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

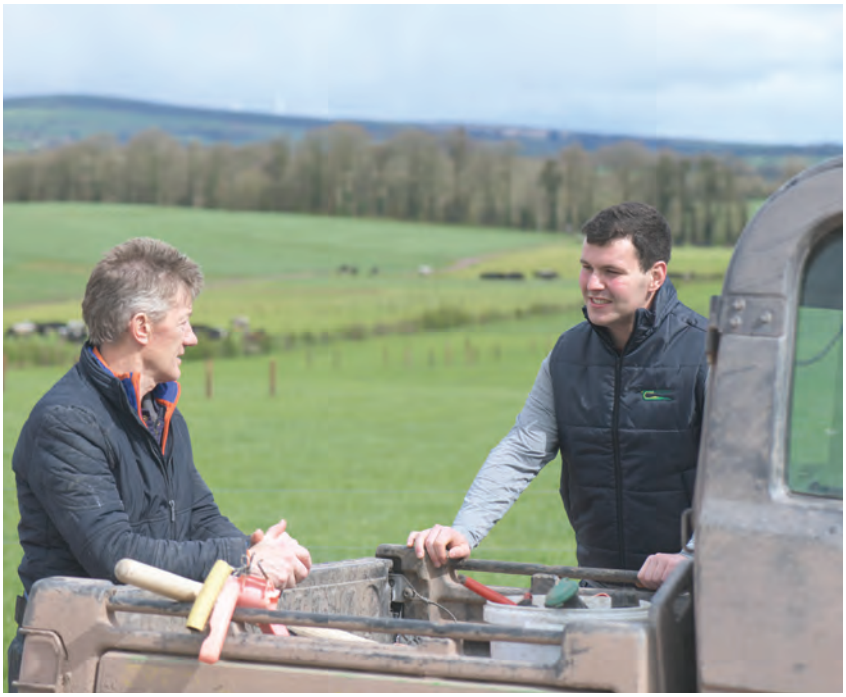
Approaches to reduce farm labour demand

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.

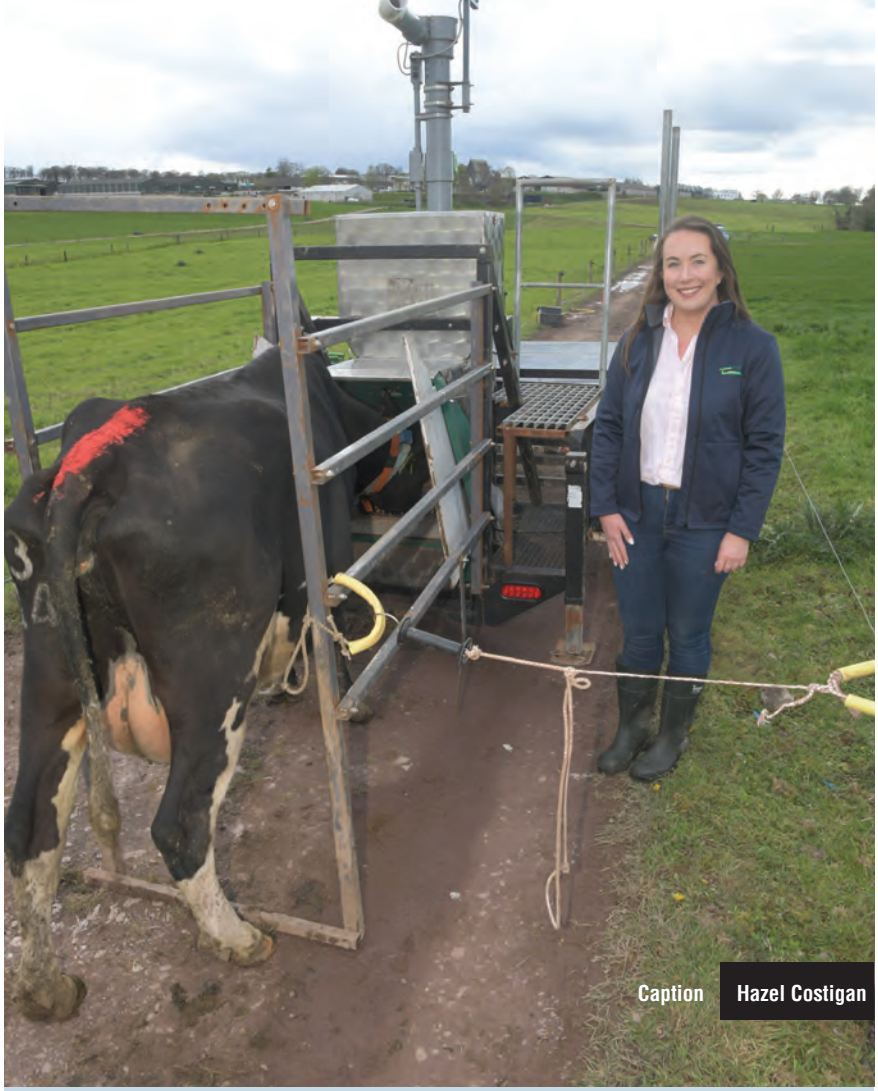


Pat Hoskins and Conor Hogan of Teagasc Moorepark discuss work organisation.

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.

Continued on p14

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

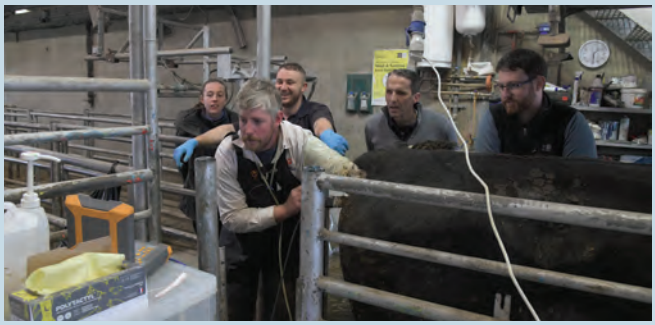
Stephen Butler

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.

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.

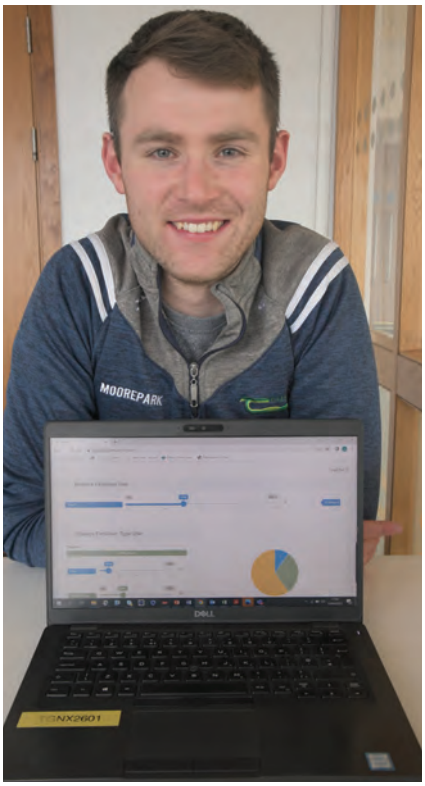
The AgNav platform also provides a decision support tool that communicates the benefits of best practice adoption.

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.

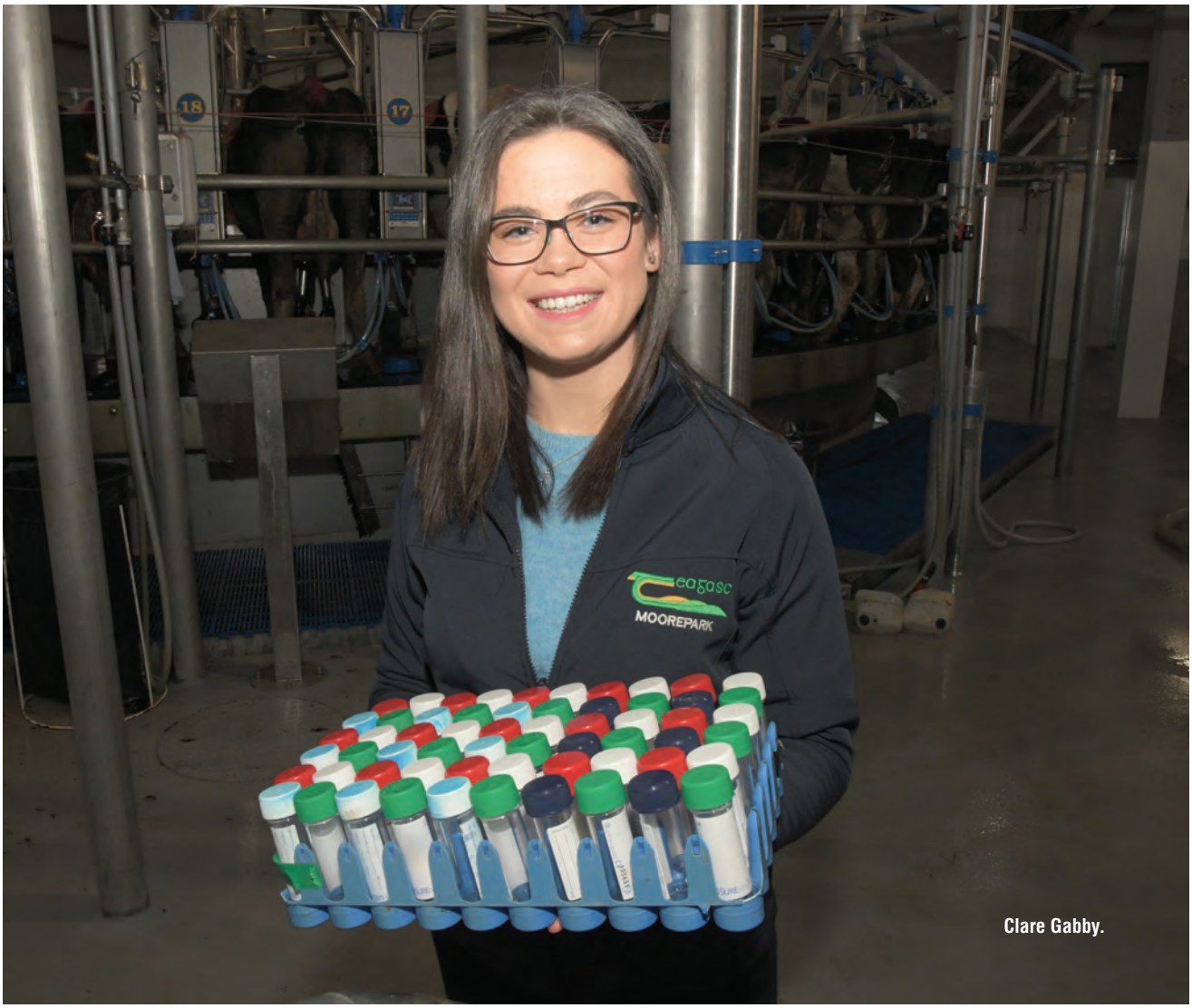
The initial phase of the AgNav platform focuses on beef, dairy and mixed cattle systems. However, the overall objective is to cater for all major farming systems in Ireland (e.g. sheep, tillage pigs, poultry, horticulture), and to expand the scope of environmental indicators investigated.

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.