, and there is currently no cure.

As part of the European Union Horizon 2020 Algae4IBD project, researchers at Teagasc Ashtown are exploring ways to identify and develop a set of novel small molecules derived from seaweeds and microalgae that can provide relief for sufferers of IBD.

The environment in which they are found leads these plants and microorganisms to develop defence mechanisms that often result in enhanced antimicrobial and antioxidative activities.

In Ireland, there are over 600 species of seaweeds found around our coastline. Teagasc's main role within the Algae4IBD project is to generate, extract and screen for anti-inflammatory, anti-pain and prebiotic compounds from extracts generated from both seaweeds and microalgae supplied by partners or generated within Teagasc.

The health benefits of small molecules found in seaweeds and microalgae is a relatively new area of biodiscovery for researchers, but marine species of both seaweeds and microalgae have been shown to have tremendous potential for use as a reservoir of health-beneficial bioactives.

Teagasc's Maria Hayes says: "The ultimate goal of the project is to develop nutraceuticals and drugs that can treat IBD and potentially prevent it."

Adapted from TResearch Winter 2022

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Butox Pour-On Suspension 0.75 % w/v contains 7.5 mg Deltamethrin per ml for topical use. Withdrawal periods: Meat and offal: 18 days; milk: 12 hours. In cases of heavy infestation it may be necessary to repeat the treatment after 4-6 weeks. Legal category: LM

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Legal category: LM

Always read the package leaflet or SPC before use. Prior to first time use on a farm, it is strongly recommended that the advice of a veterinary practitioner is sought.

*Butox Pour-On gives 6-10 weeks fly control depending on the degree of infestation, fly species and weather conditions.

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Email: vet-support.ie@msd.com Web: www.msd-animal-health.ie

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'We must create a culture of awareness of dairy farms as bright and positive places'

Q&A

with **Laurence Shalloo**, Head of the Teagasc Animal & Grassland Research and Innovation Programme

1 Times have been relatively good in dairying, can this continue?

Dairy commodity prices spiked in 2022, resulting in a dramatic increase in milk price at farm level. Dairy farm profitability was very strong, despite increased input costs. In spring of 2023, there has been a severe market adjustment which is very quickly impacting on the milk price.

As in other sectors of the economy, supply versus demand is putting increased pressure on labour costs. The focus for 2023 at farm level must be on costs of production. This is the most important strategy that can be used to reduce the exposure associated with commodity market fluctuations.

2 How can dairy farmers best contribute to reducing greenhouse gas emissions and preventing climate change?

When one looks at the IPCC reports, in particular around the role that soil can play in storing carbon, it is clear that agriculture will play a key role in meeting the GHG emissions challenge.

While the land use and land use change sector is not currently counted as part of agriculture we expect that this will change by 2030. Using current methods, Irish agriculture accounts for approximately 37% of total national GHG emissions, and has a target to reduce by 25% by 2030.

Teagasc is currently preparing its third iteration of a marginal abatement cost curve (MACC) for agriculture. This tool identifies GHG emissions mitigation strategies and associated economic impact at farm level. There are technologies that can and should be implemented today which will reduce GHG emissions and increase farm profitability or be cost-neutral.

These include introduction of clover, move to protected urea-based N fertiliser, increased soil fertility, higher EBI usage, reducing age at slaughter. There are other technologies that will have substantial cost implications at farm level and will therefore be less likely to be embraced, at least in the short term.

There is an increasing investment being made into identifying new solutions and developments. The diverse and expanding research programme at Teagasc includes research on different fertiliser types, genetics, feed additives, manure, development of a digital platform to engage farmers.

There is some early promise in this research across a whole range of areas. Examples include that the estimated enteric methane emission per cow in an Irish grazing system is less than current models suggest; genetics are having a more positive effect on enteric methane emissions than had been previously considered; and the research on feed additives (albeit at an early stage) is showing some promising results.

Laurence Shalloo.

3 Can you envisage a dairy farm that doesn't buy in any artificial nitrogen?

The journey on chemical nitrogen fertiliser use, both at research level and at blueprint level, has been dramatic.

The key driver of profitability in a pasture-based system is grass utilisation. Maintaining and increasing grass utilisation while reducing chemical N will increase profitability and reduce purchased nitrogen surplus, which will result in less nitrogen in the system available for loss.

A number of studies in both Ireland and New Zealand have shown that increasing grass utilisation, when not associated with increased purchased nitrogen in the system, will result in reduced nitrate loss.

Modelling has shown that reducing chemical nitrogen would result in a reduction in grass growth of the order of 15-20kg DM/ha per 1kg of chemical nitrogen reduced unless replaced with some other strategy.

The reduction in chemical nitrogen must be based on increasing grass utilisation, increasing soil fertility, optimising the use of slurry and increasing clover or else the reduction in chemical N will result in increased bought-in feed (at much higher cost than chemical N) and reduced farm profitability.

4 Finding affordable, qualified, labour is an ever growing challenge. Do farmers need to adjust their expectations?

The people challenge is probably the biggest challenge on dairy farms today. In a society with full employment, there can be a real challenge to secure people. The People in Dairy Initiative was launched in 2017 and identified a number of areas to focus

In spring 2023, there has been a severe market adjustment which is very quickly impacting on the milk price.

on which are still relevant today.

We must continue to develop long-term strategies around training, creating career pathways for all levels, having appropriate farm facilities for staff, investing in farmer HR skills, and implementing appropriate practices at farm level, developing seasonal business models that allow people to move between industries.

Importantly, we must create a culture of awareness of dairy farms as being bright and positive places with the potential for employment for people interested in satisfying work, whether as a career or on a seasonal basis.

5 We are a relatively high animal welfare milk producer. How can we protect that reputation, and get paid for it?

Dairy cows in Ireland have, on average, access to grazed grass for 71% of the year and are free to roam around an assigned paddock/paddocks. Irish pasture-based systems, with average milk yields of 450 kg milk solids (MS)/cow, have one of the lowest milk yields per cow in Europe.

Irish animals are less exposed to production-type diseases and issues that are common in countries where milk production per cow is maximised. In Ireland, profitability is not maximised where milk production per cow is maximised but is optimised where grass utilisation per hectare is optimised. Therefore, animals are not pushed to their biological limit.

Cow age profiles have been increasing, facilitated by, for example, emphasis on health and fertility within the EBI. Our key animal welfare considerations are lameness and somatic cell count (SCC). SCC is a good indicator of mastitis based diseases. Data from the Animal Health Ireland (AHI) CellCheck programme shows that the average SCC levels in dairy herds have declined over the past 10 years. Average SCC is now close to 175,000 cells/ml (AHI, 2021).

In terms of lameness; a recent analysis of 11,742 cows across 68 pasture-based dairy farms in the Munster region shows that just over 30% of cows studied had mild suboptimal mobility, 6% of cows had moderate suboptimal mobility, and less than 1% of cows had severe suboptimal mobility. This compares favourably with most international comparisons.

A potential risk from a welfare perspective centres around male dairy calves.

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There has been a substantial growth in dairy calf-to-beef production since milk quotas were removed. The dairy industry must embrace technologies like sexed semen and the dairy beef index.

A key component of calf transport centres on animal welfare, which will need to be supported with strategies that minimise animal discomfort and stress, underpinned by science. This is a substantial focus of the calf welfare research programme through the Moove research project.

There is a real need for joined-up strategies between the beef and dairy industry to develop profitable beef systems that are early maturing (lower GHG emissions) and can provide a reward to both the dairy and beef farmers, while helping to decarbonise agriculture. This is the major focus of the DairyBeef500 programme.

6 You are the head of the Teagasc Animal & Grassland Research and Innovation Programme. What message do you have for beef and sheep farmers?

Many of the areas of research transition across enterprises, for example research on clover, multispecies pasture and soil fertility go across beef, sheep and dairy.

For beef and sheep to be competitive in the long term, there needs to be a continued focus on increasing pasture in the systems of production.

Similar to dairy this needs to be done with less purchased N, so the focus must be on increasing the use of clover in conjunction with improved soil fertility and increased grassland measurement and management.

The beef and sheep programmes are areas of research that are continuing to grow as a result of Teagasc's climate strategy and the development of a centre of excellence in the area of climate research. This will facilitate a broader research programme across these areas.

The sheep programme has an increasing focus on anthelmintic resistance in conjunction with genetics and grassland.

The beef programme has an increasing focus on profitability and reducing the age at slaughter, through greater emphasis on pasture type and management and forage quality across all stages of the animal's life combined with appropriate genetics.

7 To what extent have we exhausted our comparative advantage from growing grass?

Recent analysis has shown that Ireland's comparative advantage relative to a number of EU countries has increased since milk quotas were removed.

However, we must continue to focus on maximising grazed pasture and pasture utilisation while minimising supplementary feed and matching stocking rate to the growth potential of the farm. Pasture-based systems will result in a seasonal milk supply where the comparative focus must be on costs of production to maintain advantage.

The farms that had a strong focus on cost control were in general less exposed as input price inflation occurred and therefore all farmers need to redouble their effort around costs in 2023.

This may pose a question on the intensity of the overall operation. There is growing evidence that products from grazing animals can be differentiated in the marketplace, we must continue to grow and exploit that potential.

8 What do you see as the key technical developments in dairying in the next five years?

Between the average of the period from 2007 to 2009 and 2022, milk solids have increased nationally by 96%.

Interestingly, approximately 50% of that increase came from increased milk solids per cow and 50% from increased cow numbers.

A full breakdown shows that 36% originated from increased milk volume per cow, 14% originated from increased fat and protein percentages, 20% from increased cows facilitated by increased stocking rates and 30% through extra cows on new land.

In future, there will be more use of sexed semen and higher DBI beef genetics in the dairy herd.

This will result in higher rates of genetic progress in the dairy herd and animals with better beef characteristics coming from the dairy herd.

There will be greater focus on fertiliser N use and type coupled with greater emphasis on white and red clover. Increasingly, there will be investment in technologies that increase labour efficiency and improve work-life balance.

From a research perspective, there will be greater focus on developing strategies that allow dairy farmers to progress while meeting the environmental challenges, reducing costs at farm level and reducing the labour requirements of the systems operated.

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Moorepark Open Day 2023

On 4 July, Teagasc Moorepark will hold its biennial Open Day. In this section, we present a selection of some of the many research areas which will be featured

MOOREPARK '23
IRISH DAIRYING – SECURING A SUSTAINABLE FUTURE

Approaches to reduce farm labour demand

Conor Hogan and Marion Beecher

Improved time-use can reduce labour demand and improve work-life balance, resulting in more attractive workplaces. There are three main approaches:

1 Work organisation
Characteristics of farms with effective work organisation include later start and earlier finish times (than the average farm), completing fewer different tasks during the day and longer non-farm activity time during the working day. To achieve this, planning and structure is necessary such as having set start and finish times. Equally, relatively straightforward organisational techniques (e.g. where possible having one person in the milking pit for mid-lactation) could be considered.

2 Facilities
Milking and calf care are the two most time-consuming tasks in spring. A recent study has shown the positive impact that upgrading these facilities can have on reducing labour demand. For milking, parlour capacity is a key influencing factor and a cow to milking unit ratio of 6:7 is best.

Pat Hoskins and Conor Hogan of Teagasc Moorepark discuss work organisation.

3 Work practices and technologies
A recent study found 59 labour-efficient work practices and technologies associated with labour efficiency (the average farm implemented just 31 out of 59). Many of the work practices require minimal capital expenditure and should be relatively easy for farms to implement.

Teagasc studies have shown an array of work practices, technologies, facilities and organisational techniques that can reduce farm labour demand and make work less physically demanding.

More detail will be available at the 2023 Teagasc Moorepark Open Day.

Enteric methane – facts and solutions

Hazel Costigan & Ben Lahart

At present, methane emissions from Irish dairy cows are predicted using international default emission factors. Research in Teagasc Moorepark has found this figure to be substantially lower in grazing dairy cows.

These differences are primarily due to high quality grass, particularly in the spring period.

This highlights the role of improved grassland management in reducing methane output.

Research also demonstrates that while genetically elite dairy cows for the economic breeding index (EBI) do not have a higher overall methane output, the greater milk solids output in the elite translates to less methane being produced per unit of milk solids.

Individual animal variation for methane is also apparent in grazing dairy cows, meaning it may be possible to genetically select for low methane-emitting cows in the future.

Research with feed additives has demonstrated reductions of 22% to 25% when fed to animals within indoor systems, in which additives are mixed into a total mixed ration and, as such, present in the rumen throughout the day. At pasture, the most practical way of feeding additives is through supplemental feeding in the milking parlour twice daily, which may limit additive efficacy.

Research in Teagasc Moorepark has found that cows supplemented with additives produced significantly less methane for 2.5 hours after feeding. After this period, their methane emissions reverted back to normal. This shows that feed additives can reduce methane in grazing dairy cows. However, slow-release technologies are required to keep the additives working for longer.

This study also highlighted the challenges in terms of additive delivery to grazing dairy cows, and is committed to finding practical solutions.

Maximising potential for renewables

John Upton

Current levels of solar photovoltaic (PV) deployment on farms are relatively low. However, to encourage the uptake of renewable energy generation by farmers some considerable developments have recently occurred.

These include:

John Upton points to solar panels at Teagasc Moorepark.

1) Planning permission: for solar panel installations on rooftops of agricultural premises, installations covering the entire roof are exempt from requiring planning permission.

2) Grid connection: the ESB micro-generation scheme allows for connection of 6 kVA inverters on single phase systems or 11 kVA inverters on three phase systems and the mini-generation scheme allows for connection of 17 kVA inverters on single phase systems or 50 kVA inverters on three phase systems.

3) Export tariffs: the clean export guarantee (CEG) was announced in early 2022 which requires that electricity companies pay an amount per kWh exported to the grid – an export tariff. The CEG is linked to the wholesale price of electricity and will vary continuously according to market rates. The export tariffs currently available are considerably less than the unit rates charged for day-rate electricity (about 50% less). Therefore, there is a strong incentive to size PV systems on farms predominantly for self-consumption, as this will yield the fastest payback. Spill over to the grid from TAMS grant aided systems can avail of the CEG.

4) Grant support: the new TAMS 3 solar capital investment scheme (SCIS) will increase the grant rate to 60% and introduce a standalone investment ceiling of €90,000 for solar installations. The maximum size of PV system allowable has also increased from 11 kWp to 62 kWp. The reference costs have similarly been revised. The sizing guidelines for solar PV systems will cap the generation capacity of the system at the total annual electricity consumption of the facility.

These four developments mean that it has never been a better time to consider a solar photovoltaic system to improve the energy security and diversification potential of your farm.

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Moorepark Open Day

Continued from p13

Ten-in-seven milking

Emer Kennedy

Flexible milking systems may help to alleviate the problem of labour shortage on dairy farms. Flexible milking systems are those where the number of milkings per week, or the daily milking time, differ from a conventional twice-a-day milking system.

Milking once-a-day (OAD) is one option. Milking can occur at any time during the day, however it must be at the same time each day.

Other options are milking three times in two days (three in two), which can provide increased flexibility for farmers without the milk production losses experienced with OAD. In this scenario, milking interval can be, for example, 10-19-19 hours or 12-18-18.

A third option is to milk 10 times in one week (10 in seven). This provides improved flexibility and minimises milk production losses compared to OAD, while employing a more structured and socially appealing milking routine. Fewer than half of farmers in New Zealand now milk twice-a-day for the full lactation.

Last year, a new study at Teagasc Moorepark investigated i) milking 10 in seven for the full lactation, ii) milking TAD for the first half of lactation, switching to 10 in seven for the second half of lactation (i.e. from 4 July; 20 weeks into lactation) and compared their performance, to iii) cows milked twice-a-day for the full lactation.

Initial results show that milking 10 in seven for the full lactation reduced milk yield by 10% and milk solids by 11%. Interestingly, when cows switched from TAD to 10 in seven halfway through the lactation their production was the same as cows milked TAD for their full lactation. A 10 in seven milking regime for the second half of lactation deliver labour saving, as well as savings in water and electricity.

Emer Kennedy.

Sexed semen in the Irish dairy industry

Stephen Butler

The use of sexed semen allows the calf sex to be determined with ~90% reliability. This allows dairy farmers to generate the required number of replacement heifers for their herd, while reducing the number of male dairy calves.

Genetic gain in the dairy herd can be accelerated by selecting heifers and cows in the top half of the herd for EBI to be eligible for insemination with sexed semen at the start of the breeding season. All remaining dams should be bred using high-DBI beef semen, producing a saleable beef-cross calf.

There are obvious management benefits to be gained from having all replacement heifers born in the first few weeks of the calving season, whether they are being reared at home or being sent to a contract rearer. All subsequent births will be beef-cross calves.

There is twice as much sexed semen available for the 2023 breeding season as in 2022, highlighting the rapid increase in uptake on dairy farms.

Oocytes being harvested from an elite genetic merit donor beef donor (high DBI), which will be fertilised the following day and cultured in a lab until day seven of development.

One consequence of using sexed semen on all the highest EBI dams will be a marked reduction in the number of male dairy calves derived from high EBI dams.

Presently, a very small number of these high-EBI male dairy calves are selected to become future AI bulls. The 'loss' of these rare but genetically superior calves could reduce long-term genetic gain in the national herd.

Research in Teagasc Moorepark is examining the potential role of in vitro embryo production to accelerate genetic gain in the face of the declining number of male dairy calves. The procedure involves harvesting eggs from elite genetic merit donors, fertilizing these eggs in a lab using semen from elite genetic merit sires, and allowing the resulting embryo to develop for seven days.

The embryos are transferred into a recipient heifer or cow that has been synchronised to be on day seven of the cycle. The potential to produce the embryos using sex-sorted semen is also being investigated.

With these approaches, it is possible for a single dam to produce up to 20 calves per year, and the sex of these calves can be predetermined.

The results of the latest research will be presented at Teagasc Moorepark '23 Open Day.

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Further research topics which will feature at Moorepark 2023 on 4 July

MOOREPARK '23
IRISH DAIRYING – SECURING A SUSTAINABLE FUTURE

Where to next for grasslands?

Ciarán Hearn

Tomás Tubritt

Grasslands are a key pillar of Irish dairy production and the composition of Irish grasslands have changed over recent years, increasing in complexity from single-species grass swards to multispecies swards.

Perennial ryegrass remains an important forage species, as it produces large amounts of high-quality feed and persists well under intensive grazing, but grass monocultures rely on high chemical nitrogen inputs and can be vulnerable to climatic stress.

Teagasc researchers have been investigating forage species which can increase the sustainability of Irish grassland systems.

Over the past decade, research from Teagasc has shown the beneficial effects of white clover inclusion in perennial ryegrass grazing swards; these effects include increased levels of milk production and a reduced requirement for chemical nitrogen where white clover is sown.

Ongoing research in Teagasc Moorepark continues to investigate the inclusion of white clover in grazing swards through projects on white clover establishment in new and existing swards, optimising grazing management of grass and white clover swards and the possibility of further reducing chemical nitrogen application.

More recently, there has been growing interest in the inclusion of other forage herbs and legumes in grassland swards in Ireland.

Teagasc research has shown that ribwort plantain persists well under intensive grazing and may be suitable for long-term grazing swards.

Ribwort plantain has been shown to impact nitrogen cycling in other countries, where it could provide a solution to mitigate some nitrate leaching; it will now be fully investigated in larger farm scale grazing system studies at Teagasc Moorepark.

Another species being investigated for use in Irish dairy systems is red clover as it can fix up to 200kg N/ha from the atmosphere; research has shown that red clover is more suited to silage production than intensive grazing systems.

Both the agronomy of red clover silage swards and the feeding value of red clover silage will be discussed at the upcoming Moorepark Open Day.

Teagasc researchers will continue to investigate other novel sward species which can complement grass and white clover swards to enhance the sustainability of Irish dairy production.

AgNav - the new digital sustainability platform

Jonathan Herron

A new digital sustainability platform, AgNav, is being developed to conduct robust sustainability assessments of farming systems in Ireland.

Through years of collaboration Teagasc, ICBF and Bord Bia have integrated Teagasc lifecycle assessment (LCA) models into the ICBF infrastructure to calculate carbon footprints of Bord Bia-certified farms.

Using this infrastructure, the collaboration has developed the AgNav platform, an online platform accessible to farmers and advisors that calculates greenhouse gas emissions and ammonia emissions from commercial farming systems.

Farm data residing in existing databases, including those in ICBF and Bord Bia, will be collated to maximise the automation potential of the assessment process and improve accuracy of results.

The AgNav platform also provides a decision support tool that communicates the benefits of best practice adoption.

Through a series of workshops the AgNav platform will be co-designed with advisors, farmers and other key stakeholders to provide transparency and ensure that it is user-friendly, interactive, and informative.

The initial phase of the AgNav platform focuses on beef, dairy and mixed cattle systems. However, the overall objective is to cater for all major farming systems in Ireland (e.g. sheep, tillage pigs, poultry, horticulture), and to expand the scope of environmental indicators investigated.

The initial phase of the AgNav platform will be deployed through the Teagasc Signpost Advisory programme where it will be a key tool for each farmer to become familiar with environmental impact indicators, establish benchmarks, and with the assistance of their Signpost advisor and the AgNav decision support tool to create a farm-specific action plan.

Future versions will expand to serve other Teagasc clients and those availing of private advisory services. The ambition is that through industry-wide collaboration and data integration AgNav will become the predominant and most robust method of conducting sustainability assessments of farming systems in Ireland.

Jonathan Herron.

Clare Gabby.

Predicting intramammary infection in late-lactation cows

Clare Clabby

Over-use of antibiotics is linked with the development of antimicrobial resistance. To reduce this risk the EU introduced a regulation that means dry cow antibiotics can only being used on cows that demonstrably have an intramammary infection.

Cows that are not infected should only be treated with an internal teat sealant. Typically, cows with a SCC less than 200,000 cells/ml are considered not infected.

Teagasc, in conjunction with Kerry Agribusiness, conducted a study in 21 spring-calving dairy herds (2,074 cows) with a monthly bulk tank SCC of less than 200,000 cells/ml to predict infection in late lactation.

> The cut-off-point for last test-day SCC which maximised sensitivity and specificity to identify cows without infection was 64,975 cells/ml

Quarter-level milk samples were collected from all cows in late lactation (more than 240 days in milk) for bacteriological culturing. If samples had bacterial growth, a cow was defined as infected.

Test-day SCC data was used to determine the ability of the average, maximum and last test-day SCC to predict infection. The last test-day SCC (37 to 64 days before dry-off) was the best predictor of infection.

The cut-off-point for last test-day SCC which maximised sensitivity and specificity to identify cows without infection was 64,975 cells/ml.

The inclusions of lactation, milk yield at last test-day and the number test-days greater than 200,000 cells/ml did not improve the ability of last test-day SCC to predict infection.

This study indicates that in Irish low SCC, seasonal pasture-based dairy herds, the last test-day SCC (37 to 64 days before dry-off) is the best predictor of intramammary infection in late lactation.

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Are you in a suckler to beef system?

Come and see what's new at Newford suckler farm

Catherine Egan
Teagasc beef specialist

Donal Fahy
Teagasc Newford herd

The Newford suckler farm is a suckler calf-to-beef demonstration unit located in Athenry, Co Galway. The farm was established by Teagasc and Dawn Meats, with the support of the *Irish Farmers Journal* and McDonald's in 2015.

The project was set up for a seven-year term during which the 100-cow suckler calf-to-beef demonstration was run on 68ha across four blocks. The project has recently been renewed for a further five years.

The herd will now consist of 85 suckler cows on 58 ha across three land blocks. Over the next five years, the farm will become even more sustainable and profitable by reducing greenhouse gas (GHG) and ammonia emissions, improving water quality and enhancing biodiversity.

The herd will continue to consist of first-cross Aberdeen Angus and Hereford cows, bred from dairy cows. Evidence shows that this breeding policy, along with careful ICBF terminal sire selection for high carcase weights, is performing well. This is due to a combination of excellent milk production by the cows and inexpensive grass-based liveweight gain by their offspring.

In 2022, Newford farm joined the Future Beef Programme and the Signpost Programme. Over the coming years Newford will demonstrate best practice by adopting a number of technologies to enhance sustainability.

2023 calving summary

This spring, there were 68 cows and 21 in-calf heifers to calve down. The first cow calved on 27 January and the last cow calved 5 April 2023. Compact calving resulted in a six-week calving rate of 90%. Of the 89 cows that calved, there are 85 live calves on the ground resulting in 0.96 calves per cow per year as outlined in Table 1.

2023 breeding – pre-breeding heat detection

Pre-breeding heat detection began on 3 April with artificial insemination commencing on 24 April until 3 July (10 weeks).

Recording pre-breeding heats helps identify issues with cows who are not cycling regularly and allows for early intervention. This process helps maintain compact calving for the following spring.

We purchased three vasectomised teaser bulls on 4 April, weighing 409kg and costing €1,016 per head. These animals are currently undergoing a quarantine period for biosecurity reasons before joining the cows and yearling heifers.

These will be fitted with a MooCall HEAT collar, which sends a text message to the operator's phone once the vasectomised bull has been paying attention to a cow showing signs of heat.

Table 1: 2023 calving summary

2022 KPIs	Newford	National average
Calves per cow per year	0.96	0.87
Calving interval (days)	359	393
Six-week calving rate (%)	90%	55%
Heifers calving at 22-26 months (%)	100%	24%

For ease of management and additional heat detection method, a chin ball is fitted to each vasectomised bull which marks the cows back and tail head during the mounting process.

We will use the once-a-day AI rule on the farm again this year. Cows are inseminated each day at midday. If a cow is inseminated at 12 noon and she is still showing signs of standing heat again that evening, she will be served again the next day (at 12 noon).

Initially, yellow tail paint is applied to the cows and is topped up every week. Once a cow is served, the tail paint is changed to red and then to blue. Table 2 outlines the section criteria used to identify suitable sires for the 2023 breeding season.

Update on Newford performance

All the 2022-born weanlings were weaned from their dams during September. The male weanlings had an average daily gain of 1.37kg from birth to weaning with an average weight of 327kg. Males were castrated on 30 July.

Heifer weanlings had an average daily gain of 1.32kg from birth to

Table 2: Sire selection criteria

Criteria for selecting AI sires
Five-star terminal index (within and across)
<8 % calving difficulty for mature cows
<5.8 % calving difficulty for younger cows
>70% reliability calving difficult
>35kg predicted carcase weight mature cows
>25kg predicted carcase weight young cows
>1.86 on conformation
<6% for first calvers (beef heifers) : 80% reliability
>25kg predicted carcase weight
Cost of AI straw less than €20
>-3 days predicted transmitting ability age of slaughter

weaning at an average weight of 328kg. Prior to weaning, all the weanlings were creep grazing ahead of the cows and were receiving 1kg of meal each day.

After weaning, this was increased to 2kg when the weanlings returned to grass.

Steer weanlings were housed on 26 November followed by the heifer weanlings on 10 December. Steer and heifer weanlings achieved 0.56kg/day and 0.68kg/day, respectively, over the winter.

Newford suckler progeny are consistently achieving significant progress in reducing age of slaughter. On average, all 2021-born progeny were slaughtered eight months earlier than comparable national animals.

Newford heifers are achieving 296kg R- 3= carcase at 17.9 months. Similarly, steers are slaughtered at 20.5 months of age delivering 355kg R= 3- carcase.

What's the plan for replacement heifers this year?

Twenty replacement heifer calves which were sourced from two dairy herds are being reared on Newford farm. These heifers are the 2025 replacement in-calf heifers and will calve down at 24 months. These have an average replacement index of €154 and arrived at 27 days old.

Calves were initially receiving 3l milk replacer/head twice daily. This has been reduced to 2l milk replacer/head twice daily and animals have access to ad-lib concentrate and straw for roughage.

Implementing this rearing process encourages greater concentrate intake, which in turn promotes rumen development. Table 3 outlines the liveweight targets required to ensure these heifers are suitable for breeding in April 2024 and will calve down in February 2025.

Grassland and incorporating clover

We walk the farm weekly and all covers are uploaded to PastureBase Ireland. Based on the results, decisions are made to match growth rate with demand on the farm.

The aim is to reduce chemical nitrogen input on the farm. Hence we decided to incorporate clover into existing swards on the grazing ground.

At the end of May 2021, 20 acres of grazing ground on the home block was over-sown with white clover. This was at a rate of 2.5kg per acre consisting of the varieties Buddy and Aberherald.

A 6m Einbock Tine Harrow air seeder was used. In follow-up, 45 acres was over-sown in May 2022 at a rate of 3kg/ac and we decided to reseed six acres on the home block with a multispecies mix.

The mix included Ballintoy (5kg), Drumbo (5kg), Aberherald (1kg) clover, Aberswan (1kg) clover, Puna ll Cichorium (1kg), Tonic Plantain (1kg) which was a total of 14kg of seed per acre.

During 2023, a further 30 acres of grassland will be over-sown with white clover and these paddocks were sprayed for docks in 2022, which eliminates dock burden for the year ahead and aids successful establishment.

Continued on p22

Continued from p21

How will biodiversity be enhanced?

The management team at Newford Farm is determined to enhance the level of biodiversity on the unit.

The farm has been selected as a demonstration farm as part of the Teagasc Signpost Programme and Future Beef programme. This will see a suite of measures introduced over the lifetime of the programme.

For example, we set aside a small portion of old grazing ground beside the main yard. This ground will not be grazed and will act as a food source for bees during the summer. We will also establish a selection of native trees in this area.

There were 220 metres of whitethorn hedge planted on the farm this spring and we plan to establish another 200 metres over the coming years.

Donall Fahy and Stephen Frend with French visitors Chloé Poitral and colleagues from CFA - AgriCampus Laval.

Table 3

Arrival weight	Rearing ADG	Weaning (nine to 10 weeks old)	ADG first grazing season	Housing	ADG first winter	Bulling (April 2024)
60kg	0.7kg	95kg	0.7kg	220kg	>0.6kg/day	330kg

Artificial insemination: proven, practical and profitable

Three-quarters of all calves born in suckler herds are from stock bulls (ICBF). By not using AI, a lot of farmers are missing out on access to the best genetics at a lower cost than maintaining a stock bull

Gabriel Trayers
Teagasc Future Beef Programme

AI offers you access to a vast range of bulls. You can choose animals that will pass on good maternal qualities to daughters for top quality replacements. Others have easy-calving traits. Many will pass on good terminal traits to increase the performance and value of calves intended to be sold for beef.

AI unarguably gives you more flexibility with your breeding policy. So why do more farmers not use AI? One of the main reasons farmers give is the time needed to observe cows and drafting those in heat. But there are technical solutions which can help with that.

Aonghusa Fahy lives with his wife, Olivia, and two children in Tullira, just outside Ardrahan, Co Galway. He is part-time farming and working full-time in a secondary school teaching construction, DGC and agricultural science. The farm is divided between Ardrahan, Co Galway, and Tulla, Co Clare, 36km away.

"We run 30 spring-calving suckler cows," says Aonghusa. "Calving starts in the first week of February.

"Exceptional calves may be sold as weanlings but all other progeny are brought through to slaughter. Heifers finish off grass at 20 to 22 months at ~300kg carcass weight. Steers finish off grass at 28 to 30 months at ~420kg carcass weight."

Aonghusa Fahy and Gabriel Trayers.

Continued on p24

Continued from p23

Breeding plan

Aonghusa is using both AI and a stock bull, and is aiming to increase the overall AI use in the herd.

"Last year, 26 cows out of 30 proved in calf to AI and I am delighted with that," says Aonghusa who has used MooCall HEAT for the last three seasons to aid heat detection.

A vasectomised bull is fitted with a Moocall HEAT collar and the cows and heifers are fitted with a special tag. Moocall HEAT sends a message to Aonghusa's phone once the vasectomised bull detects a cow in standing heat giving an optimum time to serve the cow.

"I wouldn't be able to use AI without it as I am away from the farm for large periods of the day. I will get a text on my phone that tells me what cow is in standing heat and I can then call the AI man for the morning or evening," he explains. As a backup, Aonghusa tail paints the cows.

Overall management

"I bought in two Friesian weanlings in 2022, reared them on farm and got them vasectomised in early February, well in advance of the breeding season," says Aonghusa.

"They were on top-quality silage plus 2kg of meal over the winter to ensure that they were fit for this year's breeding season.

"I will run one of the bulls with the cows and the other with the heifers. I like to let the vasectomised bulls out with the cows at least three weeks before breeding actually starts. This allows the bull to settle with his collar and I can record heats before the season starts."

The farm is dry and cows and calves were let out to grass in February and despite having to be rehoused for a week, they are in a body condition score of 2.5 to 3.

The paddocks around the yard are closed for March and most of April to build grass covers. The breeding season started on 24 April and the cows are moved to these paddocks for easier drafting into the shed.

"This year , I have selected bulls such as CWI (Castleview Casino), S14147 (Curaheen Gunshot) and LM2014 (Ewdendale Ivor) for replacements. On the terminal side charolais bulls CH4159 (Knockmoyle 10 LOKI) and CH4160 (Pottereagh Mark) will be used on specific cows.

"We'll use AI for six weeks this year and the bull will be introduced and left with the cows to mop up.

"When I am working, six weeks using AI is very manageable," Aonghusa adds. "I am at the stage now where I could nearly manage without the bull – maybe next year."

Sexed semen

For a herd size of 30, only six to seven replacements are needed each year. Sourcing four- or five-star replacements that will calve at 22 to 26 months of age is very difficult.

"I would like to breed my own and I think sexed semen is a game-changer is this regard," says Aonghusa.

"Last year, sexed semen was used on six replacement heifers. A synchronisation programme prescribed by the vet was followed and using fixed-time AI, all six heifers went in calf to the LM bull, LM2014 (Ewdenvale Ivor)."

With the positive results and confidence gained for last year, Aonghusa is planning to use sexed semen on the best five or six cows that also have the highest value on the replacement index.

"Getting heifers off these cows and putting them in calf to LM2014 and Gunshot will ensure that my replace-

The green ear tag triggers a text to Aonghusa from the bull's Moocall heat collar when the cow is in heat.

ments will be top-quality."

Aonghusa adds: "With good heat detection and having an experienced AI man, sexed semen can simplify a replacement strategy for a lot of suckler farmers."

For suckler farmers, the key goal remains that every cow or heifer must produce a live calf every 365 days. If using a stock bull is the only way to achieve this; then continue with that. If you want to steadily improve your cows and their offspring and make more money... AI is a proven route.

Surprisingly high cost of a stock bull

The average cost of purchasing a stock bull is €2,000 to €4,500. ICBF figures have shown that the average stock bull sires 80 calves over its four-year working life, so approximately 20 calves/year.

If you buy a bull at €2,000, and subtract the price it will sell for you can calculate the cost per calf. The average cost per calf produced from this bull is €32.50. At a purchase price of €3,000, this rises to over €45 per calf.

Sourcing a four- or five-star bull with figures that have high reliability is a challenge for a suckler farmer. Too often a bull is purchased primarily on its physical appearance and price with the hope that calving will be easy the following year. These risks are greatly reduced when sourcing proven bulls from an AI catalogue.

In the Teagasc Future Beef Programme almost 80% of the participants are using AI at different levels, ie from 100% AI to using AI on maiden heifers only.

Trevor Boland moves the herd to fields adjacent to the yard near calving time.

Farmer focus: Trevor Boland

Trevor Boland farms part-time in the picturesque setting of Bunnafedia, Dromard, Co Sligo. He is married to Tara and is farming in partnership with his father Joseph. He works full-time off-farm as an accountant with ifac.

The farm size is 48 hectares, fragmented into three main blocks. The suckler herd consists of 50 cows calving in the months of August, September and October."Calving at this time of year suits me and the farm," says Trevor. He moves the herd to fields adjacent to the yard near calving time. He adds: "As I am working, there is a lot less risk in calving outdoors and in most cases very little intervention is required."

There is another big advantage for Trevor with an autumn-calving system. "With cows calving at this time of year, I can use AI at breeding when the cows are indoors."

Calving at two years of age with high-value four- and five-star heifers is one of the main targets for the farm. Trevor adds: "Using AI gives me a choice of bulls , both for the terminal market but also for producing replacements."

"To help with heat detection I use Sensehub which monitors the cows' overall activity. It gives me precise information on what is the best time to inseminate.

"I can understand why a lot of suckler farmers don't use AI but my advice would be to take advantage of the technologies that there now to help with good heat detection. Under TAMS some of this technology is now grant-aided which is an extra incentive to make the move now."

Blowfly strike: why prevention is better than cure

The risk period for blowfly strike has begun and will continue through to October, and beyond, where conditions allow. Unchecked, blowfly will cause welfare issues, production losses and mortality

Ciaran Lynch
Teagasc sheep specialist

Flies are attracted to soiled areas of the fleece and strike typically starts there. This is usually around the tail end but strike can also occur on the back, shoulders and undercarriage as well as in the feet. Anywhere there is any open wound, such as the head, will also be targetted.

In the initial phase of strike, the animal may be away from the main group and appear agitated, often biting or kicking at the affected area. Typically, flies can be seen around an area of discoloured fleece.

As the condition progresses a discharge and associate foul smell will stem from the affected area. The fleece will start to come away. If left unchecked, toxaemia and death will result.

Key steps

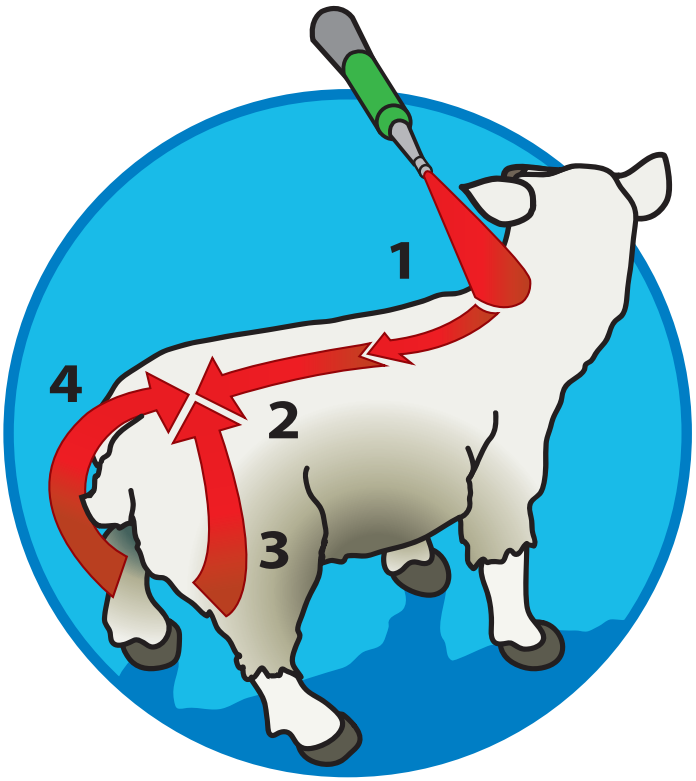
- Check regularly during the high-risk periods.
- Inspect suspected cases thoroughly once spotted.
- Treat promptly.

How it occurs

Strike occurs as a result of adult blowflies laying their eggs on a sheep. Each of these flies can are capable of laying up to 200 per day, so the problem can occur and spread quite rapidly on farm.

Eggs hatch into the first-stage larvae within about 12 hours. These larvae are little bigger than a grain of rice and cause no damage as they don't have mouthparts.

However, within 24 to 36 hours they develop into second and subsequently third-stage larvae that have acquired mouthparts and feed consistently on skin and underlying tissue, causing lesions and further serious damage when left unchecked. Once they reach the third stage – maggot – they will begin to drop off the animal and complete the life cycle on the farm with a new fly emerging within approximately seven days in ideal conditions.



Implications

- Strike can occur once there is blowfly activity
- The time from the blowfly laying eggs to damage occurring is short so prompt action is needed once symptoms are evident.
- You must try to prevent the blowfly completing its life cycle as this increases the level of challenge present on the farm and surrounding area for the rest of the season.

Pre-disposing factors

Blowflies are attracted to organic matter or discharges. Soiled dirty fleeces from animals with scour, foot-rot or open wounds from shearing or rams fighting increase the risk. They are also highly attracted to sheep where strike has already occurred. In damp humid conditions the risk is heightened.

Key steps

- Have an effective internal parasite programme in place on your farm.
- Dag/crutch/shear dirty sheep.
- Treat any incidence of strike promptly.

Treatment options

As stated already, the aim should always be to prevent blowfly strike from happening in the first place. There are a number of different options.

1 **Plunge dipping:** the effectiveness of this method depends on correct dipping procedure.

Ensure the dip is made up to the correct strength and replenished periodically, follow the manufacturer's instructions.

Sheep should remain in the solution for a minimum of 60 seconds. The duration of immersion in the dip solution is strongly correlated to the length of time that protection will last.

2 **Topical applications:** this is the most common method used on farm. There are a number of products available offering periods of cover from seven to 19 weeks.

Correct application method will have an impact on the efficacy. Ensure the gun is calibrated and delivering the recommended amount and that it is applied evenly in the designated areas as per manufacturer recommendations.

Applying to soiled or contaminated areas will greatly reduce product efficacy. The meat withdrawal dates vary from seven to 40 days for these products so be careful to ensure they are suitable for your farming system.

Given that the blowfly season is quite long, a repeat application may be required once the period of cover nears its specified duration.

These common products used can be split into two categories based on their active ingredient and mode of action

- **Insecticidal pour-ons:** there are a number of pyrethroid based pour-ons (eg cypermetrin) which offer short-term cover (six-eight weeks) from flystrike on the areas where they are applied. These products will also kill maggots if they are applied directly to the larvae.
- Insect growth regulators (IGRs).

These products work by interrupting the life cycle of the larvae. They prevent the stage one larvae that don't cause harm from developing into stage two larvae that have mouthpieces and can cause damage.

These products won't kill stage two or three larvae (maggots) and therefore must be applied before the blowfly lays eggs. There are a number of different products within this category on the market with varying lengths of cover from eight weeks up to 19 weeks.

3 **Shearing:** the fleece provides an ideal incubation ground for the fly to lay her eggs and shearing will remove this. However, this protection is only shortlived and strike can occur within weeks during high-risk periods, so one of the outlined methods above will need to be incorporated into the control programme for these animals.

Implications

- Have the control method in place before strike occurs.
- Use products correctly according to the manufacturer's instructions.
- Be aware of the periods of cover provided by each product and the withdrawal dates when selecting stock for sale.

Put a plan in place to deal with blowfly strike this season. Contact your advisor or veterinary surgeon to discuss this further.

business management

Opportunities for greater

Completing the evening milking earlier is good for the farmer and helps recruit and retain employees

Martina Gormley
Teagasc Dairy Specialist, Athenry

Milk recording data from 2,366 herds across 23 counties shows that the average milking finish time was 6.43pm and the length of the working day was nearly 12 hours (Table 1). There is huge variation, but fewer than one in four farms were finished the afternoon milking by 6pm.

The main reasons reported for later milking times include:

- Workload.
- Tradition/habit.
- Lack of hobbies.
- Milk yield loss.
- Higher SCC.
- Childcare.

'Too much work to do' is often cited as a reason for later milking. To get all the jobs done after morning milking, the afternoon milking must be delayed. The suggestion seems to be that if you milk early and finished at 5pm you then have to be gone out of the yard. Not so.

Milking earlier gives the option to take the evening off or go and get other jobs done. It also shows your employees, neighbours and family that dairy farming is structured and that you can be finished earlier if you choose to.

Doing things how, and when, we have always done them is a powerful and understandable impulse. But sometimes habits and traditions come at a cost and should be challenged. Parkinson's law says that 'work expands to fill the time available for its completion' so unless you set an end point you might never stop working.

Concerns about milk yield and SCC were mentioned. We analysed the 2,366 herds and found no difference in yield or SCC between cows that were milked in a 16:8hr (7am and 15pm) interval compared to cows milked in a 12:12hr (6am and 18pm) interval.

As spring has the greatest workload on most farms, we analysed milking times for each season. The results showed no difference in milking times by season.

The farm milking time in spring was exactly the same in summer, autumn and winter. This strongly points to milking times being a tradition/habit on many farms.

Childcare is a genuine reason for some farmers having to milk later and this is down to the stage of the family. As the family gets older milking times can be changed to allow for an earlier finish time.

Table 1: Mean milking time data from 2,366 herds recorded in 2020

	Average
Start milking AM	07:23
Finish milking AM	08:55
Start milking PM	17:14
Finish milking PM	18:43
Time spent milking (hrs)	02:58
Milking interval (hrs)	09:48
Length of working day (hrs) (milking start am to finish PM milking time)	11:47
Herd size (number of cows)	118

flexibility on dairy farms

A HIGHLY EFFECTIVE TEAM: Greg Butler, Eleri George, Michael Bryson (John Whelan's business partner), Kay O'Connell, Teagasc, John Whelan and Stephen Whelan.

Farmer focus: earlier evening milking

John and Margaret Whelan farm in Ballygarvan, Gusserane, Co Wexford. "We have four children, Stephen, Sean, Katie and Padraig," says John. Initially, we milked 16 cows plus tillage with my uncle on his farm. The farm has expanded and today we are farming on the home farm in Ballygarvan with our son Stephen and in partnership on two other dairy farms.

"When the home farm expanded to 120 cows 10 years ago, we began employing outside help. It was only then when we started to look at our milking times.

"We were milking at 7am in the morning and 5pm in the evening. By the time cows were milked and wash up done, it was 7pm.

"Paying wages and attracting staff were the drivers which made us change. We switched to 3pm milking start time. Staff are now finished work by between 5.30pm to 6pm."

John says that a key benefit to the earlier evening milking is that if there is a sick cow, she is identified at 3pm and the vet is called straight away.

Continuing, John said: "Being honest I didn't make the change for myself but I have also benefited. After milking I go in for the dinner around 5.30pm, catch up with the family and go back out if I need to or want to. I have the flexibility to do this particularly outside of the calving season.

"My children play sport so milking being finished before 6pm fits in well with training and matches. "I am not into watching TV, I really enjoy farming and I do work hard but I also take time off."

John's hobby is ploughing and he has represented Ireland in locations as diverse as Kenya and Finland and has won three world-ploughing titles and 12 national titles. "I often go out after milking and practice," he says.

"I take off four weeks each year for ploughing competitions and we always go on a yearly family holiday, which is booked in January.

"I did my homework before making the change and was confident there was no negatives to earlier milking," adds John.

"Milk solids or SCC have not been effected in anyway. On average milk solids for last year between the three farms was 540kg/cow (6,316 L, 4.7 f% & 3.6p%) with an 8% empty rate.

"There is one cow doing 53 litres/day at present and last year 25 cows on the home farm delivered 700kg ms/cow."

John Whelan.

John and his team start milking at 6.30am. He uses a back latch and says he finds it to be a good time-saver. "We have a high number of rows going through the parlour and this is the reason for our start time. If there were fewer rows of cows we'd start milking at 7am."

The earlier milking also lends itself to time management. "We have to be ready for 3pm," says John.

"There is no point in starting at 6.30am and then messing about during the day. I have done every farm task on the farm, learnt the hard way on some occasions and this has made me more time conscious.

"I know how long it takes to get jobs done. A job that requires less time is given to the person milking. If on the odd occasion, I get the time wrong or something does not go to plan, milking is prioritised and the job will be finished the next day.

"So I am realistic when delegating tasks. It's a balancing act between getting the job done well and also not putting people under too much pressure."

Staff attraction and retention is good on the farm. "Everyone won't do a task in exactly the same you will do it, but that doesn't matter if they get the same result," says John.

"We aim to recruit good people and treat them well. We find that leads to a relaxed atmosphere where we don't need to be constantly telling people what to do. They know what needs doing and get on with it."

John says that you have to be a good role model for staff and family by working hard and smart. "It also means quitting at a reasonable hour," he concludes.

In short

Earlier milking has the following benefits:

- **Allows farmers to continue to work hard while taking time off.**
- **Flexibility and better staff attraction and retention.**
- **Structure to the working day and better time management.**

Getting the most from your fungicide spend

Timing is all…but rate and product choice are also important

Shay Phelan
Teagasc tillage specialist

John W. Kelly
Teagasc tillage advisor

In the Teagasc Costs and Returns 2023 figures projected fungicide costs in winter wheat are €245/ha (€99/ac); in winter barley €145/ha (€59/ac) and spring barley €106/ha (42/ac). These figures indicate an average 10% increase in cost over 2022.

With grain prices likely to be significantly lower this harvest, getting a good return on your fungicide investment is key.

Complicating the issue is that over recent years we have seen a reduction in the choice of active ingredient either due to (de)registration or the development of resistance.

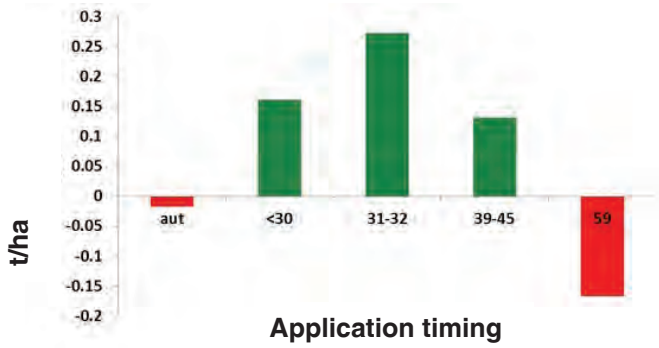
Products that are still available must be used wisely. To achieve the optimum effect, there are three critical areas:

- Product choice.
- Optimum rate.
- Optimum timing.

With the loss of key actives like epoxiconazole and chlorothalonil the options for septoria control in winter wheat, for example, rely heavily on prothioconazole (Ascra Expro, Elatus Era, Univoq etc.) or mefentrifluconazole (Revystar). All are mixed with SDHI/Qii chemistry to improve activity and to protect the azoles.

Folpet (Arizona, Phoenix, etc) has replaced chlorothalonil (Bravo) as a multisite although its performance is not as effective. Alternating the chemistry is important from a resistance management point of view so where Revystar is used as a leaf three application in wheat use an alternative product at the flag leaf. Folpet should be applied at both timings.

Figure 1: Fungicide timing response in winter barley



In the case of barley, prothioconazole products such as Proline dominate. They should not be applied on their own, as to do so, will increase the risk of resistance buildup. The partner product can be either a strobulurin, e.g. Comet or an SDHI, e.g. Siltra.

In oat crops, prothioconazole will form the basis of most programmes with a partner product such as a strobulurin or SDHI, e.g. Elatus Era. Tebuconazole, e.g. Fezan, can also be used to control rust if needed.

Optimum application rate will differ depending on whether the crop is barley, oats or wheat. In barley, it has been shown that 50% rates of azoles will give adequate control, when mixed with a partner product. However, for ramularia control, a full rate of folpet, i.e. 1.5 l/ha, will be needed.

In oats, reduced rates can be used of the prothioconazole (50% to 60%) or tebuconazole (60%) depending on the disease pressure. They should be mixed with a strobilurin for rust or a mildewicide, e.g. Midas, if mildew is present. These can also be used at re-

John W. Kelly and Derek Strong.

Farmer focus:
Derek Strong, Co Offaly

Derek Strong, who farms in Clonmore, Tullamore Co Offaly, pays enormous store by fungicide timings. He grows both winter and spring cereals and this year is also growing beans as a break crop. Barley and wheat are dried on farm for sale during the winter with some grain forward sold before harvest.

The majority of Derek's crops are established using min till which has reduced labour and costs compared to a conventional system.

"The spring crops were sown a little later than normal, similar to 2018, but I'm hopeful that the yields will be better this year," he says.

Derek is growing Tardis winter barley, which has a relatively good disease resistance profile. However, he still applies his fungicide timings to the key growth stages: "We constantly monitor crops in the days and weeks coming up to those applications," he adds.

> I have looked at the research and seen that this was leaving the crop at risk from ramularia infection

Slight changes

Like many farmers in the area, Derek has made slight changes to his fungicide applications over recent years. The final timing on barley is targeted at awn emergence. "I don't like waiting until the heads are out on the barley anymore," he says.

"I have looked at the research and seen that this was leaving the crop at risk from ramularia infection, potentially reducing yields."

duced rates depending on the disease pressure.

Wheat crops will need a robust rate to control septoria especially in wet weather.

Eighty to 100% rates are generally what is recommend to use in a mixture with folpet at 100% rate. These rates are required to ensure that crops are protected in the intervals between leaf three and leaf one and again from leaf one to the head spray. Applying lower doses will reduce the persistency of the products and the crops will be unprotected for a period of time.

Optimum timing is probably the most important of the three points. Fungicides applied at the wrong time will result in either poor control or the need for an extra application. Either can prove costly.

It's important to remember that the disease strategies in wheat, barley and oats are different.

In wheat, for example, disease control should really start as leaf three is fully emerged.

The idea is to protect the upper canopy where most of the yield comes from. This should then be followed with another application usually about three weeks later as the flag leaf (leaf one) is fully emerged. The final application mid -flowering aims to protect the crop as long as possible.

In these timings, you are trying to coat the leaves in fungicide to protect them as much as possible. Apply too early and not all of the leaf is protected, apply too late and some of the leaf may already be infected.

T0 (leaf four) applications rarely showed improved control of septoria when Bravo was available so there is little justification for using a T0 this year.

Barley

Disease control in barley is completely different. At the early stage you are trying to protect tillers, as diseases such as net blotch and rynchosporium will kill them and reduce yield.

Many barley crops will get a fungicide at late tillering to protect these tillers as there is a clear correlation about the number of tillers produced and overall yield.

The final application is targeting ramularia, which is a stress-induced disease, that can only be controlled preventatively.

There is no curative activity from any chemistry on ramularia. Therefore, trials in Teagasc and the UK have clearly shown that the final application at the awns emerging stage of the crop is the optimum timing (Figure 1).

These trials have also shown that leaving that final application until the heads are fully emerged, will allow ramularia to infect the crop and reduce yield.

In oats, generally the strategies used aim to prevent the buildup of mildew and crown rust with many crops receiving a two- or three-spray strategy depending on conditions. In winter oats there is typically a three-spray strategy at GS 30/31 followed by GS32 and the final application as the heads are half emerged GS 45-55. In spring oats there are usually two applications at GS31/32 and heads half emerged.

Signpost farms

Saving money and the environment

A range of environment initiatives made this pig business a logical choice as a Signpost farm

John Mahon
Teagasc Signpost programme

Mark Plunkett
Teagasc soils specialist

Gerard McCutcheon
Teagasc pigs specialist

Miriam and Mattie Moore have two pig units: a 1,600-sow pig unit rearing pigs up to 18kg liveweight at Cannakill townland Croghan, Rhode, Co Offaly, and a finishing unit at Rath East townland in Co Wicklow.

"Finishers consume 70% of our meal each year so Rath East was the logical location when we built a feed mill in 2009. We bring meal from the mill back to Croghan for the sows."

To achieve even greater integration and efficiency, the Moores grow an increasing proportion of the pigs' diets, using home-produced manure to fertilise their winter barley, wheat and rye crops.

Mattie Moore and John Mahon.

Mattie, a pig farmer at heart, and his staff are equally at home at field work, farrowing or feeding finishers. Miriam looks after the administration of this complex operation.

From an environmental perspective, there are a number of features on this Signpost farm that are important. On the pig farm LED energy-efficient lights are used in the pig houses.

The heating system is a wood pellet boiler, eliminating the need for fossil fuels. Solar panels will soon be generating 50% of the electricity required on the sow farm. "These investments improve the economic viability of the business and boost our sustainability credentials," says Mattie.

The Moores have three years' experience using an umbilical system with a band spreader to apply pig slurry to their crops. "Compared to using a tractor and slurry tanker we have less soil compaction, and we can apply pig slurry in growing crops at the optimum time for nitrogen, phosphorus and potassium uptake," adds Mattie.

Spring application enables the organic fertiliser to deliver a greater portion of the crops' N requirements, reducing the need for expensive bagged nitrogen. In addition, the system has the capacity to cover large areas of ground before application windows close.

Winter rye, a new crop on the farm, will help spread the tillage workload and may replace some of the winter wheat in the future. "We are looking forward to seeing how this grain performs in the pig diets," says Mattie. Teagasc research suggests that it can be included at up to 60% in finisher diets.This farm was selected as a Signpost farm because it uses organic fertiliser (pig slurry) to grow some of the feed requirements for its overall pig production enterprise.

Gerard McCutcheon, Mattie Moore, John Mahon and Kevin Browne.

Using pig slurry to reduce fertiliser costs and inputs

Slurry from the sows eliminates the need to purchase chemical phosphorus (P) and potassium (K) for the Croghan farm's 95ha of cereals. The slurry is also a valuable source of some of the other nutrients that crops require such as manganese, copper, zinc, sulphur and magnesium.

The nutrient content of pig slurry is closely related to the dry matter content. The dry matter percentage depends mainly on the amount of water added either in the feeding and watering of the pigs or from sources such as washing of houses, leaks, spills or from roofs, open tanks or dirty yards.

Good manure management will ensure minimal dilution with water. The need for storage is reduced and transport costs are lower if the manure is sold off-farm. Pig manure that contains 4.3% dry matter is consid-

Table 1: Nutrient content and value of pig slurry (4.3% solids)

	Nitrogen (N)	Phosphorus (P)	Potassium (K)
Nutrient content kg/m³	4.2	0.8	2.2
Nutrient availability %	50	100	100
Available nutrients	2.1	0.8	2.2
*Fertiliser cost per kg €	2.17	4.60	1.66
Value € of each nutrient	4.56	3.68	3.65

Note: 1m³ equals 220 gallons. *Based upon chemical fertiliser prices on 1 March 2023. The dry matter (DM) and nutrient content of the pig slurry can be assessed quickly using a slurry hydrometer.

Table 2: Typical N,P and K value of pig slurry (available units per 1,000 gallons)

Dry matter (%)	N	P	K
2	11	4	11
4	19	7	20*
8	25	14	21

*Teagasc Green Book & McCutcheon, 1997; Tunney, 1987

Table 3: Organic manures, types an carbon supply

Manure type	% DM	Application rate	Carbon (t/ha)
Pig slurry	4%	25m³/ha	0.4
Cattle slurry	6%	25m³/ha	0.6
Layers manure	55%	5t/ha	1.1
FYM	25%	25t/ha	2.5
Mushroom compost	32%	20t/ha	2.6

(Richie Hackett, 2010)

Soil carbon

An additional benefit from using organic manures is the boost to soil organic matter/carbon.

This brings other benefits to continuous tillage soils such as – feeding soil microflora and improving soil structure. Building soil carbon is a slow process.

"We are in it for the long term (they have two young sons) and we will take whatever steps contribute to the overall sustainability of the business," conclude Mattie and Miriam.

ered reasonable quality. A minimum of 5% solids is preferable.

The fertiliser value of pig manure at 4.3% solids is €11.89 per m³ when there is a requirement for N, P and K (see Table 1). This translates into €54 per 1,000 gallons. A reasonable rule of thumb is that a thousand gallons of pig slurry is equivalent to a 50kg bag of 19:7:20.

The DM% and nutrient content of the pig slurry should be known, as this will determine the required application rate for the field. Also, make sure that the slurry is well agitated before it is applied to land to get a more homogenous/consistent fertiliser application of N, P and K.

Tillage Signpost farms

Nitrogen accounts for approximately 80% of the greenhouse gas (GHG) emissions from crops.

The tillage sector is the lowest emitter of GHGs. Beef farms have three, and dairy farms seven, times higher emissions per hectare than a tillage farm.

The pig sector is a small component of our national emissions at about 4% because the sector is relatively small (about 140,000 sows plus progeny in Ireland) by comparison to other more intensive countries.

In the tillage sector, there are 12 goals to reduce gaseous emissions. The first three relate to correct soil pH, optimum soil P and K levels and increasing the N usage efficiency.

The investment in an umbilical system has allowed the Moores to apply slurry on to growing crops. "The umbilical system together with the GPS system have given us confidence in getting a more even spread of slurry and a better utilisation of the nutrients in it," says Mattie.

Pig manure has been applied to growing winter cereals on the farm over the last two years. Previously all land received 33m³/hectare (3,000 gallon/acre) of pig slurry (about 4% dry matter) incorporated in the autumn time at planting.

All of the P and K in the pig slurry is available but only 10% of the available N is taken up by the growing crop (when using autumn application). If this slurry goes out in springtime on to a growing cereal crop the fertiliser N value is 10 times greater because the crop is actively growing and has a large demand for N. This reduces the crop's N requirements by almost 70kg/ha (57units N/acre).

"Our aim is to increase our slurry storage capacity from six to seven months currently up to 12 months," says Mattie. "Which will allow pig slurry to go out in the spring, eliminating autumn application."

Scan the QR code, right, on your smartphone for more.

Robert McCabe on Delaney in discussion with Marianne Mulhall.

Equines on an organic farm

You can manage horses conventionally but terms and conditions apply

Marianne Mulhall
Organic Advisor, Teagasc

Elaine Leavy
Organic Specialist, Teagasc

Wendy Conlon
Equine Specialist, Teagasc

Robert and Maura McCabe, who farm 45ha in Corbally, Enniscorthy, Co Wexford, joined the DAFM Organic Farming Scheme in January 2023. They farm suckler cows and horses, keeping all bovine weanlings for one winter and selling them at 18 months off grass. The equine enterprise includes thoroughbred broodmares and their offspring along with some sport horses and Irish Draughts.

Robert and Maura ran young horse, Irish Blaze, in his first Point to Point in 2021 to place joint first; he won again on his first track race in Navan and was subsequently sold. He is in training with Gordon Elliot.

"We believe cattle and horses can fit in very well on an organic farm," says Robert. "They complement each other in terms of grazing. Horses generally don't require a high nitrogen input for grazing, so an organic system suits. Horses also love grasses mixed with herbs and clovers which is typical of organic swards."

Clover can be a valuable nutrient for the horse. It is important to remain vigilant where the percentage of clover increases above 20% in pasture or forage. Watch out for any contamination with a fungus or other toxins, particularly in conserved clover.

Robert says: "The cows follow the horses and graze out whatever the horses will not, leading to good clean grazing and providing high-quality regrowths. I found over the years that spreading nitrogen to force rapid grass growth did not suit the horses.

"They often left lots of this heavily fertilised grass behind. I was spending money to grow the pasture, the horses didn't eat it and I ended up topping the fields. I hope now that without artificial fertiliser and a dif-

ferent mix of grasses and herbs that there will be more efficient grazing by the horses."

The equine enterprise is not part of the organic conversion and as such they can be fed non-organic feed. Under the 'Organic Food and Farming Standards in Ireland', the horses can graze for 180 days as non-organic animals on the organic holding.

Robert says: "Breeding a racehorse is very rewarding and this allowance has enabled us to convert to organic farming and still run our successful equine enterprise."

There are two approaches possible to combine an equine enterprise and an organic enterprise:

A. Separate the organic and equine enterprises as the McCabes have opted to do

The equine housing and other facilities and pasture used for equines (horses or donkeys) must be clearly separate from those used to manage the organic livestock. Equines in this scenario can be managed conventionally with non-organic feed, veterinary treatments and parasite control providing the following are adhered to:

- **Physical boundaries**– a dedicated non-organic area (stables/ other facilities; and paddocks) with physical boundaries must be clearly identified for use by the non-organic equines. Physical separation means geographically distinct blocks of land with separate LPIS (land parcel identification system) numbers on BISS (previously BPS) declared as non-organic parcels. The two holdings can be adjoining, provided fields are separated by stock proof hedging or fencing.
- **Stocking levels** must be nitrates-compliant (not exceeding 170kg N/ha)
- **Financial and operational separation is required** – separate accounts with invoices clearly identifiable for the two holdings independently of each other and must be able to demonstrate separate procedures and record keeping for both.
- **Grazing of organic/in-conversion land** is possible by non-organic equines once the period does not exceed 180 days per calendar year. However, the non-organic equines cannot be on the pasture at the same time as any organic animals.

Equines grazing organic/in-conversion land may not be fed any feedstuffs possibly containing genetically modified organisms or derivatives whilst grazing the organic land.

B. Farm all enterprises organically

Any equines on the holding in this situation must be managed according to the organic regulations. Equines in this scenario have unlimited access to the organic grazing on the holding,

Maura and Robert McCabe.

and must be kept on certified organic pasture.

A health plan is a requirement for all holdings, developed in conjunction with the farm veterinary surgeon and setting out a plan for health care and nutritional supplementation.

However, all equines also have to be managed according to organic regulations including in relation to, for example:

- **Feeding** – all concentrate and forage feed inputs must be of organic origin. Sourcing organic concentrate feed suitable for equines is challenging. Equines may not be fed any feedstuffs possibly containing genetically modified organisms or derivatives thereof.

Trace elements and minerals may be given where justified by known farm deficiencies and specified in the health plan. In addition to use as a feed additive, trace elements and minerals may also be given by injection where identified in the health plan by a vet.

- **Bedding** – conventional straw is permitted. Untreated wood chip/shavings are also permitted.
- **Parasite control** – treatment of internal/external parasites is permissible under veterinary guidance and the health plan. However, to minimise the requirement for anthelmintics, high-quality pasture management is of critical importance to minimise worm burdens. The following practices contribute to managing parasite burdens:

– Appropriate stocking density (1.5 horses/hectare) is a good general guideline.

– A rotational/mixed grazing system providing periods of rest for pasture.

– Grazing younger/more vulnerable stock on 'clean' pasture.

– Removing dung from pasture is probably one of the most effective practices in breaking parasite life cycles, particularly if cross grazing is not employed.

– Monitoring stock using faecal egg count testing and blood sampling to ascertain the parasitic status of the herd (discuss with your vet).

All of the above practices are equally advisable for non-organic enterprises to conserve the use of anthelmintics and preserve their effectiveness for the future.

- Vaccination is permitted in cases where there is a known disease risk which cannot be controlled by any other means and which has been confirmed and specified in the health plan with the vet.
- Chemicals – synthetic chemicals, fertilisers, pesticides and herbicides are all prohibited under organic farming irrespective of livestock category.
- **Adding new equines** – for breeding purposes up to a maximum of 10% of the number of adult animals on the holding may be introduced with prior permission granted by the organic certification bodies. For units with fewer than 10 equines the introduction of new animals is limited to a maximum of one per year.

For most, the first scenario where the equines are farmed non-organically as a separate enterprise to the organic enterprise will be the simplest choice, but this depends on the farm infrastructure being conducive to the clear separation.

Further information

- **Teagasc organics:** www.teagasc.ie/organics
- **DAFM organics:** https://www.gov.ie/en/publication/fc7c8-organic-farming/
- **Organic Food and Farming Standards in Ireland, Edition 2.1:** https://www.gov.ie/en/publication/fc7c8-organic-farming/#organic-food-and-farming-standards-in-ireland
- **Irish Organic Association:** https://www.irishorganicassociation.ie/
- **Organic Trust:** https://organictrust.ie/

Woodland for water

John Casey
Teagasc forestry advisor

Eimear Connery
Teagasc ASSAP advisor

March 2023 saw the establishment of almost three hectares (ha) of new native woodland and undisturbed water setbacks at Teagasc Moorepark. Teagasc's Forestry & Agricultural Sustainability Support and Advisory Programme (ASSAP) programmes have been encouraging the planting of such woodlands on farms, where appropriate.

This woodland will eventually deliver a wide range of benefits including:

- Reduction in sediment mobilisation and runoff into the adjacent river Funshion.
- Interception of nutrient runoff into the watercourse.
- River bank stabilisation.
- Food input into the aquatic ecosystem
- Shading/cooling.
- Regulation of floodwater.
- Riparian restoration.

These are in addition to other ecosystem services such as native woodland biodiversity, habitat linkage within the wider landscape, carbon sequestration, amenity and environmental interpretation.

Why plant trees in Moorepark?

ASSAP is working with farmers in a free and confidential advisory service to help them to improve water quality. One of the main challenges to protecting water quality is limiting nutrients (nitrate and phosphate) and sediment from reaching watercourses.

As part of the ASSAP programme, all Teagasc farms have had a farm assessment carried out by the local ASSAP advisor to identify suitable mitigation measures, where needed, to help protect water quality.

The decision to plant native woodland in Teagasc Moorepark was based on the EPA's Pollution Impact Potential Phosphate Maps (PIPP maps) which identify areas that have a higher risk of Phosphate (P) loss.

The farm at Moorepark is predominantly nitrate risky but the fields along the Funshion river (i.e. the river floodplain) also have a high risk of phosphate loss.

The 3ha area being planted in Moorepark accounts for approximately 33% of the phosphate risky soil type within the farm.

The phosphate flow pathway identified within the area for planting along with the P index 4 soils make the area an ideal location for native woodland planting.

The water setback, an integral part of the woodland project, follows specifications set out in the Environmental Requirements for Afforestation (Department of Agriculture, 2016), and forms a strip of undisturbed ground vegetation positioned alongside the river bank.

New forest types (FTs)

Under the proposed Forestry Programme 2023-2027, there will be a range of establishment options and tree species available to landowners, depending on site suitability and the landowner's objectives.

Teagasc will be using the new woodland in Moorepark to highlight three options to farmers considering forestry, with a special focus on the protection of aquatic zones.

- Forest type (FT) 1: native forests – creation of intimately mixed forest, comprised entirely of native species and prioritised native provenance (mainly alder, oak, willow).
- Forest type (FT) 2: forests for water – creation of native forest in targeted area, with the specific objective of protecting water from significant pressure.
- Native tree area (NTA) 2: creation of native forest for water protection

Site inputs and future management

The woodland was established with the minimal amount of site inputs (eg fertilisers) and disturbance (eg cultivation). The focus was on retaining natural site conditions and facilitating the emergence of a native woodland type that would occur naturally in time.

Ground preparation was limited to inverted mounding and a small amount of pit planting. Standard fertiliser application is unlikely to arise.

The control of competing vegetation such as grasses, herbaceous plants, bramble and bracken will be vital for the rapid establishment and growth of young trees on such a fertile location.

While non-herbicide control (eg trampling and grass cutting) is only realistic on a small scale, any necessary post-planting spot spraying herbicide application will be kept to the minimum required to ensure success. Herbicide application will not be carried out within the water setback or within 20 metres of the aquatic zone.

Water setback

The water setback was designed to create an intact and permanent buffer

John Casey and Teagasc Moorepark farm manager John Paul Murphy.

of natural vegetation alongside the aquatic zone, in order to protect water quality and aquatic ecosystems. The water setback breaks the 'pathway' between the source of possible pollution and the receiving watercourse.

Appropriate tree planting within the water setback will deliver direct in-stream benefits such as bank stabilisation, cooling/shading, and food drop into the aquatic ecosystem, and will create further habitat diversity within the setback. The protective function of the setback will be maintained by leaving this area undisturbed, excluding machine traffic, and allowing a mosaic of natural ground vegetation to develop.

Woodland layout in Teagasc Moorepark

Key:

A River.

B Permanent undisturbed water setbacks, 10+ metres in width, uncrossed by new drains & largely unplanted. These areas contain setback planting comprising single trees and small groups of suitable native riparian species of trees and shrubs, strategically planted for bank stabilisation, dappled shading and as a food source for aquatic life.

C The new native woodland area is 20 metres or greater in width and uncrossed by new drains. It has been widened at key locations on site, where adjoining land use, site hydrology and slope increase the vulnerability of receiving waters.

A small part (<10%) of the total was allowed to be less than 20 metres in width. This lower limit was used to create a relatively narrow woodland strip along part of the watercourse, without encroaching too greatly on the adjacent agricultural land.

D Surrounding farmland: the woodland establishment on a natural floodplain such as the paddock area was feasible because:

- The frequency of flooding and the inundation periods involved will not impede woodland establishment and development; and
- The form of the new woodland along such a sensitive watercourse was developed with input from other statutory bodies such as the EPA and Inland Fisheries Ireland.

Conclusion

Publicly available maps on www.catchments.ie are a very useful tool for all farmers to identify the high-risk areas on their farm for potential nutrient loss and put suitable mitigation measures in place.

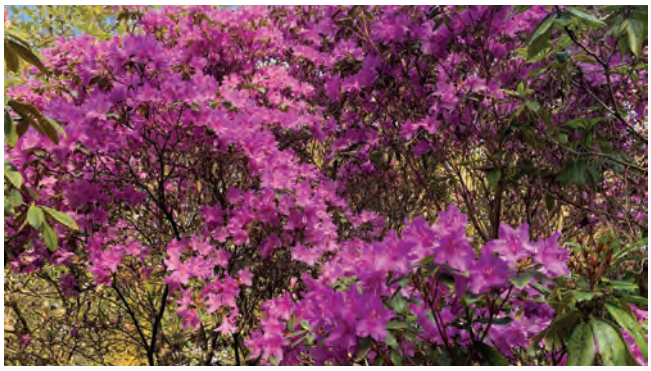
Potentially every farm has an area that would be suitable for planting of native trees particularly if it can be incorporated with a phosphate flow pathway to help break the pathway of overland flow. The aim is to slow the flow, allow the deposition of sediment and associated nutrients and also to encourage the uptake of nutrients by growing vegetation.

Substantial funding has been earmarked for the 'Forests for Water' measure under the new Forestry Programme 2023- 2027, including a proposed grant of €6,744/ha to establish woodland and a 20-year annual premium of €1,412/ha.

It is very important to consult with Teagasc advisors before planting takes place to ensure that it is the best fit for your farm.

Contact details for your local Teagasc forestry development officer can be found on the Teagasc website.

Beautiful plants which thrive in acid soils



ABOVE: Rhododendron concinum.

LEFT AND FAR LEFT: Magnolia x soulangeana.

Chris Heavey
Lecturer at the Teagasc College in the National Botanic Gardens

One of the great beauties of the late spring garden is the abundance of ericaceous (acid soil loving) plants doing their thing. I have many favourites and first among them is Magnolia, which comes in evergreen and deciduous species.

The glorious white, candle-shaped flowers of *Magnolia x soulangeana* appear in February and continue until April. There is a purple cross called 'Susan' which doesn't grow as tall as x soulangeana. Some of the larger types include Magnolia *campbellii* which has a reputation for only flowering after 30 years or so…but remember a gardener should never be selfish, plant for future generations.

Some of the best specimens, I have encountered on my travels in Ireland, are in suburban Dublin where the soil would be considered unsuitable. Magnolia do best in acid soil but possibly due to the stress of growing on an alkaline soil. In Dublin, they flower brilliantly every year.

The evergreen *Magnolia grandiflora* with its massive creamy white, highly scented flowers throughout the later summer into autumn is well worth growing. It too flowers and survives well in alkaline soils. Try a variety called 'Exmouth' called after the famous gardens of the de Rothschild banking family in England and a major influence on one of Irelands great 20th century garden creations, Mount Congreve in Co Waterford.

The most well-known gardens, that Ireland has to offer, present best during the Rhododendron season, which runs from February through to early June. Whereas the magnolia will perform well for us in alkaline soil, rhododendrons will not.

Acid soils

These plants must have access to acid/ericaceous soils. The range available is tremendous and allows for the use of these plants in the biggest and the smallest of spaces.

Large plants of the Highclere rhododendron, R. 'Alta-clerense', line the broad walk of Kilmacurragh Botanic Gardens, in Co Wicklow, from March to May and deliver a strong impact with their height and abundance of cerise pink flowers.

There are beautifully scented rhododendrons, examples such as *Rhododendron Fragrantissimum* (white), *R. luteum* (yellow) and *R. Lady Alice* (a little tender) are all scented and add to the enjoyment we can derive from the species.

If you only have a small space available , you can use varieties once known as azaleas, such as R. 'Blue Tit' an evergreen shrub not getting to any more than a metre in height and covered with dark blue flowers in spring.

R. impeditum is very similar and *R. mucronatum* is a lovely hardy white-flowered alternative. *R. pemakoense* or *R. racemosum* are pink, really small in stature and suitable for a tub or rockery area.

If you find you have alkaline soil and really wish to have rhododendron and azalea, you will need to prepare beds by digging out the soil to a depth of 45cm and lining them with thick plastic around the sides but not the bottom. This will reduce the leaching of lime from surrounding soil.

Fill with ericaceous compost mixed with soil and give them plenty of rain water in their first season. While they are not year round, the enjoyment we gardeners can gain from these beautiful plants for their season is immense and well worth the effort in cultivating them.

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