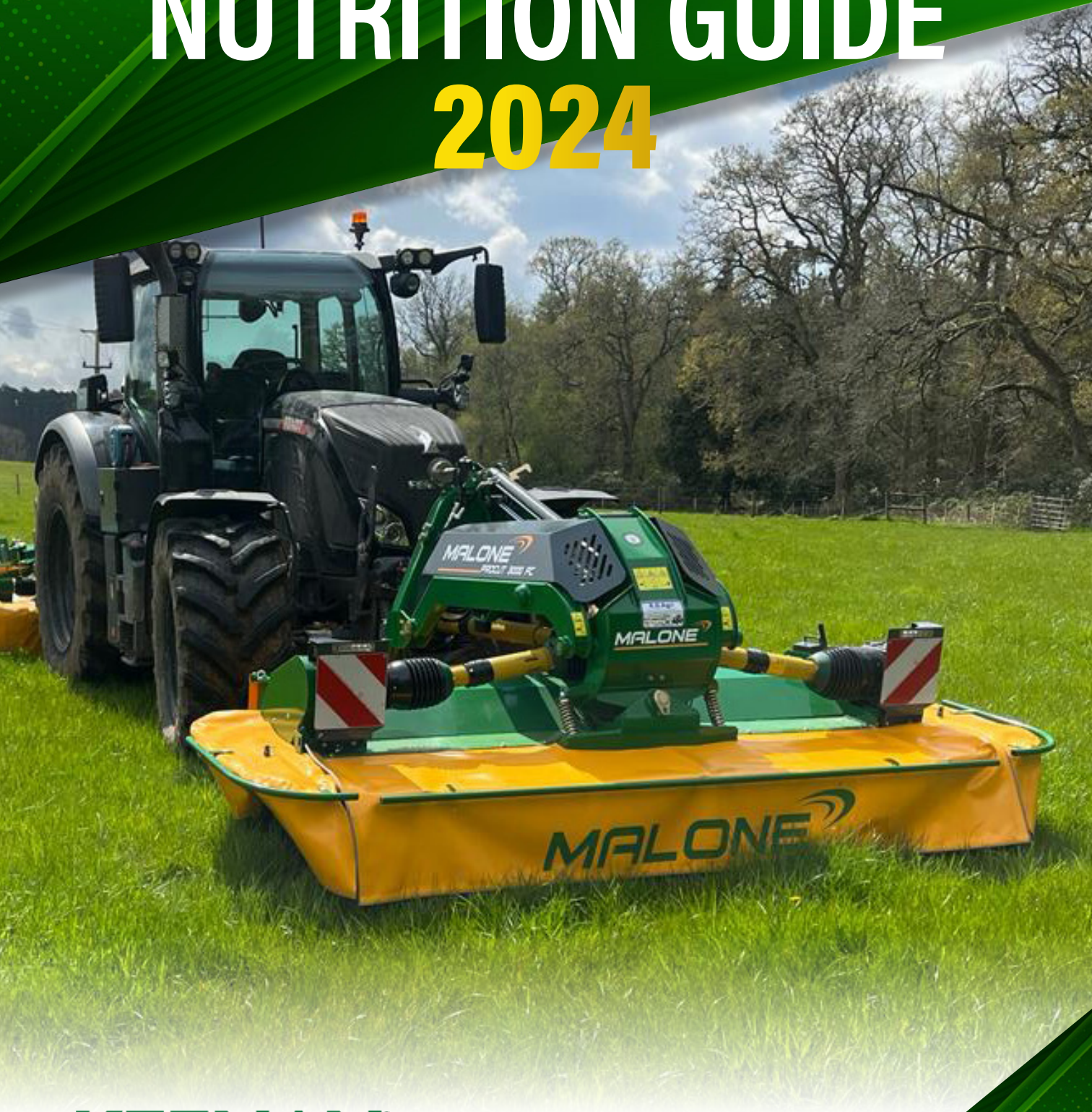


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INTRODUCTION

Welcome to this year's issue of the *Forage & Nutrition Guide* - where we have compiled a wide selection of features and interviews focused on this sector and we hope you find them informative.



2023 was a tough year for most farmers this due to low milk prices and higher costs for feed, fertilisers etc. While cattle and lamb prices were reasonable, profitability was eroded by higher input costs. Weather conditions were also difficult for tillage farmers which impacted on crop yields and quality. However, 2024 is looking much better with better prices for cattle, lambs and milk while feed and fertiliser prices are well reduced.

The stricter guidelines under the new 2023 Nitrates Derogation Scheme caused many dairy farmers a lot of concern as regards current and possible

future policy changes. Many milk producers believe they will have to lease extra land to cope with the new stocking rates or else reduce herd size and suffer a loss on income.

Options open to dairy farmers to minimise a reduction in their herd size include rearing calves and replacement heifers on contract and giving up any beef enterprise. In addition, many milk producers are overstocked so they could cull passenger cows for problems such as infertility, mastitis, high cell counts, lameness, low milk/solid yields etc.

While farmers feel pressurised by the ever-increasing burden of environmental regulations, EU bureaucracy and a negative press due to a poorly informed environmental lobby there are some positives. Reducing the use of N fertiliser, better slurry storage and the use of the LESS slurry spreading system will actually save them a lot of money.

With a reduced herd size there would be more grass available for grazing/cow and for silage conservation. With more grass available per cow, milk yields would also increase and improve farm incomes. The cost of purchased feed would be reduced and there would be less labour/time and costs associated with caring for problem cows; so, overall herd profitability would improve. With improved genetics the heifer replacements would be far and more profitable than their mothers. The use of more sexed semen would also greatly improve the value of calves from the dairy herd. The increased use of new technology will also bring huge benefits and of course younger farmers have access to far more education, advice and research than their parents.

From a long-term global perspective, a growing world population needs more food. As the standard of living improves in Asia and the third world there will be an increasing demand for our dairy products and meat.

Arising from recent farm protest Ursula von der Leyen, president of the EU Commission has said that they plan to reduce the admin burden on farmers in response to an ongoing wave of protests around the EU, which is good news indeed.

We also have a competitive advantage worldwide in producing quality food with a green image and a low carbon footprint compared to countries such as Brazil etc. The image of dairy products is very positive with consumers: new research shows even more benefits from increasing consumption of dairy products by the elderly.

To optimise their incomes, farmers need to continue investing in new technology, avail of the latest research advice and use current best practices to produce food in the most environmentally friendly and economically sustainable manner. For example, recent research from UCD shows that multi species grass swards need 60 per cent less Nitrogen (N) and can produce up to 25 per cent more grass for livestock. Using more clover in grass and silage swards will also greatly reduce the use of N fertilisers thereby making significant savings on farm costs.

While it is possible that the reduction in chemical N use, could reduce grass production, Teagasc research suggests that a reduction in grass production could be avoided through better soil fertility, increased use of clover, better grassland management and improved N management. For example, in a 2022 Teagasc survey of dairy farms only 20% of soils were at their optimum soil fertility. If this problem was rectified, most farmers could be on target to utilise 10t of grass DM /ha which would significantly improve profitability.

New income streams are also opening up for the future: renewable energy can be produced from agri crops, meat and bone meal, forestry residues etc consistent with Ireland's low carbon standards, greenhouse gas and climate change policies. Already, lots of farmers are installing solar panels on the roof of their sheds thereby minimising their electricity costs.

It's expected around 20 large-scale anaerobic digesters (AD) will be built in the Republic by 2025, and up to 200 by 2030. So, a good opportunity for older farmers to destock their farms and grow silage for AD plants. Silage would be harvested by farm contractors and transported to a local AD plant, so no farm labour is required.

Hopefully, we can look forward to good weather for the rest of the year, which would cheer us all up.

I hope you enjoy this issue,

Liam de Paor,
Editor.

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MASSEY FERGUSON

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MCHALE FUSION VARIO PLUS



The McHale Fusion Vario has been a machine of choice for contractors and large-scale farmers around the world who require the ability to bale and wrap various size bales in different crops. There has been a requirement in the variable chamber baler market since the introduction of film binding technology and the benefits it brings and McHale is proud to present the new McHale Fusion Vario Plus.

The McHale Fusion Vario Plus is a fully automatic variable chamber baler wrapper which can apply film or net wrap to the barrel of the bale, delivering optimum bale shape and bale density. According to the company, the Vario Plus can provide high quality fodder through the use of the film binding system, resulting in better quality silage and a bale that is easier feed out. The new Fusion Vario Plus has received a more modern progressive look with its specially designed twin skin panels and features enhanced throughput, increased bale density and faster wrapping speeds, and a focus has also been placed on operator comfort.

Martin McHale, McHale Marketing & Sales Director, said: "The variable chamber market has been seeking a machine with film binding capabilities. The new Fusion Vario Plus utilises our proven film binding technology and has focused on higher output and comfort for the operator. There is also an increase in throughput thanks to the new Profi-Flo pick-up along with higher bale density and faster wrapping speeds."

Film Binding Advantages

The McHale Fusion Vario Plus is a machine which can apply balewrap to the barrel of the bale instead of twine or net wrap. The company notes that the advantages of this system are:

1. Chamber film acts as a wrapping layer
2. Chamber film results in better shaped bales
3. Chamber film delivers higher quality silage
4. Chamber film makes recycling easier

Should an operator wish to use net wrap for hay or straw, this can be done with a simple changeover.

ISOBUS Compatibility

In designing the Fusion Vario Plus, operator comfort and friendliness were at the forefront of the machine's development, says McHale. The Vario Plus is ISOBUS compatible to allow the operator to experience the highest level of customisation and performance. It can be plugged into any ISOBUS tractor connection and operated via the tractor's own terminal in the cab. If the customer wishes to operate an ISOBUS controlled machine with a tractor that is not ISOBUS compatible, they can do so through the McHale ISO-Play consoles which are available as an optional extra.

Profi-Flo Pick-Up with Adaptive Intake

The new Profi-Flo pick-up has been designed to increase crop intake through more efficient crop flow. The new tapered feed channel encourages the crop to flow from the pick-up, towards the rotor and into the bale chamber, maximising throughput. To reduce maintenance, all Profi-Flo pick-ups are fitted with a heavier driveline which reduces chain load and increases chain life.

McHale have also introduced the Adaptive Intake which has been specifically designed to allow the intake area to automatically adjust up and down to changes in material flow.

James Heanue, McHale Irish Sales Manager, said: "The new Profi-Flo pick-up sees an improvement in intake and increases throughput capacity. ISOBUS has also made the whole baling experience easier and more enjoyable for operators from a driving and maintenance perspective."

The new Fusion Vario features a Quicker Bale Transfer & Faster Wrapping Speeds. An improved transfer with a smoother sequence reduces the transfer delay while the wrapping speeds have increased to match the new machine intake. The McHale Fusion Vario Plus features Active Density Control which results in an increase in bale density, due to higher loads being exerted on the bale at the optimum stages of bale formation. New Bale Shape Assist Indicators are fitted to the Fusion Vario Plus. A load cell on each door lock measures the bale load on each side and displays accurate bale shape feedback to the operator for informed driving and better bale shape. A larger Net/Film Brake has been fitted to all Fusion Vario Plus machines which provides 25 per cent more tension to be easily achieved. Depending on machine specification, a number of additional optional extras are available for machines which include: 1000rpm Gearbox, Selectable Knives, NRF/Net Loading Device, Side Tip, and Bale Weighing & Moisture System.





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KRONE AND LEMKEN FOCUS ON AUTONOMY

The 2024 season will see significant expansions in the area of autonomous agricultural technology. The agricultural technology specialists KRONE and LEMKEN are significantly expanding the range of applications for their autonomous process unit by utilising the front attachment space.



With their joint "Combined Powers" project, KRONE and LEMKEN are endeavouring to advance and bring into focus not only the development of autonomous process units, but also the associated work processes by carrying out additional practical deployments at home and abroad. The findings and results of the field trials in 2022 and 2023 were incorporated into the optimisation and further development of various features of the process units. The functionality of the autonomous process unit has been significantly enhanced by the integration of a front linkage with PTO shaft; this means that two separate, intelligent attachment

spaces are now available. This combination can be used profitably in both grassland and arable farming. For grassland specialist KRONE, for example, the use of a front-rear combination significantly improves mowing efficiency. Initial experience was successfully gained using the KRONE EasyCut F 320 front mounted mower in combination with the Butterfly EasyCut B 950 Collect. LEMKEN, on the other hand, utilises the additional function particularly in the areas of stubble cultivation and sowing where rollers and front hoppers can now be easily carried and used. The VTEs (autonomous process units) were further developed, taking into account ease of maintenance, practicality and optimisation of the sensor carriers. Another highlight is the improvement in the diesel-electric drive. The new generation of machines retains its power output of 170 kW / 230 hp and continues to feature 4-wheel steering with large tyres for maximum tractive power and minimum ground pressure. The transport solution presented at Agritechnica 2023, using a drawbar (VTS = Vehicle Transport System), is possible even in combination with front-mounted implements. The new tractor units are characterised by their uniform paintwork in dynamic platinum grey. The "Combined Powers" project marks a decisive step towards efficiency and innovation in modern agriculture. The advanced autonomous tractor



units from KRONE and LEMKEN enable large-scale practical trials and significantly improve the reliability of autonomous processes. The test deployments take place on various farms in Germany and neighbouring European countries in order to test the functionality and communication of the autonomous process units (VTE) using various implements under real conditions. KRONE and LEMKEN rely on open interfaces and are in lively dialogue with other implement manufacturers in order to exploit synergies and create added value for the customer. Both companies are endeavouring to further develop the product in close cooperation with practising farmers and to make it marketable as quickly as possible. This will create forward-looking solutions to the impending shortage of skilled agricultural labour by enabling farmers to act as system operators of autonomously operating machines in the future and to focus more closely on arable farming issues and farm management tasks.

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KVERNELAND LAUNCHES NEW 8.75M QUATTROLINK TRIPLE MOWER CONDITIONER

Kverneland expands its offering in the triple mower segment with two new triple mower conditioner combinations: two 8.75m combinations with the innovative QuattroLink suspension concept specifically designed for long productive working days. The heavy-duty build Kverneland 5387 MT is based on the 3300 series platform and includes well-established features like QuattroLink suspension concept, SemiSwing steel tine conditioning and dual adjustment of conditioner plate. Kverneland note that the 5387 MT is developed for maximum productivity and offers excellent ground tracking, easy operation, and outstanding versatility. Comprising two 3.2m mowing units, each with 8 round Kverneland discs, this combination can be operated by tractors starting from 180hp. The 5387 MT is available with simple mechanical controls as standard, or the extra comfort of the Dual Lift Control joystick for electro-hydraulic folding and unfolding as an option. "The Kverneland 5387 MT takes all the strong features of the well-established 10m triple mower 53100 MT into a more compact package. This is a



productive, easy to handle and versatile mower," explains Jelle Hospes, Product Manager, Disc Mowers. Kverneland 5387 MT is available in a BX version with belt merger for efficient crop collection. The belt merger offers significant possibilities to improve productivity and quality of output. The swath belts are designed for work with massive volumes of crop, including heavy first cut silage. Featuring high-speed belts that will operate up to 1500rpm, they can carry high crop volumes and place the grass into even, narrow swaths. Open centre tractor hydraulics and the pre-

selection control box, which comes as standard with the machine, power the Kverneland 5387 MT BX. Dismounting the BX belts can be done in less than 15 minutes. The Kverneland 5387 MT BX has the smart option to quickly dismount the two BX belts and park them safely on specially designed transport rollers. In this way, you can easily leave unnecessary weight at home when crop merging is not needed.

QuattroLink suspension provides accurate ground following ability and generous working range. The 4-arm suspension concept provides the mowing unit with exceptional flexibility in adapting to demanding ground contours. The mowing pattern is flexible with a vertical working range of 400mm upwards and 300mm downwards and a transverse adaptation range of 30°. The 100% NonStop BreakAway system offers protection across the full working width of the mower, including the part closest to the tractor. The Kverneland 5387 MT folds into a safe transport position, above 90° for stable weight distribution and importantly to keep the mowing units away from treetops during transport.

KVERNELAND GROUP IRELAND LAUNCHES NEW FINANCE OFFER

With the recent rises in interest rates leading to higher cost of ownership for farm machinery, Kverneland Group Ireland are coming to the market with new finance schemes. The highlight of the offering is a fixed term finance payment with 0 per cent interest over three years on 100 per cent of the VAT inclusive recommended retail price.

Kverneland Group Ireland has unveiled new flexible finance schemes on the full range of Kverneland Arable, Cropcare and Grass equipment as follows:

- 1+2 Annuals payments @ 0 per cent finance on 100 per cent of the vat inclusive recommend retail price
- 1+4 Annuals payment @ 1.5 per cent flat rate on 100 per cent of the vat inclusive recommended retail price

Philip English, Managing Director, Kverneland Group Ireland, says: "It is clear there's a need for continued investment in efficient and effective machinery for sustainable farming, that goes without saying, but the burden can't all be on farmers. With these schemes I'm confident we can give access to the best in agricultural machinery with the security of interest free finance.

By engaging with these finance schemes, farmers and contractors can enhance operational efficiency with state-of-the-art Kverneland equipment tailored to meet the demands of modern agriculture, further strengthening the partnership between Kverneland Group and our customers."



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NEW KRONE EASYCUT B MOWERS



With the NEW EasyCut B 880 CV/CR (Collect) and B 1050 CV (Collect), Krone presents two new and highly efficient Butterfly combinations. They come with conditioners as a standard feature and can be equipped with cross conveyor units.

Krone has pushed beyond previous limits with its new triple mower combinations of the EasyCut B 880 CV/CR (Collect) and B 1050 CV (Collect) series. Combined with Krone's 4-metre front mounted mowers, the EasyCut B 1050 CV (Collect) achieves a maximum working width of up to 10.45m. The mower combinations are hitched to the tractor by means of an optimized three-point attachment, telescopic outrigger arms ensure optimal front mower positioning and the standard conditioners in combination with cross conveyor units form a perfect combination for swathing. Capable of handling the heaviest grass and reducing the drying time, the new EasyCut mowers make efficient use of short harvest windows.

Neat Mowing with Variable Overlap

The outrigger arms of the EasyCut B 880 CV/CR (Collect) can be adjusted mechanically in two positions to a working width of 8.52m or 8.72m. The EasyCut B 1050 CV (Collect) is even more variable: thanks to hydraulically telescoping outrigger arms, the working width can be adjusted steplessly from 9.30m to 10.45m. Depending on the working width of the front mounted mower that is used, the overlap can be adjusted to suit field conditions. According to the company, this ensures a consistently neat cut with the highest possible acreage output.



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Fast Harvest

With unpredictable harvest windows, the use of a conditioner has proven to be advantageous for shortening the time the grass is left on the field. The EasyCut B 1050 CV (Collect) and B 880 CV (Collect) are equipped with Krone's proven tine conditioner, currently the largest on the market with a diameter of 64cm. It's tempered on-grip V-shaped steel tines condition the mowed material intensively facilitating reduced drying times. The tines have floating suspension, so they are able to avoid foreign objects. The conditioning can be adapted to the crop by adjusting the rotational speed (600/900 rpm) and the distance from the deflector sheets to the optimally arranged tines – a process that is not only simple, but also very efficient.

Mowing, Conditioning and Swathing in One Work Step

The EasyCut B 880 CV/CR Collect and B 1050 CV Collect mower combinations are equipped with hydraulic cross conveyor belts. These make it possible to set down the conditioned grass in a swath directly while mowing. This is ideal for light crops of grass and for harvesting whole crop silage. The cross-conveyor belts have very large dimensions and bring the mowed material together to form a uniform swath. Adjusting the belt speed from the tractor cab will alter the width of the swath to suit the harvester. The belts can be switched on and off individually while working. This allows for even more set-down modes in addition to swathing, such as clearing field edges or wide spreading on one side. For the latter process, the Collect models set the grass down in two passes so that a Krone four-rotor rake can form a finished swath in one additional pass. Krone says that this reduces sward damage and saves time and fuel. With the EasyCut B 1050 CV, swath merging can alternatively be done with the auger conveyors. This option is unique to Butterfly combinations.

Operation made easy

Various options are available for operating the mower combination. The hydraulic functions of the EasyCut B 880 CV/CR; including raising the mower units on one or two sides or swivelling the cross-conveyor belts in and out, can be preselected electrically as a standard feature with the new Krone PreSelect. The preselection can be made either with the PreSelect DS 50 operation unit or if an ISOBUS terminal is available as PreSelect Digital, by means of a cable link to the mowing unit. The PreSelect Digital offers the option of preselecting a function and carrying out activation of the control device using the ISOBUS-capable control lever of the tractor.

The Comfort control unit via ISOBUS is optionally available for the EasyCut B 880 CV/CR (Collect). For the EasyCut B 1050 CV (Collect) it is a standard feature. The hydraulic functions are performed directly using the tractor's own terminal or terminals DS 500, CCI 800 or CCI 1200 with touchscreen.

The company notes that the upward pivoting mower units ensure safety in road traffic, ensuring that the transport height remains below 4m.

Warning panels and LED lighting ensure good visibility.

All mowers are equipped with proven Krone features; EasyCut cutter bar as a standard feature with all-around welding and lifetime lubrication, including SafeCut, SmartCut and integrated impact damage protection system. The light, redesigned tensioned cloths can be opened wide, which facilitates blade changing without a tool and maintenance work. The patented DuoGrip suspension and the hydropneumatic relief, which can be operated conveniently from the tractor cabin, ensure ideal ground adjustment, even under the most difficult conditions.

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TIME TO CONSIDER A DIFFERENT MILK PRODUCTION SYSTEM

Brian Reidy at Premier Farm Nutrition says it is time to step back and consider a different milk production approach.



We currently have a Government with a policy to reduce the Irish livestock population. Dairy and beef cattle are being used as a scapegoat and it is unacceptable. Agriculture is one of the most innovative industries in this country in 2024; farmers are currently embracing technologies and exploring many options to play their part in reducing emissions, but the more we do, the more we are being pushed to do. Every way we turn they are changing the rules and regulations, and all of this is resulting in a large volume of frustration from livestock producers and a not insignificant number of dispersal sales taking place countrywide.

Low input and low output grass-based systems have been the mantra over the years pre and post quota, which pushed this type of cow and system on the Irish milk producers in the first place. All milk produced in Ireland is on a grass-based system! Be that grazed or ensiled, it makes up the dominant proportion of forage consumed by dairy cows in Ireland.

Post Celtic Tiger, we needed a “good news story” and dairy expansion was it for the Government of the day. Push expansion and drive farms to borrow lots of money to help the, by now, Government-owned banking sector. This has resulted in a major labour issue on many dairy farms where men and women have worked themselves into a standstill, all to make repayments to said banks and feather the nests of the milk processors.

A new model

We must look at another milk production model going forward in Ireland. A system which can tick so many boxes. Less cows, producing more milk per head, would allow for lower cow numbers, less pressure on land price and more importantly less pressure on the farmer. Less fertiliser, less slurry and

storage requirements, less silage to produce, less calves to rear and less hours worked. Improving the genetics of the cows is the key to this, the management of these cows is not as we are led to believe; far more difficult than the low input, low output cow. Once we breed more of these cows, then sexed semen will have a major impact and these cows will also breed saleable beef calves of value to the breeder and the feeder. These cows are being managed efficiently all over the world. Yes, these cows will require more concentrates, but most of this can be home grown or sourced locally if animal numbers are reduced due to higher milk yields being achieved. And, no, these cows are not infertile; how did they end up in the parlour if their mothers were incapable of going in calf? Successful dairy production they say is 1/3 breeding, 1/3 feeding and 1/3 management.

Example

As an example, if we take a herd producing 1 million litres at 4500 litres per cow (390kg solids, I used this figure as it represents just below the coop average for the last 2 years for milk solids), that herd requires 222 cows and between 40 and 50 maidens and the same number of in calf heifers. This herd will require approximately 130 tonnes of concentrates annually. If, instead, we have an 8000-litre cow (590 kg solids) producing the 1 million litres with 125 cows, between 25 and 30 maidens and the same number of in calf heifers, that herd will require just under 250 tonnes of concentrates. What must then be considered is that without a derogation in the future, the 4500-litre herd will require over 310 acres (125.75 hectares) and the 8000-litre requires 222 acres (89.85 hectares). At €400 per acre that's €35,200 on extra rent per year alone! That's before you ever look at the cost of additional labour. Beyond that the 1 million litres produced in the 4500-litre herd is at 21.4g Organic N per litre and the 8000-litre herd is at 15.3g Organic N per litre. So, each litre of milk would have 39% less organic N attributed to it based on the current nitrate banding. With a requirement for less acres and lower silage requirements (2000 tonnes vs 1125 tonnes), there would also be a significant reduction in Nitrogen to produce the forage on the 8000-litre herd. If we take a typical application of 200 units per acre (250kg/hectare) There is a reduction of over 19 tonnes of Urea or 33 tonnes of CAN annually for forage. At current prices, would be a saving of €10,000 to €12,000 annually. The lower land requirements, savings in bought in Fertiliser and Lower organic N per litre will easily offset the additional concentrates, while helping to reduce the workload and borrowings necessary.

Nitrogen

Furthermore, where land quality allows, if some of the nitrogen

was used to produce maize silage instead of grass silage then the reduction in nitrogen would be even greater and the feed value of the forage would be significantly higher, resulting in a reduced requirement for concentrates. 1 acre of Maize silage with a requirement for 150 units of N will produce 6 to 7 tonnes of dry matter, whereas you would need to harvest over 3 acres of 1st cut grass silage to achieve the same yield, using 250 to 270 units of nitrogen. The maize will also have significantly more energy per tonne of dry matter (this is where further concentrate reductions will come from) and can be stored in the same facility as the grass silage. Thus, more milk can be produced from forage on the farms. Again, we have a stumbling block here, where the Department of Agriculture class maize silage as a tillage crop, when it is clearly a forage. This needs to be addressed by our farm organisations by lobbying the Department as it is currently having a negative effect as part of the 80:20 rule on derogation farms. As we all know after the LESS rules, derogation farmers are the guinea pigs for the rest and those rules before long will apply to everyone. If, as an industry, dairy herds can produce better quality conserved forages, be that grass silage, Maize, whole crop, clovers etc, it would be very achievable to produce 4500 litres from forage alone and then the concentrates required to push further yields could be reduced. If we now consider the impending increase in slurry storage requirements moving from 0.33 cubic metres per cow per week to 0.4 cubic metres per cow per week, this will mean

currently compliant herds will be required to increase storage by just under 25 per cent. More costs just to stand still. Never mind the proposed 70 per cent grant aid for tillage farmers to build slurry storage, would it not make more sense to give grants to store the slurry in the yard it is produced.

An 8000-litre herd supplying 590 plus kgs of solids would be an exceptionally efficient herd as I have outlined above. Less land, less labour, less silage, less slurry (less storage too), less organic N per litre of milk, less calves to rear and less fertiliser etc.

Work Smarter

While comparing these models, the higher yields are well able to compete with the low input system with regard to margin per litre, per cow and per hectare. When you factor in a labour cost, which must be done and is a significant flaw in the current system, more milk per cow must be considered as a model for Irish milk production going forward. We must work smarter and not harder if we are to meet targets.... it's time the poor cow stopped taking the blame! Efficient cows, producing higher volumes and milk solids are the way forward for Irish producers, they must be fed and managed every day to fulfil their genetic potential. If we do that, there is a bright future. Less is more is a term used in many industries, the 'stack them high' model is stressing farmers, land and animals to breaking point.

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HAYLAGE BETTER VALUE, HIGHER QUALITY & SAFER THAN HAY FOR ANIMALS & HUMANS



Lloyd Dawson – Sales Director, UK, IRE & Asia Pacific at Berry Agriculture, which manufactures Baletite net replacement film and Silotite balewrap for baled silage – discusses the benefits of haylage or silage.

When the weather is good in the UK or Ireland, many farmers are tempted to make some hay. However, even under ideal conditions, hay will have a much lower nutritional value than haylage or silage and there can also be problems with dust. This can cause serious animal and human health problems. If weather conditions are less than ideal, one can end up with mouldy bales, which can be even more detrimental to animal and human health. In addition, these bales can, on occasions, combust spontaneously and cause unexpected barn fires.

There are significant nutritional differences between haylage and hay to consider when choosing a forage. Hay is cut between June and August, when the grass is at a more mature stage of growth. As such, the moisture content of hay is low and lots of nutrients are lost in the drying process. Haylage is a better source of energy and protein than hay, but it requires careful preparation to prevent spoilage happening during the storage period.

The use of mower conditioners will speed up the process of wilting grass to the desired dry matter (DM) levels. It may be tempting to over-dry the crop, however ideally haylage should not exceed 65 per cent DM. The crop should be rowed up in a uniform and even sward to allow the crop to feed evenly into the bale chamber, thus avoiding the potential formation of air pockets inside the bale. This is especially important with high DM crops such as haylage.

Holding the bale density is vital to prevent air from re-entering the bale when it is released from the chamber. High DM crops tend to expand more than wetter silage crops; therefore, applying an extra layer of netting is advisable. A more recent development in modern round balers is the

adoption of the Film&Film binding and wrapping combination (such as Baletite & Silotite). This system replaces the binding net with a wide width Balerfilm, that not only holds the bale together tighter than netting, but it also provides extra layers of protection. In combination with the baler film, the outer balewrap is applied to the bale in the opposite direction (cross wrapping), therefore giving the bale a better airtight seal.

Because haylage has a high DM content, it is important to avoid overheating the bale surface. It is therefore recommended to use a light coloured green or white balewrap to reflect the sun as opposed to a dark/black coloured film, which would absorb the sun's heat - potentially leading to mould growth in the outer layers of the bale. A minimum of 6 layers of film needs to be applied to the bale. The barrel of a round bale forms 66 per cent of the total surface and the first 13 cm represents 37% of the bale contents. This is why the extra film layers provided by the F&F system are proving ideal for round bales. Additional benefits of this system include reduced spoilage, longer storage periods, easier opening with no crop becoming enmeshed in the film and no need to separate the inner and outer film for recycling (both are made from the same base material).

Haylage Best for Cattle & Sheep-USA & Canadian Research

According to Anita O'Brien, Sheep and Goat Specialist with the Ontario Ministry of Agriculture, Food, and Rural Affairs: "Haylage offers producers a greater flexibility in harvesting their winter feed supply, the potential for improved quality in feed and less wastage from feeding."

Baled haylage requires less drying time than conventional hay, so that during poor drying conditions, quality feed can still be made. Because of the higher moisture content in baled haylage, there is less leaf loss (5 to 12 per cent) during harvesting than with dry hay (22 to 26 per cent).

Since the protein content of the leaves is considerably higher than that of the stalks, less leaf loss means higher protein in the finished diet. With quality haylage, very little wastage occurs at feeding, since the stemmy material is now softer and more palatable than with dry hay.

USA Study compares Haylage vs. Hay

Haylage can have similar or improved quality compared to dry hay. To investigate the latter point, Darren Henry, Assistant Professor in the Dept. of Animal and Dairy Science at the University of Georgia, USA and a team of researchers conducted a study to evaluate the organic matter intake and total tract digestibility of nutrients of two types of feed in beef steers.

The study used 16 Angus steers and 14 Brangus steers with an average body weight of 244 kgs. These cattle were randomly assigned to ryegrass hay or haylage — and both diets were fed ad lib. The ryegrass hay in the experiment was 89.7 per cent dry matter (DM), whereas the ryegrass haylage was 51.2 per cent DM. Organic matter was roughly 90 per cent for both feeds, and crude protein levels were 12.4 per cent and 11.9 per cent for hay and haylage, respectively.

Fibre content was also similar in the hay and haylage. Neutral detergent fibre was about 69 per cent for hay and 68 per cent for haylage. Moreover, acid detergent fibre was approximately 41 per cent and 42 per cent for hay and haylage, respectively. Overall, total digestible nutrients values were 56.9 per cent for hay and 56.2 per cent for haylage. Angus cattle had higher feed intakes than Brangus cattle, but there was no correlation between breed and nutrient digestibility.

The steers that received haylage consumed nearly 1.36 kgs more of feed/day than the steers that received dry hay. According to Henry "DM and organic matter digestibility was 19 per cent greater for haylage compared to hay. The digestibility of DM and organic matter was improved largely due to the 21 per cent increase in total tract digestibility of neutral detergent fibre."

These results contradict what researchers expected. "Very often, when an animal has greater DM intake, such as the steers consuming haylage, digestibility is consequently reduced," "we found the opposite occurred for these steers." He offered one explanation for this could be the "softening" of fibre in haylage due to fermentation. Another reason could be a shorter lag time of microbial attachment to fibre.

Danger of Soil Contamination

Soil and manure contamination can have negative impacts on forage intakes and production according to Stephen Gilkinson, a dairy technologist with the College of Agriculture Food and Rural Enterprise (CAFRE). A sign of soil contamination is the presence of high levels of ash – over 10 per cent in the forage. Normal ash levels in the plant should be around 6 per cent to 8 per cent, depending on the crop. Ideally, pre-cut dry NIR tests should be carried out to establish sugar levels, ash and nitrate content.



Soil is a good source of enterobacteria, clostridia and listeria, which increases the risk of a poor fermentation and can lead to animal and human health issues. Therefore, it is important to avoid soil contamination while mowing, tedding, raking and baling forage.

Risk of Farmyard Fires from Hay

When harvested at a higher moisture level, a forage crop sometimes stays damp and respire well after baling. That continued respiration in the presence of oxygen creates conditions that can cause spontaneous combustion in bales. Hay bales can catch fire due to a build-up of mould caused by moisture in the hay from time of baling or from being rained on. Hay naturally insulates, so once the hay reaches 55°C, a chemical reaction creates flammable gas. If the temperature of the hay continues to rise, the heat can cause the flammable gas to combust.

After hay is baled and stored at higher moisture levels, the fire risk from spontaneous combustion is greatest in the first two to six weeks. That risk continues if hay bales are stored where moisture can linger, like a barn with a leaky roof or in a high-humidity area.

Main Advantages of Haylage

- Haylage is pretty much completely dust-free forage, so it's perfect for animals that have respiratory problems.
- It is more nutritious than hay, making it excellent for performance animals.
- Haylage is much tastier, as most ruminants prefer the taste of it.
- It is a lot easier on the stomach, as it is very easy to digest due to its higher moisture content.
- Haylage can be stored outdoors due to its protective wrap.
- Reduced risk to human health from dust, spores and vapours in mouldy bales which can cause "very severe" respiratory illnesses such as farmers lung.

AWARD-WINNING YOUNG AURIVO COOP MILK PRODUCER

The prestigious FBD Young Farmer of the Year competition is organised annually by Macra supported by the IFA and sponsored by FBD Insurance. Christopher Tuffy, from Co. Sligo, was the FBD Young Farmer of the Year 2022. Christopher farms with his parents and his partner Eimear - with whom he has one child, Iarlaith.

He leases a 150ac farm and currently milks 155 cows. Located just outside of Sligo town, Christopher started on the farm in 2012 with 90 cows, consisting mainly of Christopher's dad's home herd and heifers. Over the next few years herd size increased due to a combination of extra heifers and bought-in stock.

The farm was formerly a beef farm, so a parlour needed to be constructed, along with a cubicle shed. "We were able convert an existing shed into a 160-cubicle and installed a 20-unit Dairymaster milking parlour with an ACR system. It only takes an hour and 45 minutes at peak to milk the cows and do the parlour clean up." Christopher added. "The real attraction of the farm was that it has loads of slurry storage and none needed to be built."

There is no expensive machinery invested on this farm as a quad and handler are the only other equipment used, with a local contractor doing most of the machinery work. The focus on his dairy farm is very much on grass production, quality silage and producing milk solids from grass.

Last year his local contractor, Michael Goggin's made around 1,400 bales for him on the home farm. Christopher uses a multi cut silage system to optimise quality and last year he cut silage in late April, during the June bank holiday and again during July and early Sept. The silage sward is a mix of red clover and hybrid grass varieties. Christopher follows the advice from the Teagasc farm at Solohead in Co. Tipperary. These bales were made using the film and film (F & F system) system where netwrap is replaced with a baler film. This new system not only holds the bale together tighter than netwrap, but it also provides extra layers of protection. In combination with the baler film, the outer balewrap is applied to the bale in the opposite direction (cross wrapping), therefore giving the bale a better airtight seal.

The F&F system reduces silage losses in storage by minimising mould growth and preventing silage becoming enmeshed during feed out. The F&F system results in more uniform and compact bales, with have a longer storage life.



Bales are easier to handle or stack and more valuable to farmers buying or selling forage. By using film to bind the bale together, removal and recycling of the film is made easier and you avoid the time-consuming job of separating netwrap from the balewrap.

He comes from a dairy farm near Enniscrone in Co. Sligo, where his father milked 60 cows. Upon completing his Leaving Cert in 2008, Christopher spent a year at Mountbellew Ag College and then Kildalton Ag College where he completed the Dairy Herd Management course. Upon completing the dairy herd management he spent four months near Christchurch on the south island of in New Zealand. There he was working for an agribusiness which had six dairy farms with 800 cows on each farm.

Christopher felt that farming on the home farm was not an option due to scale and farm fragmentation. And so, on his return to Ireland, he set out to farm on his own. The original plan was to find a farm to manage, but when an opportunity come up to lease a farm near Sligo town he couldn't turn it down and the family support was there to go for it.

Christopher credits his father for backing this endeavour. "My

father took all the risk; I had nothing to lose, I was only 20 at the time," he said. Today, his father plays a large part in the operation, with calves and heifers reared on the home farm in Enniscrone. Calves are reared in straw bedded hutches and wear jackets for extra comfort. To ensure optimal performance and minimise the labour/ time required calves are fed using an automatic feeder.

Christopher milks 155 cows in a spring-calving system. The herd is expected to produce 495kg of milk solids this year. The farm grows 14.8t of grass and around 1t of concentrates supplied by Aurivo Coop is fed/cow. The herd produced 5,000L of milk and 399kg of milk solids in 2013, but by increasing percentages Christopher has been able to increase milk solids to 500kg, while L/cow has only increased by 500L.

"I have cows doing 600kg of milk solids, but getting every cow up to that level is very difficult to achieve. The herd is also more mature now and we have an average herd lactation of 3.9."

Christopher's future planning is based around continuing driving efficiency on the farm.

"The plan for the future is to increase the clover content in the grazing platform to between 40 and 50 per cent," he said. "We currently have 25% of the platform in grass clover swards and we reseeded 18 per cent of the farm last year."

The heifers coming in now have an economic breeding index (EBI) of €250 with a 90 per cent six-week calving rate a number which Christopher is very happy with. The carbon index with the EBI has seen the herd EBI increase from €175 to €220, with his herd having a carbon index of €15. This is in the top 10 per cent of herds for this index.



Commenting on the focus during the breeding season and how technology has changed it, Christopher said: "We wanted a well-balanced robust cow that has a maintenance figure of €20, has a protein figure of 4 per cent, 4.9 per cent butterfat and produces 530-540kg of milk solids. We want a cow that will go back in-calf easily and calves in the first three weeks – that's the type of cow I want. As regards the economic breeding index (EBI) figure, I focus on the sub-indexes to ensure a good, balanced team is selected. The bottom 40 per cent are bred to beef and we use almost all sexed semen on the rest.

"We installed the Allflex collars last year and it is probably the best investment I made. They have completely simplified our breeding season. We have it linked to the drafting gate and cows that are bulling are just waiting for the AI man when he arrives." "It is a massive labour saver, I can actually take a day off and get the relief milker in for the day."

According to John Keane, ex National President of Macra "Christopher has demonstrated the skills and knowledge that it takes to be at the pinnacle of Irish agriculture. He will inspire many young people to become farmers for the future but also those already farming to improve and develop."

What is also interesting is that he is the fourth member of the West Awake farm discussion Group, (it has 15 members and was established in 1999), to win the Young Farmer of the Year award. This shows just how important these farm discussion groups are in encouraging young farmers to improve their agri enterprises. It is not all work and no play as Christopher plays football with his local Enniscrone/Kilglass GAA club. He is also active on social media platforms such as Instagram and X (Twitter). However, he still has some time to spare as in 2024 Christopher joined the National Dairy Council's Farmer Ambassador Programme. The current group consists of 13 farmer ambassadors who act as advocates and spokespeople for Ireland's family-farm-based, grass-fed milk production system. They are champions for the many initiatives being employed to make Irish dairy more sustainable and environmentally-friendly – and they are all keen to speak about what they are doing and what needs to be done.



KEY FACTORS FOR SUCCESS



Dr Elaine Brady, Tirlán, looks at maximising efficiency and profitability in Dairy-to-Beef Systems.

Due to the expansion of the national dairy herd, the number of dairy-beef animals has increased in recent years, and now account for 57% of the cattle processed in Irish meat plants. This is expected to increase over the next 8 years with around 900,000 dairy beef calves in Ireland predicted to be available for beef production (ICBF, 2023).

During the expansion a decrease in carcass conformation of dairy bred progeny from beef and dairy sires occurred as the selection criteria for beef sires was calving ease and short gestation with insufficient emphasis on genetic merit for carcass traits.

Recently, there has been a big effort to encourage dairy farmers to improve the quality of the dairy calves for beef production and increase the usage of beef AI. To aid this improvement, the beef sub-index within the EBI was revised. In addition, the dairy beef index (DBI), a breeding tool, was launched by ICBF and Teagasc to produce a more saleable calf that is still easy calving with a short gestation length.

Dairy-calf to beef production systems are broadly similar to those for suckler progeny with finishing taking place at the end of the second grazing (18 to 21-months of age), during or towards the end of the second winter (21 to 25-months of age), and during the third grazing season (25 to 29-months of age). The earlier average calving date for the Irish dairy herd and greater use of early-maturing sires increases the opportunity for finishing before the second winter for dairy calf-to-beef systems.

To reduce age at slaughter and attain economic and environmental efficiency, there are four fundamental principles of running a dairy-calf-to-beef. These four principles are as follows:

- Grassland management;
- Nutrition;
- Genetics;
- Herd-health.

Grassland management

Regardless of the type of production system, growing and utilising grass is central to a profitable beef production as it is the cheapest high quality source of feed. Therefore, grassland management must be the cornerstone of any dairy to beef system. Aim for the system that best suits your farm, with an optimum stocking rate that best utilises grazed grass and facilities most efficiently. The purpose is to have fresh, leafy grass in front of your calves, yearlings & finishing animals at all times, for the length of the grazing season.

For grazed grass to support high levels of performance, a rotational grazing strategy needs to be implemented. Offering paddocks that are a suitable size for groups is critical to ensure that rotation lengths are kept to an average of 21 days and grazed within 3 days. Aim for an overall farm stocking rate of 2.5 LU/Ha. This will allow for surplus silage to also be taken off from the grazing platform.

Remove surplus grass as soon as it is identified in order to get the paddock back into the grazing rotation as quickly as possible. This will contribute to producing top quality silage reserves for any indoor housing period.

Nutrition

Animal growth rate is a significant driver of beef farm profitability thus, the focus should be about putting on kilograms of liveweight as efficiently as possible. The most crucial time to set up the animal to achieve this is within the first 3 months of the calf's life. The growth rate achieved during these first few months affect the lifetime performance of the animal and is largely a function of feed quality and quantity. It's also the time when feed conversion efficiency is at its highest as liquid milk is more nutritious and digestible than concentrates. Target pre-weaning live weight gains of dairy-beef calves are 0.7 kg /day, and subsequently at pasture 0.8 kg/day.

Successful transition from a milk-based diet to a total solids

diet and to be able to thrive on a grass-based diet requires proper rumen development. Failure to prepare the rumen for weaning can stall calf growth or put calves at greater risk for illness because of nutritional stress resulting in growth checks. This can be done by providing calf starter from 3 days old and ensure calves are consuming 1-1.5 kg of concentrates at the time of weaning. Provision of roughage and fresh clean water at all times is also essential.

Throughout the first grazing season, it is advisable to keep calves on a minimum of 1kg of a 16%-crude-protein ration, along with a fibre source, such straw in the paddock. The concentrates will help with growth, and also work as a carrier for the key minerals that are required to meet the calf's growth demands.

Provided the first two stages were well-executed the finishing and slaughter can be achieved off grass. Early-maturing heifers can potentially be slaughtered off grass without any concentrates if the grassland management is kept to the highest standards — but this can really only be achieved by utilizing rotational grazing. If cattle are struggling to get that final fat score of 3 off grass, feeding 3–4kg of a high-energy, low-protein concentrate per head per day is recommended.

High quality silage is a must for an environmentally efficient and profitable beef system. For growing and finishing cattle the target is to have silage at 72- 74% DMD or higher to achieve target weight gains during the winter period with minimal concentrate feeding. Teagasc outlined the cost to maintain target performance can be reduced by 47% by moving from national average quality silage of 65% DMD to 74% DMD silage resulting in lower concentrate feeding requirements.

Genetics

Genetics of dairy-beef cattle has a large influence on the performance and output of dairy-beef systems. While dairy farmers now have the Dairy Beef Index as a tool to select short gestation, easy calving beef sires that are superior for beef traits, beef farmers also have been equipped with the Commercial Beef Value (CBV) to help source beef cattle based on their genetic merit for beef production traits as carcass weight, carcass conformation, carcass fat, docility and feed intake. The CBV is divided into star ratings within three different breed types (sire x dam): beef x beef, beef x dairy and dairy X dairy. A '5-star' animal is in the top 20 % of the national population within that genotype and the '1-star' animal is in the bottom 20 % of the national population within that genotype which was validated by Teagasc. Across the different breed types, those with a 5 star rating tended to have heavier carcasses and better confirmation compared to the 1 star animal. Breeding for age at slaughter will also be critical for the economic and environmental sustainability of beef systems.

Herd Health

Having healthy animals will always lead to better thrive and daily liveweight gains resulting in reduced costs, greater profitability and environmental sustainability. This starts with the calf, ensuring a clean and stress free environment with correct nutrition. A well-planned herd health programme that

includes bio-security, vaccination, parasite burden and disease surveillance and prevention. Preventative measures are superior to treatment, greatly reducing the risk of performance loss and expenses, ultimately leading to achieving earlier age at slaughter.

Table 1 illustrates that profitability was greatest for early slaughter age systems, with the 20-month slaughter system most profitable overall. This early slaughter system benefited from a higher number of animals carried and relatively low production costs.

Table 1. Summary of the performance, profitability and greenhouse emissions for dairy calf-to-beef steer systems based on a 40-ha farm at prevailing prices¹ (Teagasc, 2022)

Age	Slaughter age (months)			
	20	22	24	26
Organic N (kg/ha)	213	200	204	182
Forage in the diet (DM basis)	0.77	0.81	0.79	0.88
Concentrate (kg DM/head)	701	702	878	578
Number of steers finished	136	111	99	78
Carcass/weaning weight (kg)	282	308	332	343
Beef carcass output (kg/ha)	960	851	826	670
Gross output value (€/ha)	4,067	3,650	3,577	2,911
Gross margin (€/ha)	1,652	1,488	1,199	1,174
Net margin (€/ha)	948	782	479	516
Net margin (€/head)	279	283	193	264
Production costs (€/kg carcass)	3.89	3.96	4.29	4.10
Price sensitivity (€/ha)				
Beef carcass sales (+/-50 c/kg)	+/-480	+/-426	+/-413	+/-335
Calf price (+/-50 €/head)	+/-180	+/-147	+/-132	+/-104
Concentrate (+/-50 €/t)	+/-122	+/-99	+/-111	+/-58
Protected urea (+/-100 €/t)	+/-26	+/-27	+/-29	+/-30
Greenhouse gas emissions (kg CO_{2e})				
Per kg beef carcass	10.3	11.9	13.1	14.8
Per hectare	9,900	10,100	10,800	9,900

¹Price assumptions as per Table 2; calf price €180 per head.

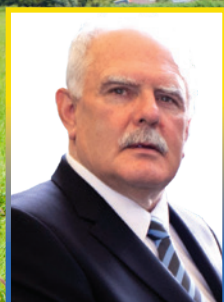
The environmental performance of beef cattle production is facing growing scrutiny with Green House Gas emissions of particular interest. The analysis presented at the Beef Open Day 2022 showed that the emissions from dairy calf-to-beef systems was lower than suckler systems and that age at slaughter has a large impact on emissions. Similarly, slaughtering animals at a younger age within the dairy to beef system reduces GHG emissions per kg of beef carcass.

Despite much of the animal variation in carcass traits being under genetic control (46%), good nutrition, grassland management and animal health allow animals and production systems to achieve their potential optimising the economic and environmental efficiency of dairy-beef systems.

NITRATES

– 20 YEARS ON

Matt O’Keeffe looks at the last two decades since the introduction of Nitrates Regulations



The Nitrates Regulation has been in place for 20 years: first introduced in 2004, the Regulation came with several impositions attached. Apart from limitations on stocking rates, the Nitrates Regulation includes specific requirements in relation to slurry and organic manure storage facilities and capacities on individual farms. There are also limits imposed on chemical fertiliser usage. The Regulation has a specific aim and that is to secure reductions in nitrates losses to watercourses, including ground waters, surface waterways and estuaries around coasts. There is an additional aim of reducing phosphorous losses from farming activities that ultimately end up enriching our rivers.

The Derogation Concession

The Regulation was a blanket imposition with a Derogation then added on to accommodate specific farming circumstances in different countries across the EU. Generally, the stocking rate density was set at 170kgs of organic nitrogen per hectare. In order to facilitate farming at a higher stocking rate than 170kgs a Derogation facility was introduced and Ireland was one of the countries to make use of this Derogation on its more intensively stocked farms, with stocking densities up to 250kgs per hectare of organic nitrogen. It was not an open-ended permission to farm at a higher stocking rate, however. An annual application has been necessary in order to maintain the Derogation permission. In addition, every four years individual countries where the Derogation was being implemented, have had to apply to continue its use. Derogation farms have been

subjected to far higher scrutiny in terms of farm inspections and standards around storage facilities and the adoption of LESS technologies. In theory the Derogation lasts until 2027. However, after a mid-term review, a reduced maximum stocking rate of 220kgs per hectare has applied from 1st January 2024. Two years ago, the continuation of the 250kgs Derogation limit was allowed on the assumption that Irish water quality would show specific improvements in the following period. That has not been the outcome, though generally, our water quality is of a far higher standard compared to most countries across the European Union. Nevertheless, as several thousand farmers now fully realise, the 220kgs limit is in place with profound effects on those farms that have to reduce their stocking densities.

Unpalatable Options

There are several options for farmers affected, not of them particularly palatable and all of them with significant costs attached. Renting/purchasing additional land to spread livestock across a greater area has been an ongoing phenomenon for the past year as farmers anticipated a change in the stocking rate figures, as has come to pass. This immediately imposes higher land costs on the farm enterprise and has also altered the general land rental market, with tillage farms, particularly, hit with higher land rental costs as they compete with Derogation farms; an increasing deficit in the amount of land available for tillage rental and consequent impacts on operating costs with less land and cropping to spread production costs across.

Another option being adopted on some Derogation farms is

to reduce livestock numbers on their farms. Some of these reductions are accommodated through the sale of ancillary cattle enterprises with lower profit returns. This comes at a cost but allows the higher return enterprises, mostly milk production, to continue unaffected. Figures have been compiled to show that some farms can accommodate the reduced stocking rates by selling off the lowest productivity cohort of the herd. i.e. low yielders, high cell count cows, lame animals and surplus stock generally. In some cases, higher breeding efficiency will allow for some slack to develop in stocking rates. A replacement rate of twenty percent instead of twenty five percent, for instance, releases more land to use for cows to convert grass into milk. Not all these options, however, are immediately implementable, whereas immediate actions are required to lower stocking rates as the clock started ticking on the 1st of January this year. That effectively means that delays in implementing measures to bring the farm within the required 220kgs limit compound the problem, resulting in far more stringent measures being required later in the year. The measurement is an annual calculation. If measures to reduce stocking rates are not implemented until well into 2024 – the end of April for instance - then whatever measures are adopted must deliver a 12-month outcome with only an eight-month calculation of stocking rate. In other words, if the farm is operating at 250kgs per hectare from January to April, the following eight months from May to December must reflect a far lower stocking rate than 220 kgs per hectare to deliver the required stocking rate for a full 12-month period.

Future-proofing our 220kgs Limit

The Derogation reduction is in place. It will not be rescinded, unless quite seismic improvements are secured in water quality within the next two years. In two years' time, unless water quality is at the very least, stabilised at current standards, there is every possibility of further reductions. There is general agreement that a further reduction in the Nitrates Derogation limits would seriously damage the fundamental basis of Ireland's grass-based competitive advantage in milk and meat production. Ireland's long grass growing season was one of the central arguments for securing a higher Nitrates stocking rate ceiling in the first place. With no other discernible competitive advantage, maintaining a 220kgs stocking density is of the utmost importance. Current regulations around protecting water quality, if adhered to by all farmers and fully implemented across the country and especially in the more vulnerable regions, can deliver the necessary water quality figures.

The implications for all farmers across the country are alarming should the Derogation limit move down further to the standardised European threshold. For farmers within the current threshold to maintain current livestock numbers they would have to increase the land area farmed by 50 per cent. A 40-hectare farm would have an additional land requirement of twenty hectares. That would not be achievable in most cases, even at the costs involved. The negative implications for individual farm profitability, productivity and viability across the Irish farm sector are almost unimaginable.



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A BUTTERFAT - GRASS CONFLICT

Butterfat levels are typically lower during summer and farmers will typically see a dip at turnout. This can happen fairly rapidly after turnout, but it can be more pronounced during the second or third round of grazing, between three and nine weeks after turnout.



**Michael Luttrell,
Cargill.**

"We can also see levels dip if conditions bring about a fresh flush of grass growth through the grazing season," says Cargill Ireland's ruminant nutritionist Michael Luttrell. This is because the high oil content and lower structural fibre of the young grass affects the butterfat production pathways in the cow.

"This fresh, leafy grass is higher in oil than more mature, later season grass," he adds. "In spring and early summer, the oil content in grass is 50 per cent richer in unsaturated

fats than a typical winter ration. Also, it digests quicker and has a higher sugar content, which can create acidic rumen conditions. The combination of the acidic conditions and the high oil content in fresh grass creates a 'perfect storm' in the cow's rumen and disrupts the usual pathways used by the cow to produce milk fat."

CO. CORK HERD MANAGES SUMMER BUTTERFAT DIP

The bar is set high for one pedigree Holstein herd, based at Carrigtwohill, in County Cork. High milk yields are combined with a spring-calving system and a forage-based feeding programme. Denis O'Brien and his father, Denis senior, have improved herd performance through genetics and better feeding, and production is kept on track by being agile when it comes to balancing and improving the cow's diet. Average annual milk yield from the 180-cow Ballinkilla herd is currently 9,800litres and 715kg of milk solids, at 4.22 per cent butterfat and 3.51 per cent protein. The herd has been closed for 35 years, with not even a bull brought onto the farm. They use sexed semen on 30 per cent of maiden heifers and 30 per cent of cows in the first 10 days of the breeding period to produce enough heifers to support a 25 per cent replacement rate and to ensure these are born at the start of the calving block in mid- January. Beef sires are used on any cows calving from the beginning of March.

Great importance is placed on fine-tuning the herd ration. A 14 per cent protein concentrate is fed all year round at a flat rate of 3kg per cow through the parlour, and the ration is balanced with the summer buffer feed and a winter mixed ration.

"We can make immediate changes to the buffer if production deviates from our targets," says Denis. "When you have a bin full of dairy nuts it takes a while to implement any changes."

The winter forage-based diet is based on high quality grass silage, which is analysed every three weeks, plus maize silage, fodder beet and treated grains and minerals.



Denis O'Brien's Farm Yard in Co Cork.

The soya content of the diet is adjusted to balance the protein. A summer buffer feed, fed before evening milking, comprises 10kg to 12kg of maize silage, 4kg of treated grains comprising barley, maize meal and wheat, and 1kg of straw plus Carfe Excel protected fat and minerals. Cows are typically out grazing by mid-February, although they gauge this depending on conditions. This year turnout was in early March, but as conditions turned wet, cows were brought in again for a period. Denis has no issue with keeping cows in longer or bringing them back inside if conditions change because they've plenty of cubicle space for the milking herd.

Grass challenge

Denis admits that managing cows at grazing and maintaining milk yield and quality is a challenge. They operate a paddock grazing system with a 21-day maximum rotation. Grass is measured regularly. "In peak growing season this rotation might only be 16 days," he adds. But we can't rely on just grass to support our yields and milk quality. Milk is sold to Dairygold on a solids contract, so production of milk solids is very important. "We want to maintain the percentage of fat and protein, even in our higher-yielding cows, but it's been difficult in early in summer. We normally see a dip in butterfat from mid-May to mid-July to 3.6 per cent from the seasonal average of 4 per cent. This isn't good for our milk contract."

So, when this dip in butterfat started happening in spring 2023, Denis was keen to try a specialised rumen buffer from Cargill, suggested by his feed supplier Pat Coakley from Specialist Nutrition. This product, Equaliser Cream, is designed specifically to support butterfat production and counter the depression caused by high oil content diets, seen in young leafy grass, and to support rumen health.

Butterfat bounce-back

"We added 140g/cow/day of Cream to the buffer feed, and we'd no complaints afterwards," says Denis. "Butterfat levels recovered to 4 per cent within a week or two and we

worked out that it paid for itself half as much again. Not only were butterfat levels back on track, but the cows' overall performance improved too – they went well for the rest of summer.”

This year, in anticipation of the dip in butterfat, Denis introduced Equaliser Cream to the buffer feed in March, well ahead of the problem period. “We hope this will help to keep production on target in early summer and maintain cow health and well-being through the grazing season.” He describes their dairy system as fairly pressurised. “So we have to keep things right to keep on target. It’s a streamlined system at each stage.”

This philosophy starts with the young calves who are nurtured from birth, keeping close to the dam but in an open box to avoid ‘hassle’ from other cows, before moving to pens. After ensuring sufficient high quality colostrum, calves are introduced to the high specification follow-on milk NeoMilk Beyond and a starter feed, plus fresh water.

“This high quality diet gets them off to a good start. Consistent growth rates and no checks are important, so heifers are ready to breed at 15 months and calve at two years old,” adds Denis. “We aim to keep calves on target just like we do the cows, through careful management and fine-tuned nutrition.”

PRICE TAG ON BUTTERFAT DIP

The seasonal dip in butterfat percentage can be as much as 0.5 per cent early in the grazing season, and an average reduction of 0.35 per cent is often seen between April and August. Figure 1 shows the seasonal butterfat profile for a typical 120-cow herd managed on an automatic milking system and producing 7,450 litres of milk, at 4.49 per cent butterfat and 3.65 per cent protein, on 1.2 tonnes of concentrates.

Between March and September butterfat fell by 0.35 per cent, with a low of 0.48 per cent in May. This equates to 51c per cow per day in May and 35c per cow per day throughout the season, based on an average yield of 25 litres per cow on a typical milk contract. This dip in butterfat ‘costs’ the business €56 per cow, or €6,720 for the herd, from May to September.

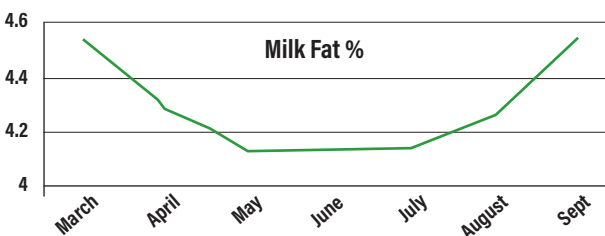


Figure 1: Typical seasonal butterfat profile.

VALUE-ADDED BUFFER

Specialised buffers, that go beyond controlling rumen pH, will reduce the negative impact on milk quality of high oil content diets found in grazed grass and also where highly digestible, high-energy silages are included in the ration.



Trials from 2021 to 2023 have consistently shown the success of Cargill’s Equaliser Cream where its use on 25 farms in Ireland and the UK have been monitored. The buffer was added at rates of between 75g and 150g per cow per day. The proportion of grazed grass in the diet ranged from 0 per cent to 75 per cent. Thirteen farms introduced Cream into the ration early, before the usual dip in butterfat, and 12 farms introduced it after experiencing low milk fat.

Fat and finance gains



Philip Ingram, Cargill.

Early users had the best overall response. They pre-empted the dip in butterfat, recording an average improvement in butterfat of 0.4 per cent in May, compared with the same month in the previous year so therefore protected their milk cheque.

The 12 farms adding Equaliser Cream to the ration when they experienced low milk fat and saw an uplift of 0.33 per cent, which continued during the next few weeks with an average increase in one month of 0.51 per cent. The benefit was rapid with butterfat improving within a week of adding the buffer, and any drop in the milk cheque was minimised. The average financial benefit of adding Equaliser Cream to diets was 80c per cow per day, or €2,422 per month based on a 100-cow herd on a typical milk contract.

According to the company, Equaliser Cream maintains rumen pH and promotes rumen health, and also helps to normalise the oil conversion pathways.

“It has a two-pronged effect and prevents rather than ‘cures’ the problem,” explains Cargill’s ruminant technical manager Philip Ingram. “While most buffers tackle rumen pH to help prevent milk fat depression and are not consistently effective, Equaliser Cream provides powerful buffering capacity and has key ingredients to help reduce the impact of the high oil content of grass on milk fat,” he explains.

“And response is rapid with increases in butterfat typically happen within days of introducing the product into the cows’ diets. This means that farmers can protect the butterfat content of their milk and safeguard their milk income.”

AN INTEGRATED APPROACH **KEENAN**[™]

an **Alltech** company



Pictured from left to right are: Aisling Raggett, Cathal McCormack; Adam Hanratty and Gary Kelly.

Since the start of 2024, the KEENAN business – which previously operated as a separate entity alongside Alltech – has been realigned so that KEENAN commercial and service functions now sit within the Alltech Ireland business. Here, Cathal McCormack, Country Manager at Alltech, discusses the reasons behind this and his vision for the future.

Cathal McCormack joined Alltech in 2007 and, after working as a sales manager for the West Midlands, he took over as Country manager for Alltech Ireland in 2016. "I looked after Alltech's commercial business in Ireland on the feed side – in that time, since 2016, our business has trebled and we have developed a very successful team across the island of Ireland." As of January this year, the KEENAN business has been brought in under the Alltech structure and Cathal is now responsible for this area of the business, on both the commercial and services side. The reason for doing this, he states, is to better align business decisions for the benefit of the KEENAN customers and bring Alltech closer to the KEENAN customer.

"This is a significant business change and one that will see it grow and develop KEENAN in a more efficient and integrated way. Housing KEENAN within the Alltech structure means that we are bringing the KEENAN customer closer; we will have a shorter communication chain and we can respond quicker to farmers' needs and opportunities."

"We have a fantastic team on the service side, who are working in conjunction with six service agents across Ireland with all counties covered, north and south. We want to provide a 'best in class service' to KEENAN customers; we stand behind our promise that with KEENAN you never miss a feed." Commenting on the KEENAN offering, Cathal notes:

"KEENAN has always been focused on improving efficiencies at farm level: while other mixer wagon companies solely focus on the machinery side, at KEENAN we not only have the best machine on the market but we also have a system that ensures optimal animal performance and efficiency at farm level. This is achieved by using several different strategies. Firstly, the unique KEENAN MechFiber system ensures that the mix that the animals are presented with is consistent and optimises rumen health. Secondly, our InTouch feeding specialists formulate a diet specifically to meet the nutritional requirements of the animal depending on the farmer's goals for their herd. In addition to this, the unique InTouch controller which is attached to the KEENAN machine monitors exactly the ingredients or feeds that are fed through the KEENAN. The information from the InTouch controller then goes back to our team of InTouch feed specialists where they monitor this data along with other information such as milk production from the farm in question. If there is an issue identified, then one of our 10 InTouch feeding specialists will contact the farmer. I believe that this holistic approach to nutrition at farm level is unrivalled in the Irish marketplace and it all focuses on optimising animal efficiencies and farmer profitability."

The addition of the Alltech offerings adds another string to the KEENAN bow according to Cathal: "Alltech is known across the globe as experts on a number of key areas relating to

animal nutrition such as rumen health, mineral nutrition and mycotoxin management. This knowledge allows our KEENAN customers in Ireland the opportunity to avail of a broader set of expertise to help them overcome any potential issues on their farm."

"With environmental sustainability and fluctuating input cost challenges top of mind for the foreseeable future there never has been a more important time for Irish farmers to maximise

the return on every single input used on their farms. I believe that KEENAN is perfectly positioned to help Irish farmers achieve this goal in the future" concludes Cathal.

To assist Cathal McCormack in leading the KEENAN Ireland business, a new management team has been appointed. The new management team are heading up the Commercial Sales, Customer Service, and Machine Service for KEENAN Ireland. The new appointments are as follows:

Adam Hanratty, KEENAN Ireland Sales Manager



Adam Hanratty is KEENAN Ireland Sales Manager. Adam started with the company selling the KEENAN Range in the Southwest of the U.K. and now covers Leinster and the midlands. "Although our approach to farming is quite different to many U.K. farmers, ultimately our goal is still the same: to provide high quality food in a sustainable and profitable way from 'farm to fork'. In my role, I liaise closely with our Irish Southwest manager Ryan O'Leary, Northern Ireland Manager Adam Smyth and with our 10 Intouch feeding specialists across the nation. Together, we strive to bring industry leading advice and machines to farmers across the country. When customers see great success from machines I have sold them like extra milk solids, increased average daily weight gains, halving feed bills/labour, I can take pride in what we have helped make possible. Over the last year we have made a lot of changes to futureproof the business to ensure KEENAN remain the nation's number 1 diet feeder."

Aisling Raggett, KEENAN Ireland Customer Service Co-Ordinator



Over the last 23 years Aisling's career has been predominantly senior management posts within both the retail and veterinary practice management sector. Alongside the day job, she also has a dairy farm at home in north Kilkenny, milking approximately 100 cows. Aisling's industry experience and her own farm business have allowed her to bring a range of skills to KEENAN and its customers, especially liaising with Irish farmers in supporting them with their KEENAN machine purchase. "It is paramount that our customers at KEENAN know that I am available at all stages of purchasing, delivery and aftersales, to aid and support should they have any queries or concerns. Our team prides itself on resolving any issues in an expedient manner."

Gary Kelly, KEENAN Ireland Service Manager



On finishing his Leaving Certificate in 2008, Gary joined KEENAN where he completed an MAMF (Mechanical Automation Maintenance Fitter) apprenticeship which is a four-year course. During and after his apprenticeship he worked in different areas of production and gained knowledge in all areas of each machine. In 2017 he moved to a technical role troubleshooting weigh box issues before moving to service, where he is today. "My role in service involves keeping our new warehouse stocked with parts, selling machine parts, giving advice on issues and over the phone troubleshooting. I organise our engineers, who cover all of Ireland, to visit our customers for breakdowns, services and relines, which can be carried out on farm. They are based around the country, helping us to ensure our customers get the best support and service. Every year we attend the different agricultural shows such as The Ploughing Championships and The Balmoral Shows. These shows are great for getting feedback from our customers face-to-face, seeing where we can improve and how we can make the feeder more beneficial for them."

MULTIPLE AWARD-WINNING PEDIGREE HERD

Philip and Linda Jones are multiple award-winning pedigree breeders from the Hallow Holstein 100 cow herd at Killowen near Gorey in Co. Wexford.

Philip got his Agri education at Greenmount College in Antrim. Philip is an active member of the Slaney IHFA club and the YMA Coordinator. Average milk yield for this high yielding herd is a very impressive 10,000 litres at 4.3 per cent butterfat and 3.5 per cent protein. Indeed, longer term the plan is to increase herd yields to around 12,000 litres or twice the national average.

Philip makes the point that if their herd yield was at the national average they would need almost twice as many cows to produce the same amount of milk along with having to double their investment in buildings and slurry storage. So, he says that higher yielding herds minimises the capital investment and labour required for profitable milk production.

The herd is milked in a Fullwood parlour and has won several milk quality awards with Glanbia. To cope with the N derogation problem they export slurry to an uncle who is delighted to get such a valuable organic fertiliser. They reseed 10 acres of land every year and sexed semen is used to minimise the number of bull calves. Any problem cows are inseminated to a continental bull.

Herd Management is Important

Herd management and preparation of animals in advance of showing are key factors contributing to the continued success of the Hallow Holstein herd. "We have been fortunate to win prizes at all the national shows on the island of Ireland" says Philip.

He has noted an overall improvement in the performance of the herd using their animal nutritionist Brian Reidy to formulate a TMR ration using a Keenan mixer wagon. The hi spec diet includes wheaten straw, grass silage, molasses, local barley, home grown forage maize, soya etc.

"You have to have the right animal to start with, but they can change quite a lot, especially if they are on a good, balanced diet and have consistency in their diet - they can improve quite a lot. "Because we are buying the straights we can change the protein and energy level in the diet pretty easily to get the result we are looking for."

Philip also incorporates Kexxtone, an Elanco Animal Health product, into his management strategy on the farm. Kexxtone is an intra-ruminal bolus which prevents negative energy balance post calving and associated issues. Since introducing the product, Philip has seen great results.

The Jones family believe in making the very best quality silage (70-75 DMD). First cut silage is clamped and the



Cow in photo is Hallow Solomon twizzle 3 Ex94 Supreme Champion at the Royal Ulster Winter Fair 2023. Pictured are: Christine Adams, former RUAS president; Rodney Brown, head of Agri at Danske Bank; Philip Jones (leading the cow); and Judge Mike Duckett. Front Row Kate Jones, Will Jones, Linda Jones.

rest is baled silage—they make around 400 bales each year using their local contractor T & D Allenwood which is run by father-and-son Tom and David Kinsella.

According to Philip "we have been using the Film & Film system to make baled silage for a number of years with excellent results. Bales keep better in storage for longer and are easier to manage- it is much easier to separate the film from the silage and both the Baletite film and Silotite balewrap can be recycled together. We are delighted with silage quality and the minimal wastage since we changed to this system from netwrap."

Numerous Herd Awards

Philip and Linda have been showing cattle for over 25 years and it gives them great enjoyment. Their children Will and Kate are also heavily involved in showing pedigree cattle and have won several awards. Both children are active members of the IHFA young members association (YMA). Check out their Facebook page at https://www.facebook.com/HallowHolsteins/?locale=uk_UA Prestigious show awards for the Hallow herd include numerous prizes from Balmoral Show (Supreme, Reserve and Honourable Mention awards in 2019), Emerald Expo (2023 Reserve Champion title), RUAS Winter Fair

(Supreme and Interbreed championships on a number of occasions), Tullamore (Reserve & Honourable Mention) and Virginia shows (Diageo Baileys Irish Champion Dairy Cow, first prize Junior Cow section).

Hallow Holstein Cow History

The Hallow Holstein story dates back 50 years to the founding of the herd by his parents Mervyn and Joyce who are now retired from active farming. It was mostly Friesian when the original herd was started. Mervyn began importing animals from Canada and over the years it was changed and is now all Holstein. The herd is equally divided between autumn and spring calving, which spreads the workload in a one-man operation.

Born in January 2008 into the Holstein herd, Hallow Advent Twizzle 3 ET (EX96) achieved national and international success and her progeny are continuing to blaze a trail on the pedigree show scene. This cow was classified at 96 points - one of the very highest scores ever awarded to any Holstein.

"She won every major show in the south and went on to take the major awards in Northern Ireland," says Philip of the former Emerald Expo champion, Diageo Baileys Irish Cream dairy champion, IHFA champion cow, and Diamond Award winner. "She is the cow that everybody in Europe knows about because a heifer of hers that sold to an Italian breeder went on to win at the European show and won at Verona a few years ago."

Hallow Advent Twizzle 3 ET (EX 96), was bred from an imported embryo and produced almost 100,000kg over six lactations at 5.71 per cent butterfat and 3.72 per cent protein, yielding 5,704kgs of butterfat and 3,714kgs of protein. Her Twizzle cow family are a driving force in the herd as generations of her descendants consistently win top awards, and demand for the progeny from other breeders shows no signs of waning.

"I was always involved on the farm from a young age and preparing animals for the shows and for other breeders," says Philip. His son, Will, is closely following in his father's footsteps on the farm.

Hallow Advent Twizzle 3 ET (EX96), was bred from an imported embryo and produced almost 100,000kg over six lactations at 5.71pc bf and 3.72pc pr, yielding 5,704kg fat and 3,714kg protein.

"The Twizzle family have done great for us in recent years, but there have been a mixture of cows from different cow

families that we purchased that have performed very well too. Breeding from good cow families has been the focus here," adds Philip. "We place a lot of value on the strength of our cow families."

The Twizzle cow family has its roots in Canadian embryos purchased by the family in 2006. We ended up with five heifers from the embryos including Advent Twizzle," recalls Philip on the decision to import the embryos. "We have had a good few Attwood daughters off her which have done very well. The one we sold to Italy did very well, which made the herd well known abroad."

A second cow family, Embrace, are adding to the consistency of the Hallow Holstein herd's breeding. In 2016, eight-year-old Desmond Dundee Embrace Holstein was judged overall inter-breed champion at the RUAS Winter Fair. Desmond Dundee Embrace was purchased as a one-month-old calf in 2008 for €10,300.

Philip frequently sells bulls and embryos from the herd, with a full sister of Twizzle among those sold internationally. Hallow Atwood Twizzle EX93-Max-ITA was sold to a breeder in Italy, where she went on to clinch Supreme Champion at the All-European Championships in Colmar, France, in 2016.

Each year a selection of top heifers from the herd are also sold at the Dalevalley Sky-High Protein Sale at Carnaross in June. In 2020, a daughter of Twizzle's, Diamondback Twizzle 159, made the top sale price at 10,500 guineas when she was sold to the Willsbro herd in England.

Preparation of Animals for Livestock Shows

"It is the small details between from the balance of feed to getting their feet right, to clipping right and a balance of few things that you need to get right - and it seems to be working for me anyway," Philip says. "I believe that preparation of the cows on the show side has done well for us however the cow families have been the main factor because when you have good cow families in the herd you get more consistency in the breed and we look to use more on the type of cow we have," Philip explains. "Udder quality and legs and feet are two of the main focus areas for me," he said.

"When I was younger, getting cows ready for shows was something that I did a lot of. I prepared cows for showing for other breeders - it was something that I grew up with. Our children Will and Kate regularly attend the shows and sales with stock from the herd."

IS AN ADDITIVE NEEDED WHEN MAKING GRASS SILAGE?



Ken Stroud.



Ken Stroud of Volac explains the science behind a proven additive.

With the silage in a clamp worth a lot of money, it is well worth protecting it against losses in quality and dry matter (DM). Even in a very well-made silage, typical DM losses can be between 8 and 10%. But if attention to detail slips, losses could easily be over 30 per cent. Whenever grass is ensiled, some sort of fermentation of the sugar that it contains will occur. Fermentation is basically a kind of 'pickling' process. The problem is, while some fermentations are efficient, others are much poorer – leading to much more of the silage's DM and nutrient content being lost.

Improving the fermentation

Producing a better fermentation can be influenced in several ways – for example, by maximising the sugar content of the grass by cutting it at the optimum growth stage and wilting rapidly; by minimising contamination with soil and slurry bacteria; and by ensuring the clamp is well consolidated and airtight. All are important.

However, another integral step is to use a proven additive that 'bombs' the clamp with a high number of efficient bacteria which rapidly produce lactic acid. Lactic acid is important because it is this that 'pickles' the grass to preserve it. The additive Ecosyl 100, for example, delivers 1 million, highly efficient lactic acid-producing bacteria (*Lactobacillus plantarum* MTD/1) per gram of forage treated.

By comparison, without an additive, fermentation is at the mercy of whatever bacteria happen to be present on the grass – both good and bad bacteria. But even if slurry and soil bacteria are minimised, the lactic acid-producing bacteria that

tend to be naturally present on grass are often low in number and not necessarily the most efficient strains. If the wrong bacteria dominate the initial fermentation, this leads to greater silage losses.

Ideal fermentation

The role that rapid production of lactic acid plays in producing good silage cannot be overemphasised. It is important for two reasons:

1. Lactic is the strongest acid produced during a silage fermentation, so it produces the fastest pH fall. In this way, the growth of undesirable microorganisms which 'want to feed' on the silage is quickly halted before they have chance to cause major nutrient losses.
2. No undesirable by-products are produced during this process, which means very little energy contained in the sugar in the grass that was fermented is wasted. Indeed, the lactic acid produced retains over 99 per cent of the energy of the original fermented sugar.

It is this type of fermentation that occurs when a quality silage additive containing a high number of efficient lactic acid-producing bacteria, such as Ecosyl 100, is applied. It is called homofermentative because there is only one end product: lactic acid.

Research on Ecosyl has shown that it not only produces much faster pH falls than an untreated fermentation, but it has also halved DM loss and conserved greater nutritional quality. In trials, using Ecosyl has been shown to boost silage metabolisable energy by 0.6 MJ/kgDM compared with

untreated silage, and to improve animal DM intakes. It has also preserved more true protein.

Most important of all, Ecosyl has led to improved animal performance. Across a range of forages in 15 international independent dairy trials, milk yield from feeding silage made with Ecosyl was improved by an average of an extra 1.2 litres per cow per day over untreated silage. Across 19 independent beef trials, it has also consistently produced more beef – with liveweight gain in growing cattle increased by more than 11% in 10 trials, and in finishing cattle increased by more than 9 per cent in 9 trials.

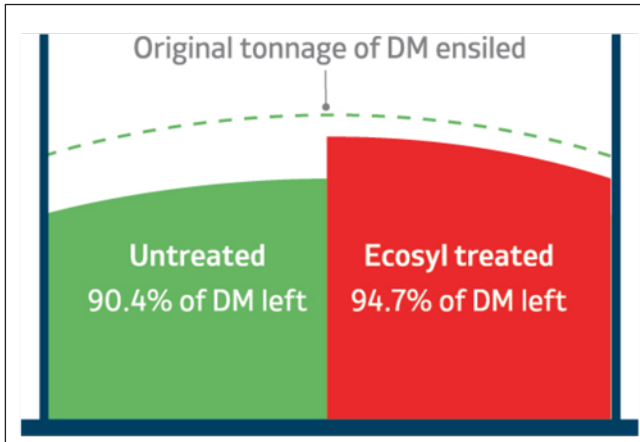


Figure 2: Improved dry matter (DM) retention from Ecosyl in trials.

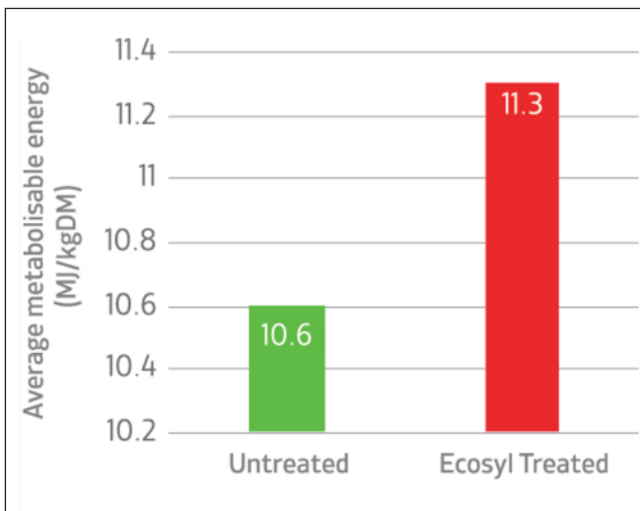


Figure 3: Improved preservation of silage quality (metabolisable energy) from Ecosyl in trials.

Poorer, untreated fermentations

At the opposite end of the scale to an efficient, treated fermentation, poorer fermentations can occur for two reasons. Firstly, if they are carried out by bacteria naturally present on the grass that still produce lactic acid but do so less efficiently. Or secondly, if certain 'bad' bacteria are present on the grass. The problem with these latter 'bad' bacteria is that they produce a range of less desirable end products besides lactic acid. This type of fermentation is termed heterofermentative.

These end products can include other acids called volatile fatty acids (VFAs). VFAs are weaker than lactic acid, which means the 'pickling' process is slower and the pH may not fall as low, so undesirable microbes can continue feeding on the valuable nutrients in the silage for longer. On top of this, carbon dioxide is produced. This is undesirable because carbon dioxide means loss of DM. It is also a greenhouse gas. Another by-product of a poor fermentation is ethanol, which is not a preservation acid at all.

Particularly poor fermentations occur if enterobacteria, the bacteria associated with slurry, are allowed to take hold in the clamp, or if clostridia bacteria are present, which are introduced from soil. These can waste around 17 and 18 per cent of the original energy content of the sugar respectively. Clostridial fermentations are also particularly undesirable because they convert beneficial lactic acid into butyric acid, which makes silage unpalatable. So not only is the silage less nutritious, but livestock want to eat less of it.

The slower fall in pH during the early stage of fermentation also means that there will be a greater breakdown of proteins, mainly due to continued plant enzyme activity. Good silages should have a suitable pH of 3.8 - 4.5 depending on the % DM, low ammonia-N (less than 10 per cent total N) and a high ratio of lactic acid to volatile fatty acids – a minimum of 3:1 or higher.

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Ecosyl 100 drives fermentation by delivering 1 million, highly efficient *Lactobacillus plantarum* MTD/1 lactic acid-producing bacteria per gram of forage treated (1 gram of grass pictured on right).



Effective consolidation to remove air from the clamp is also a crucial element of making good silage.

it is used to produce an image (see picture below) where horizontal bands represent the DNA of different bacteria. Darker banding indicates more of that bacteria is present. Where no additive was applied (left), results revealed that during the early part of the fermentation in particular, the silage was dominated by undesirable enterobacteria, commonly found in slurry. Where Ecosyl was used (right), there was very little growth of enterobacteria, as the 'good' bacteria present in Ecosyl dominated the fermentation.

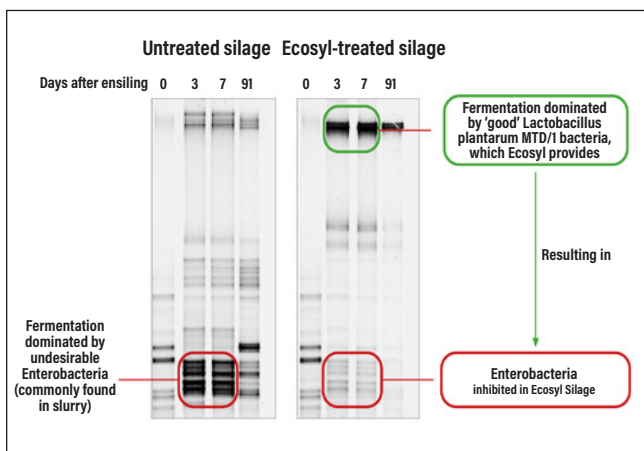


Figure 4: Sequential benefits of *Lactobacillus plantarum* MTD/1 (Ecosyl) treatment based on research.

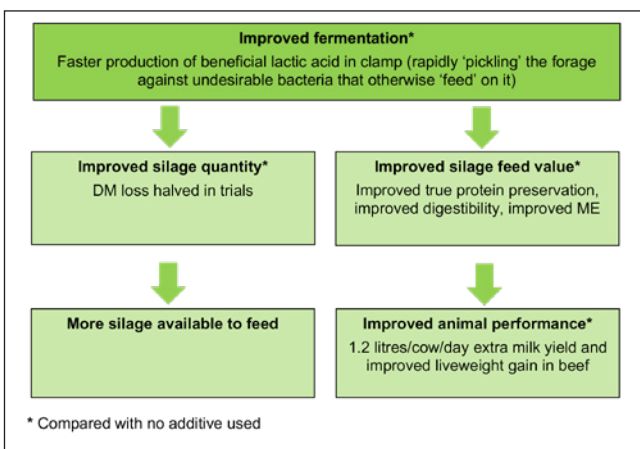
Does baled grass need an additive?

With baled silage, fermentation is slower and restricted due to the longer chop length and the typically higher % dry matter (DM) of the grass. Bales are also more susceptible to aerobic spoilage (heating and moulding) due to their high %DM and large surface area to volume ratio making air removal more difficult – 27 per cent of the volume of a 4ft bale is in the outer 5cm. They are also less dense compared to clamped silage, although improvements in balers have meant densities have been much increased over the years.

Another issue with bales is their susceptibility to the growth of *Listeria* bacteria due to their higher pH and increased risk of aerobic spoilage. *Listeria* only needs a small amount of air ingress – e.g. from pierced wrap – to be able to grow. Bales can therefore benefit greatly from an additive that will improve fermentation and reduce aerobic spoilage. The specific additive used can be tailored to the %DM of the bales and how long the silage will be exposed to air for once opened before being consumed.

For lower %DM bales (e.g. below 33 per cent DM) that will be eaten within a day (e.g. on dairy farms) and where there is little risk of aerobic spoilage, then focus on an additive that preserves the bale by improving the initial fermentation e.g. Ecosyl 100.

If bales are likely to be open for two or three days before being eaten (e.g. on beef and sheep units) then focus on the initial fermentation but also on tackling spoilage and heating risks. For example, consider Ecocool, which contains two beneficial bacterial strains, one for fermentation and one to target the yeasts and moulds that cause heating and spoilage. Alternatively, consider Double Action (DA) Ecobale, which includes two bacteria, one of which is effective at fermenting drier material, plus a feed-approved preservative.



DNA fingerprinting reveals how 'good' bacteria in Ecosyl outcompete undesirable bacteria.

Can a silage additive be seen working?

To provide an insight into the workings of an additive, Volac scientists have used DNA fingerprinting to reveal the different bacteria present in silage (in this case grass silage) – either with or without Ecosyl 100 additive applied – at 0, 3, 7 and 91 days after ensiling. DNA fingerprinting is a technique used in forensics. Here

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BEST OPTIONS FOR PROFITABLE LAMB PRODUCTION

Gareth Beacom, Beef and Sheep Development Adviser CAFRE, discusses best practice in lamb production.

Financial benchmarking completed by CAFRE on Northern Ireland (NI) sheep farms have consistently shown sheep enterprises to be leaving a positive margin at the year-end over the past number of years. CAFRE benchmarking figures confirm a strong correlation between lambs sold per ewe and enterprise profitability. A similar correlation exists between stocking rate and overall net margin per hectare.

However, as stocking rate increases care must be taken to ensure lambs are managed in a cost-effective way which suits your farm and your system. Each year a small number of farms fail to convert the increased output of lambs into increased profit. There are many reasons behind this, including poor performance at grass leading to a high % of lambs requiring meal finishing at the year-end or alternatively lambs being sold off in the autumn for a low price.

Now is an ideal time to review last year's lamb sales and plan ahead for this year's lamb crop and decide what finishing system is the best for you. Whilst the price of lamb fluctuates every year one thing that does not fluctuate is the general trend in lamb price caused by its seasonality leading to variations in supply and demand throughout the year.

As can be seen from the following graph, lamb sales follow the same general trend year on year and whilst there is some sporadic peaks and troughs the general trend remains the same. This gives us some scope to plan ahead with our current lamb crop and manage them in a cost-effective way to maximise returns.

The first step to start planning this year's lamb sales is to review last year's lamb sales.

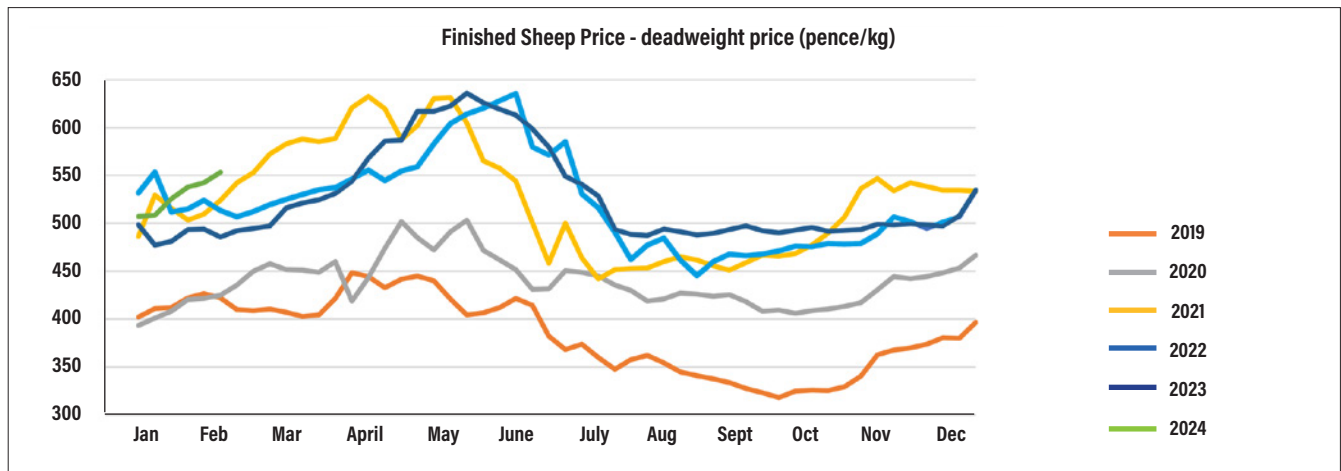


Figure 1: NI Finished Lamb deadweight price 2019-2024.

Source: DEARA NI Agricultural market report.





Gareth Beacom.

When were the first and last batch of lambs finished last year? What month were the main bulk of the lamb crop finished in? What % of lambs needed meal supplementation to get finished? Did you have enough grass for your ewes last autumn and early this spring?

As a general rule of thumb, a typical March lambing flock should aim to have at least 75% of their lambs sold by end of September. Keeping a high number of lambs after this point often limits grass supplies to tugging ewes in the autumn as well as grass supplies to ewes and lambs the following spring. Both of which leads to a vicious cycle of underperformance. If this was not achieved last year, then questions need to be asked as to why and what can be done differently this year in order to get lambs away earlier.

Potential from grass

As demonstrated from Agrisearch's grass to lamb project there is significant room for improvement in terms of grass grown and grass utilized on sheep farms in NI. The project concluded that a well-managed grass system has the potential to supply 90-95% of a sheep flock's nutritional requirements. The project demonstrated lamb growth rates, drafting patterns and carcass data from both a 4 paddock and an 8-paddock

system. Across both systems 100% of the lambs were finished by the end of November with an average carcass weight of 20.2kg and average age at slaughter of 27 weeks.

As well as the obvious benefits of extra grass growth and utilisation from rotational grazing there is also significant advantages in animal health and welfare from moving sheep onto fresh ground regularly which will also help boost animal performance.

Whilst grass is obviously the cheapest and most cost-effective way of finishing lambs it is not always possible to finish all lambs off grass. Even when grass is plentiful the quality of the grass will fall as the year progresses as highlighted in the graphs below meaning that it is harder to get lambs, ram lambs in particular, finished in spec without the supplementation of concentrates at the end of the summer.

Creep feeding is a debate which crops up annually by BDG (Business Development Groups) members and has many pros and cons. Although it obviously increases the cost of production, creep feeding also provides many benefits. The main benefits are getting lambs sold earlier, hopefully at a higher price, and freeing up grass in the late summer and autumn months.

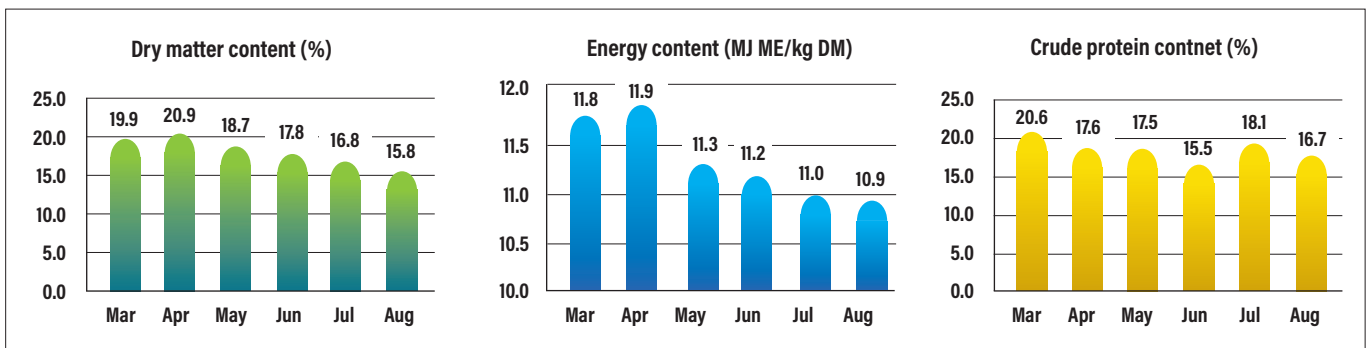


Figure 2: Grass quality from Agrisearch sheep and beef farms 2019.



However, Table 1 also shows that the costs of creep feeding at various levels range from £9 - £17 per lamb. Although this doesn't take into account the extra grass freed up by creep feeding, it still means that a significant number of lambs would need to be sold at a higher price. Hence it may not be the best option for later born lambs as these would struggle to be finished prior to July; but for lambs born mid-March or earlier there a reasonable argument for creep feeding if grazing ground is going to be under pressure with rising fertiliser costs.

A mixed approach may also be the best option for some farmers i.e., targeting a couple of batches for creep feeding such as early forward lambs or lambs already achieving a high daily live weight gain. Or lambs on ewes targeted for culling in order to get these ewes off the grazing platform earlier and avail of good prices for them also.

Ruminants are more efficient at converting protein into live weight gain when they are younger rather than when they are older; hence the exceptional daily live weight gains that can be seen of creep fed lambs compared to lambs fed in the autumn and winter months. Hence, if you found you fed a high percentage of lambs' supplementary meal last autumn or winter then perhaps creep feeding may be a more cost-effective option for you in order to achieve a better feed conversion ratio on your purchased concentrate.

Creep feeding lambs also allows the option to wean lambs earlier, further reducing the pressure on grazing ground. The ewes can be grazed on poorer more unproductive swards or for cull ewes to be sold earlier to avail of high cull prices.

Research carried out Teagasc in Athenry (shown in Table 1) demonstrates the extra performance which can be achieved at when supplementing lambs at different feed rates and under different grazing heights.

Table 1. Effects of concentrate feed & grass availability on performance from birth to slaughter.

	Low sward height (5cm)			High sward height (6cm)		
	0	300	600	0	300	600
Creep feed (g/lamb per day)	0	300	600	0	300	600
Weaning weight (kg)	31.4	34.3	36.9	33.7	36.7	37.5
Drafted at weaning (%)	7.3	20.7	42.8	29.4	41.2	53.7
Age at sale (days)	167	140	125	154	126	118
Creep intake (kg)	0	32.5	52.9	0	27.5	46
Cost @ £320/t	0	£10.40	£16.90	0	£8.80	£14.70

These results highlight that creep feeding shouldn't just replace good grassland management, as the highest daily live weight gains are achieved when lambs are offered high quality grass as well meal. The results also show that lambs ate less creep meal when offered more grass whilst having higher daily live weight gains.

Creep grazing

Creep grazing via a creep gate can deliver similar levels of performance to creep feeding without the additional cost of creep feed. It has been shown to improve weaning weights by up to 2.0kg. It can also be coupled with creep feeding to significantly boost performance by offering lambs meal in troughs as well as the best possible grass available. This has the added advantage of being able to move troughs easier than a creep feeder which helps reduce the build-up of infection and will also be easier when moving to a new paddock. However, this does require good fences and won't be possible in all farms, i.e., farms with fragmented ground etc.

Alternative forages

If reseeding is needed, then incorporating a forage crop such as forage rape or tyfon stubble turnips is another option for finishing lambs in the summer months. These can be sown either on their own or under sown along with a grass reseed to provide a cost-effective alternative for finishing lambs.

While growth rates will not be significantly higher than you would expect of high-quality grazing, forage crops are generally dense in nutrients, with the leaves high in protein and the roots high in energy. If a good establishment is achieved then a high dry matter yield per ha is possible, allowing many lambs to be finished on a small area.

Summary

- Review last year's lamb sales and drafting patterns.
- Maximising grass growth and utilisation as this will reduce costs and boost overall profitability
- Where supplementation is required plan to avoid a 'worst case scenario' – high concentrate cost and low sale price.
- Consider creep grazing
- Alternative forages offer an option if they can be incorporated into an existing reseeding plan.



ROSCOMMON FAMILY LEADING THE WAY IN SUSTAINABLE MILK PRODUCTION



Miriam Gunn is a farm ambassador with the National Dairy Council's (NDC) Grass Roots Movement. Miriam, with her husband Michael, operates one of the 17,500 family-run dairy farms in Ireland, producing liquid milk and milk used to manufacture Kerrygold butter, cheese and other dairy products. Based at Carrowglogher, near Strokestown in Co. Roscommon, the farm is home to three generations of farmers: her father-in-law, herself, Michael, and their four children Olivia, Kieran, Diarmuid and Aidan.

Miriam and Michael live on farm with his parents Kevin and Eileen-the farm has been in the family for four generations. Michael's father Kevin started milking way back with only 3 Shorthorn cows. They now milk 180 pedigree Holstein Friesian cows in their pedigree Slievebawn Herd. Average yield is around 8,000 litres at 4.13 per cent butterfat and 3.48 per cent protein. The focus is on making the most of the grass available and top quality clamp silage to feed their hungry cows and optimise milk production from home grown forage.

The family make all their own silage and their equipment includes a Krone mower, tedder, rake and a Krone forage wagon. A major advantage is the reduction in labour and machinery requirements when using a forage wagon. With this system less people are needed to collect and clamp the silage and fewer machines are involved reducing fuel bills, wear and tear on tractors and trailers. Compaction across the sward is greatly reduced offering significant benefits in grass yield and soil health long term. With the flexibility to collect the crop at the right time, silage quality can also be enhanced.

Both Miriam and Michael are active in the IHFA West Midlands club - Miriam was a former PRO officer. The cows are milked in a modern BouMatic 32-point internal rotary parlour the first of its kind in southern Ireland. Cows are fed to yield in the parlour and this averages 1.5 tonnes/cow pa. To ensure best value they purchase their animal feed through a purchasing group. The dairy ration is stored in an 18 t McAree V-Mac split bin and augured from there to the parlour.

The family has won many awards over the years. They were finalists in the Origin Green Farmer Award and Aurivo Milk Supplier of the year both for 2018. They were also NDC and Kerrygold Quality Milk Awards finalists in 2019. The Gunns make the best use of modern technology to save time and use the latest animal data available. Heat-detection collars have been a great addition to the farm says Miriam and instead of spending time watching the cows to see when they're coming in heat, Miriam simply gets an email to alert her.

"Often, we wouldn't even have seen any sign that a cow is in heat, but the collars have picked it up and alerted us to it. It's hugely time saving as well as making everything more efficient. "I have the computer in the dairy linked up to the computer in the house so I can manage everything from there," says Miriam.

They have a new Volac urban automatic calf feeder for feeding their heifer calves and have 42 calves on it at the moment. "It has two stations and it eliminates the need to mix milk powder and carry heavy buckets of milk before filling the group

feeders. It saves us a lot of time and work," she says.

When it comes to cleaning out the cubicles, the Gunns use a Bobman which brushes down the cubicles before spraying them with lime and blowing out sawdust to bed them. "It does three jobs in one and it means we can clean and bed 140 cubicles in under 10 minutes," she says. "We also have an automatic slurry scraper, which saves us so much time."

Split calving ensures that Miriam and Michael have time off with the family over Christmas. "Calving starts the last week in October and runs until the first week in December. We start calving again in mid-January and keep going until end of April." We use sexed semen on our autumn calving heifers. The calves from cows and heifers that calve from April on go for beef. We use a Longhorn beef bull and those calves are sold on contract to Buitelaar Group who have a good market for these quality calves."

Buitelaar source their calves from approved and monitored dairy farms, assessed on their standards of early-stage calf rearing, use of genetics, health recording and calf housing choices.

Originally a beef farmer from North Longford, Miriam moved to her husband's farm when she got married in 2008. Miriam is passionate about farming in a sustainable way, and during 2023 she completed the Green cert at Mountbellew Ag College-indeed she was student of the year.

On their own farm she can point towards environmentally sustainable solutions such as low-emission slurry spreading and regular soil sampling and analysis to manage fertiliser use which positively affects greenhouse gas emissions, water quality and saves the farm money as well. New initiatives such as giving all animals a carbon hoof print, which is used in breeding programmes allow for the birth of a more emissions-efficient animal, and the space for nature scheme which shows areas on the farm designated for nature.

According to Miriam "milk production is a big commitment, but we are all involved, including the kids. They love it, which is probably one of the reasons they have an appreciation for dairy farming. There are no decisions made on our farm here that don't consider the environmental impact as a priority. Sustainability is dairy's future, and milk producers are serious about it."

Miriam is a founding member of Aurivo's women's discussion group and hopes transparency and publicity around women in agriculture, and farming in general will inspire the next generation.

HI-TECH DAIRY EQUIPMENT REVOLUTIONISES SUSTAINABLE MILK PRODUCTION INTO THE FUTURE



Roisin O'Regan at DairyMaster reports on the importance of technological advances for Ireland's dairying future.

Ireland's dairy sector has generated approximately €17.6 billion in economic value to the nation's economy in 2022, with the pasture-based system ranked as having one of the lowest carbon footprints in the world. This grazing system has found dairy herds are out on pasture for an average of 240 days per year with 95 per cent of their diet consisting of grass.

However, as a world leader in milk production, dairy farmers in Ireland are continually looking at how they can make their farms more sustainable and future proof them for the next generation. It is crucial for the dairy industry to play their part in addressing these environmental challenges and creating a future built on sustainability.

In order for the agri industry to achieve the targets set out in Ireland's Climate Action Plan, milk producers need to review their current practices on the farm and identify new opportunities that will reduce the environmental footprint and do what is right. Milk producers are becoming more aware of the challenges of climate change and are working to find better ways in which they can continue to be sustainable food producers.

The key to improving sustainable milk production is to reduce input costs and increase efficiency which can be done through the use of the latest cutting-edge technologies. This technology helps to make dairy farming more sustainable,

profitable, along with the added bonus of making it more attractive. Having adequate milking units and labour-saving technologies within the milking parlour reduces milking time, reduces labour, and provides a better work/life balance.

Research and innovation are vital in finding new ways to provide sustainable food to the world's growing population. Dairymaster has always put a strong emphasis on energy efficient products, time and labour-saving technologies and investing in sustainable solutions to future proof your farm. As these topics are becoming increasingly important, Dairymaster continues to invest in research and development to provide next generation technology and products for dairy farmers. Technology across the dairy unit has advanced significantly in recent years and has become an integral part of the management process on farm.

DairyVue360 is a complete farm management platform that records, analyses and displays milking data in one simple place. It provides the farmer with data-driven dairy insights about their herd. The DairyVue360 app allows the farmer to see milking metrics in real time such as let-down time, yield deviation, flow rates and incidence of bimodal flow. The personalised milking settings can be adjusted to optimise the milking process.

The DairyVue360 is equipped with the DM LiveVue touchscreen device that gives the farmer a picture of everything that is happening live in the parlour, from information for the cows entering or leaving the platform and status of cows currently milking, to the camera views at cups off or in the collecting yard.

Dairymaster has put a renewed focus on core milking research and development, and it now provides farmers with the ability to personalise the milking process to each individual cow in the herd. The personalised milking control comprises three different elements:

- Increased pulsation rate for the first 60 seconds of cluster attachment to stimulate milk let down.
- Dynamic pulsation rate and ratio depending on the stage of milk out.
- Variable take-off.

Together, these elements combine to promote higher average milk flow rate and shorter milking time. Peer reviewed research published by Teagasc has confirmed time savings of almost 1.5 minutes per cow per day and demonstrates that there is no negative impact on yield or milk quality.

Personalised milking has allowed for a suite of innovations that will deliver benefits to both farmers and cows in terms of increased productivity through the milking process, more detailed information about the milking of each and every cow, and better animal welfare. With the key developments having been validated in peer-reviewed journals, all farmers can be confident that the system will improve their overall milking performance.

The Swiftflo Personalised Milking system is delivered in conjunction with the DairyVue360 platform and is currently available for rotary parlours. Developments are on-going to roll it out to other parlour types so all customers can



benefit. The DairyVue360 app provides the farmer with a comprehensive herd management tool, combining detailed data for each individual cow.

Monitoring the milking of each individual cow along with their health and fertility, provides the farmer with a futuristic approach to producing high-quality sustainable milk. Improved productivity and cow health can be achieved from better management of the data received, making it a more sustainable farming practice. The farmer is now relying on technology to make more informed decisions.

The MooMonitor+ monitors cow's 24x7 for heat related activity, rumination, resting, feeding, head position and restlessness. This system can improve farm profitability by reducing labour requirements for farm personnel, improving reproductive performance and minimising losses due to missed heats, undiagnosed illnesses, and general cow health. It allows the farmer to be in control of their cows at all times, receiving notification alerts to their phone.

Feed is one of the main inputs on farm, so it is of utmost importance to use feed efficiently and effectively. Technology is used to calculate feeds based on user defined feed levels, feeding to yield, body weights or stage in lactation. Dairymaster In Parlour Feeders Feed to Yield system feeds each cow to her specific needs ensuring she can perform to the best of her ability. Feeding each cow to yield results in more milk and better performance from each cow as they are fed on their individual energy demand.

Dairymaster has smarter solutions for a sustainable farm across its wide product range, bringing smart energy efficient products to customers worldwide. Dairy farmers commitment to sustainable practices on farms is driving change within the industry, utilising new technologies to optimise their management practices, improve cow welfare, reduce energy, and improve sustainability.

Cutting-edge technology is now paving the way for dairy farmers in implementing sustainable methods to improve their farming system. Every farmer must play their part in creating a greener Ireland in reducing carbon footprint and continue to produce dairy products in the most sustainable and efficient manner.

AMMONIA EMISSIONS AND AGRICULTURE

Martin Kirk and Robert Edwards - Air Quality Technologists, CAFRE, Greenmount - provide an overview of what ammonia is, how it is produced in farming systems and identify agri practices and technologies that can be adopted to reduce emissions on farm.

Ammonia is a naturally occurring gas containing nitrogen (N) and hydrogen. It has the chemical formula NH₃. Some agri practices and activities encourage the loss of N to the environment in the form of ammonia. Ammonia emissions result from the breakdown of ureic N by the urease enzyme and it's subsequent volatilisation as ammonia.

Robert explains that based on 2021 calculations, 97 per cent of the total ammonia produced in Northern Ireland comes from agriculture. Figure 1 provides the breakdown, by sector, of agri ammonia emissions for 2021. The figures show that cattle produce 68.1 per cent of emissions, sheep 2.6 per cent with pig and poultry producing a combined 17.2 per cent. The remaining emissions come from inorganic fertiliser spreading (8.2 per cent) and land spreading of anaerobic digestate (5.9 per cent).

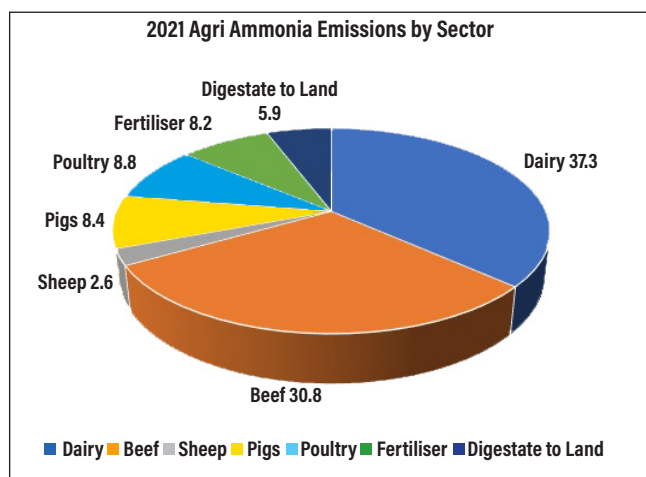


Figure 1: Breakdown of Ammonia emissions by agri sector.

In a further breakdown of these figures, Figure 2 outlines the agri ammonia emissions by activity. We can see that cattle manure management, and land application, is responsible for 74.5% of agricultural ammonia emissions whilst other livestock manure management and land applications accounted for 10.1 per cent of emissions. In comparison, emissions from livestock, whilst grazing, accounted for only 7.4 per cent of agri emissions. Application of Inorganic fertilisers accounts for the final 8 per cent.

Why is ammonia an issue?

Ammonia is an air pollutant that has significant effects on the environment. Whilst the environmental effects are significant ammonia also has an indirect impact on human health.

Robert outlines that when ammonia is produced and emitted into the atmosphere, a process known as N deposition occurs.

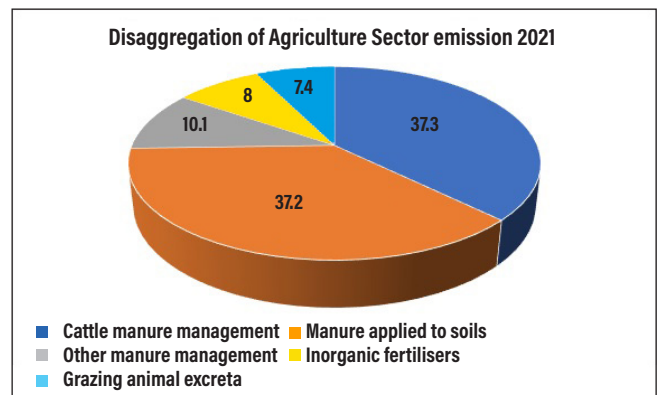


Figure 2: Ammonia emissions by agri activity.

Ammonia is dispersed and circulates as an atmospheric gas before being deposited either as a gas (dry deposition) or in rainfall (wet deposition).

When ammonia, is deposited in high concentrations, it can acidify and enrich soils and fresh waters by over supplying N. Excess N has negative effects on sensitive habitats whereby causing increased competition between plants. For example, grasses which out compete slower growing species such lichens, mosses and herbs that have lower N requirements. Over time, continued deposition of N increases the nutrient content of the soil, which subsequently alters the balance of these plant species and the diversity of insects and animals using the habitat. In addition, excess N can be lost from soils into freshwater eco-systems. This causes a process known as eutrophication, where excess nutrients cause an increase in plant growth, removing oxygen from the water and adversely affecting these ecosystems.

As part of the UN Gothenburg protocol, the British Government is committed to reducing ammonia by 16 per cent in 2030 compared to the levels of 2005. As a result of manure management and land spreading systems in the Dairy sector ammonia emissions have increased since 2011 and from 2017 have plateaued. Increased emissions in 2021 are attributed to increased manure spreading and increased application of inorganic fertilisers including urea (Air Pollutant Inventories for England, Scotland, Wales, and Northern Ireland: 2005-2021, October 2023). Recently published 2023 data from the NI Environmental Statistics Report has highlighted that 98 per cent of Northern Irelands Special Areas of Conservation (SACs), 83.3 per cent of Special Protection Areas (SPA) and 88.3 per cent of Areas of Special Scientific Interest (ASSIs) had N deposition rates exceeding their critical load with 95.7 per cent of Areas of Special Scientific Interest (ASSIs) having N deposition rates exceeding their critical load for at least one feature.



Reducing Ammonia Emissions?

Efficiently managing N on farm will reduce ammonia emissions. Robert outlines that there are various mitigation strategies that can be implemented at various stages of the farming system, to mitigate ammonia emissions.

Livestock Diets

Un-utilised, excess protein from livestock diets is excreted from the animal in faeces and urine. When faeces (which contains the enzyme urease) and urine (which contains urea) mix, ammonia is produced and released to the atmosphere. Ammonia is emitted whether the mixing of urine and faeces occurs on the floor of the livestock shed or during slurry storage. Balancing protein intake to the requirement of the animal will minimise excess N being excreted. A reduction of 1 per cent crude protein content in ruminant diets can reduce NH₃ emissions by 5-15 per cent.

Livestock Housing Management and Manure Storage

Scraping Management - Peak ammonia emission rates from soiled floors occur between two and six hours after slurry and urine deposition. A regular scraping interval, of between one and two hours, can achieve ammonia reductions of up to 20 per cent.

Flooring - Low emission floor types are available that will help reduce pooling of urine by funnelling it into deeper grooves or slurry tanks. This also aids with keeping manure and urine separate to a greater degree. There are products and designs to suit many circumstances. Options include, solid concrete or rubber, improved slat designs and retrofit options. The best improved floor designs, in conjunction with toothed scrapers, can achieve ammonia emission reductions in the region of 40-50 per cent.



Figure 3: Tension covered slurry store at CAFRE, Greenmount Campus.

Slurry Covers - Covers on outdoor slurry stores (above ground slurry stores or lagoons) effectively reduce ammonia emissions. This is achieved by placing a barrier between the stored slurry surface and air movement, reducing emissions. Various types of covers are available, with one of the most effective systems being an impermeable tensioned fixed cover (Figure 3) offering an emissions reduction of 80 per cent. This option has the potential to increase effective storage by keeping rainwater out of the tank.

Fertiliser and slurry application

Fertiliser - Introducing protected fertiliser products, treated with urease inhibitors, slows the conversion of urea in the soil to ammonium, increasing the time plants have to absorb the fertiliser. This means more N remains available to the plant rather than being volatilised and lost as ammonia. Protected urea therefore matches the agronomic performance of calcium ammonium nitrate.

LESSE - Robert explains the traditional slurry spreading practice, using a splash plate, is susceptible to losses of up to 80 per cent of the N content of the slurry to the atmosphere. Low Emission Slurry Spreading Equipment (LESSE) reduces the surface area of the spread slurry and depending on the option used, can deposit it directly on or in the soil so grass acts as a barrier between the slurry and air movement. Ammonia emissions are reduced as a result and valuable N retained by the crop it was intended for. The four main types of slurry application offer varying levels of ammonia reduction: trailing hose (30 per cent reduction), trailing shoe (60 per cent reduction) shallow injection (70 per cent reduction) and deep injection (90 per cent).



The Grazing Benefits

Grazing offers a few benefits for ammonia reductions. Grazing cuts out the need to manage, store and spread manure. If we look back at Figure 2, these contribute to a huge piece of the ammonia pie. Urine, when excreted by grazing animals, infiltrates the soil quickly, so the action of urease is minimised; meaning lower ammonia emissions when livestock are at grass. AFBI have calculated that a total confinement dairy system has an increase in ammonia emissions, per litre of milk, of over 30 per cent compared to a traditional system where the cows graze during the summer months.

In Conclusion

Northern Ireland livestock farmers are facing increasing pressures to reduce ammonia emissions from their farming enterprises. With the use of technologies and enhanced manure management practices the agri-sector can reduce ammonia losses from farm to the atmosphere. Reducing N losses from farms will bring benefits to both the farm business and the environment.

THE POTENTIAL OF PLANTAIN FOR DAIRY FARMS

Dr Conor Holohan - Senior Grassland Scientist, Agri-Food & Biosciences Institute, Hillsborough, Northern Ireland - discusses latest research into the ability of plantain to maintain or improve farm productivity whilst delivering improved environmental outcomes - something which will become clearer as the research progresses over the coming year.



Dr Conor Holohan

There's an old saying 'the only constant in life is change,' something which farmers are all too familiar with. Challenges like weather, input costs, market prices, and regulations mean the goalposts never seem to stay in the same spot for long. Grasslands are seen as one of our greatest strengths and may hold the key to adapting to some of these challenges now and in the future.

The last decade has seen renewed interest in alternative plant species that could complement our traditional perennial ryegrass-based swards. One such species, traditionally considered a weed to many a greenkeeper and groundsman, is the herb known as plantain. Research emerging from New Zealand in recent years suggests that plantain could have promising benefits when it comes to improving the environmental footprint of dairy farms. However, as is often the case, there may be some challenges to consider. Here we look at some of the potential pros and cons of plantain and whether it might feature in your paddock reseeding mix in the future.

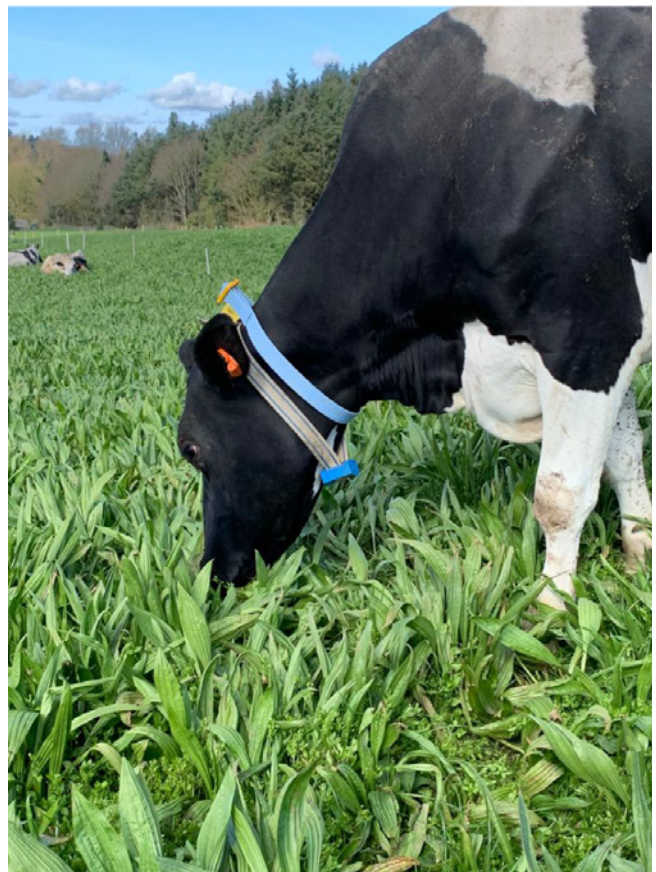
What is Plantain?

Most of us will recognise it as the weed often seen growing in lawns or along roadsides around the country. Plantain (*Plantago lanceolata*) is a leafy herb with a fibrous root system that is in fact highly palatable to animals. Herbs such as plantain have long been recognised for their high mineral content and health-boosting chemical compounds, and now with the help of modern plant breeding methods, new and more productive varieties have been developed to suit grazing systems. There are typically two ways to utilise plantain in grazing swards: as a pasture mix usually with ryegrass and clover or as a stand-alone crop.

Why the interest in plantain?

In response to water quality and greenhouse gas emissions targets, researchers are seeking to find practical and impactful solutions which can be easily implemented on farms. Research emerging from the southern hemisphere in recent years has shed light on plantain as a possible solution to reducing the environmental footprint of dairy farms and boosting pasture supply in summer dry periods. Plantain can also be managed on a similar rotation length to perennial ryegrass and has similar nitrogen (N) fertiliser requirements. Here are some of the key benefits highlighted in the research so far:

- 1. Reducing nitrate leaching:** N loss from farms is a concern for water quality, and in dairy grazing systems the largest



Picture 1. Dairy cows grazing a perennial ryegrass/plantain sward at AFBI Hillsborough

contributor to nitrate leaching is the surplus of dietary N in grass relative to the cows' nutritional requirements. The majority of excess N is excreted in urine and is more susceptible to leaching compared to N in faeces. Experiments in New Zealand have shown that the inclusion of plantain in the diet results in cows urinating more frequently, having a lower concentration of N in their urine, and better overall N use efficiency. According to a two-year farmlet study at Massey University nitrate leaching was reduced by between 20% and 60% from pastures containing 30-50% plantain. The extent of the reduction however depends on soil, climate, and farm system. There are also suggestions that plantain may help to retain N in the soil for longer, allowing plants more time to utilise it,



Picture 2. Indoor feeding study with cows fed zero-grazed sward treatments to assess methane emissions and nitrogen use efficiency.

however the exact mechanisms of this are not yet clear.

2. Drought resistance and climate resilience: Plantain has a higher heat and drought tolerance than perennial ryegrass and when managed well (0-25% stem) can retain its nutritional value and productivity during prolonged dry spells. This could play a role in boosting mid-season pasture supply, particularly if summer droughts become a more regular feature in the future.

3. Soil health and biodiversity: The deep root system of plantain can play a role in enhancing soil health by alleviating soil compaction, improving water infiltration, and promoting nutrient cycling. Plantain's nectar-rich blooms can also provide a source of food to a diverse range of beneficial insects, including pollinators and natural predators of common pests.

Considerations and Challenges

While the potential benefits of plantain are significant, it is not yet fully understood how well these will translate in an Irish context. A number of practical challenges have been highlighted in New Zealand such as establishing and maintaining target levels of plantain in swards, limited herbicide options for weed control, and occasional palatability issues when plant N status is low or when advanced seed heads become hardened.

Probably the most notable consideration with plantain is its

longevity. It typically lasts 2-3 years in dairy grazing paddocks, with plant numbers declining during this time. Research suggests that the total cow diet needs to contain around 30% plantain to significantly reduce nitrate leaching, so swards will likely need to contain more than this when meal feeding is factored into the overall diet. Achieving this is certainly possible but requires high plant establishment rates at reseedling and careful management to avoid treading damage, especially on heavier clay soils. Oversowing may be an option to help maintain plantain levels, however results appear to be mixed thus far.

Looking to the Future

A number of new research programmes are currently underway at AFBI, Teagasc, and UCD to examine the potential of plantain for dairy farms in Ireland and Britain. These include N balance experiments where feed, urine, faeces, and milk are simultaneously collected and analysed, as well as studies measuring gaseous emissions, and grazing experiments evaluating cow and pasture performance. Together these will help determine the environmental benefit of feeding plantain and give us an indication of the feasibility of using plantain in grazing swards. Ultimately, the key to its uptake in the future will likely depend on the ability of plantain to maintain or improve farm productivity whilst delivering improved environmental outcomes - something which will become clearer as the research progresses over the coming year.

WHAT VARIETIES ARE IN YOUR MULTI-SPECIES SWARD?

Choosing a multi-species sward mixture that contains grass, clover and herb varieties suitable to your farm is key to a productive and persistent mixture, says Thomas Moloney of DLF Seeds Ltd.



The interest in multi-species swards has been growing steadily over the last number of years with dairy, beef and sheep farmers reaping the wide range of benefits these diverse swards bring. Fertiliser savings is still the main reason for sowing multi-species swards but as time passes, we are seeing many more benefits like better seasonal growth, drought tolerance and impressive animal performance improvements compared to grass swards.

Multi-species swards have been well supported by DAFM in recent years and the MSS Measure* is available to farmers again in 2024. This measure is worth up to €300/ha so make sure you get your application in before the May 15th deadline.

Multi-species swards are mixtures of grasses, clover and herbs with much of their benefits arising from complementary interactions between the species in the mixture. For example, clovers fixing N to drive growth and deep-rooting herbs boosting summer forage production. But like any forage mixture the varieties of each species selected is important. We know from the Pasture Profit Index for perennial ryegrass that varieties possess very different traits to each other that determine how they are used on farm. This is also the case for clovers and herbs like chicory and plantain. If we don't carefully choose the varieties that make up our mixtures, then the mixtures will not perform to their full potential leading to poor growth and shorter persistence.

The DLF 6-Species Herbal Ley mixture includes top-rated grasses for utilisation, quality and spring growth that ensure a consistent supply of forage through the growing season. The mixture also contains Pastor, a grazing type of red clover unique in Ireland.

Pastor red clover has a much lower growth habit with extensive shoot production allowing it to tolerate grazing better than the traditional upright varieties of red clover used for cutting. Pastor is quick to establish with good disease tolerance.

The varieties of chicory and plantain in your multi-species mixture will affect the performance and persistence of the sward.

Information on the different varieties of herbs available on the Irish market can be difficult to find, and in most cases, farmers will take what they are given assuming all chicory and plantain is the same – this is not the case however! There are different varieties being used in multi-species mixtures here and like grass varieties they all have different characteristics.

Take chicory for example. It is seen as the least persistent component of a multi-species sward but different varieties

have different lifespans. Biennial varieties like Choice are most productive and persistent lasting at least 2 years. There are a lot of annual varieties, primarily used for salad production in other European countries, being used in Irish multi-species mixtures.

Using these varieties in forage mixtures is not recommended as they will not survive under grazing for more than a year. There are also variety differences in plantain with the species classified as either winter-active or winter-dormant. In our farm systems we want to use winter-active types like Ecotain, so we are not penalised with poor growth in early spring.

We are hearing more and more reports from farmers of varying levels of persistence between different multi-species mixtures – mainly because of the varieties being used.

Ecotain Environmental Plantain

There is a lot of research being carried out around the world investigating the potential of plantain in grassland mixtures. One of the most exciting developments is the effect that varieties like Ecotain can have on our production systems. Not only can Ecotain boost forage yield and quality throughout the year, but it can also reduce nitrate leaching from grassland



soils to waterways by up to 90% in some cases. This has been repeatedly shown by New Zealand trials and there are very promising trials nearing completion here in Ireland.

To date, controlling the N in waterways has been difficult and reducing the rate of N fertiliser application has been seen as the most practical solution. Managing N better in Ireland is going to be a major issue going forward, and Ecotain provides a practical solution for farmers.

Nitrogen Management with the Power of 4

Ecotain combines not one, but four modes of action that work together to significantly reduce N leaching from the urine patch.

1. DILUTE

Ecotain environmental plantain has diuretic properties which increases urine volume and therefore decreases urinary N concentration. Animals urinate more frequently which spreads the urine patch across a greater area. In addition, Ecotain generally has a higher water content than ryegrass – which also increases the volume of urine the animals produce and further dilutes the N content.

2. REDUCE

Typically, the more N contained in the feed, the more N is present in the urine and is recycled back into the soil via urine. However, Ecotain is different in that it reduces the total amount of dietary N being excreted in the urine, compared to ryegrass diets. Studies show that at equal N intake, Ecotain diets will result in less total N released in urine compared to ryegrass diets.

3. DELAY

Urine patches from animals represent up to 90% of the N lost through leaching in the grazing system. The amount of N in a typical urine patch far exceeds what plants can uptake. Using Ecotain, the N excreted in urine becomes slow release – its conversion from ammonium to nitrate is delayed, allowing plants a longer period to uptake N which therefore reduces the risk of N leaching.

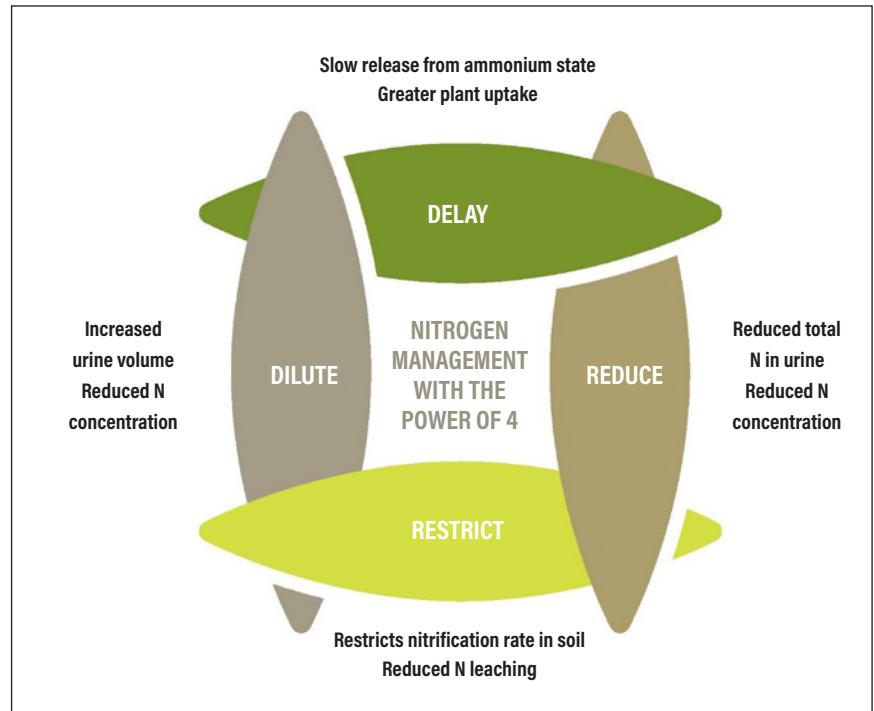
4. RESTRICT

The amount of N in a typical urine patch far exceeds what plants can uptake.

Using Ecotain, the N excreted in urine becomes slow release – its conversion from ammonium to nitrate is delayed, allowing plants a longer period to uptake N which therefore reduces the risk of N leaching.

* Research work carried out on multi-species swards has shown positive

results around low N fertiliser use, which will have a beneficial impact on nitrous oxide emissions. Other benefits arising from this Measure include improved biodiversity, greater tolerance to drought conditions and reduced anthelmintic requirements due to the presence of chicory and plantain.



THE POTENTIAL OF RED CLOVER IN SILAGE

Dr Nicky Byrne and Dr Peter Doyle - Teagasc, Grange Animal & Grassland Research and Innovation Centre, Dunsany, Co. Meath - examine the use of red clover in swards to offer benefits to ruminant production systems.



Dr Nicky Byrne. Dr Peter Doyle.



Forage legumes, such as red clover (RC), can contribute substantially to organic, low-input and conventional animal production systems due to their ability to fix atmospheric nitrogen (N), thus reducing the reliance on chemical N fertiliser. Through RC's biological N fixation ability and its capacity to support higher animal performance improved farm gate N-balance can be expected. Given the high cost of fertiliser and feed, and increasing environmental constraints, incorporating RC into swards can offer significant benefits to ruminant production systems. Despite the many benefits of RC inclusion, it has had limited uptake on pasture-based production systems in Ireland. The poor on-farm uptake of RC is likely due to its more complex management requirements, unsuitability to frequent grazing, reduced persistence (approx. 3-4 years), and the relatively low cost of chemical N fertiliser in the previous years.

Nitrogen fixation

Red clover swards have the ability to fix high levels of atmospheric N, making it available to plants in the soil. Swards with a high content of RC - 75% on a dry matter (DM) basis - are capable of fixing 24-36 kg N/tonne DM produced, so such swards are potentially fixing in excess of 200 kg N/ha annually. At Teagasc Grange, RC-grass swards receiving no chemical N were found to

have similar annual DM production to grass-only swards receiving up to 412 kg N/ha per year in plot studies. The application of chemical N fertiliser to RC-grass swards has antagonistic effects, reducing the proportion of RC in the sward, annual DM production and persistence.

Agronomy

Unlike for perennial ryegrass and white clover varieties, no 'Recommended List' currently exists for RC varieties in Ireland, with Irish producers relying on information from the British Recommended/ National List to identify suitable varieties. The breeding goals for RC varieties suited to Irish farm systems are for improved dry matter (DM) production and persistence. Red clover varieties differ in their DM production potential and persistence under frequent cutting, with newer varieties offering improved persistence through better DM yield stability and plant survival over multiple harvest years.

Red clover should be grown in rotation with a standard grass or grass and white clover sward, allowing for a minimum four-year break to control diseases such as stem eelworm and Sclerotinia fungus (clover rot). This four-year break can be achieved by sowing RC with perennial ryegrass and white clover, with both of these species remaining productive beyond the lifespan of RC.

Research by Teagasc at Grange has shown that the inclusion of perennial ryegrass with RC at sowing will improve annual herbage production, silage digestibility and ensilability. Red clover should be incorporated into swards on soils that are well-drained and have a pH ranging from 6.5 to 7. Typically, sowing rates of between 7.5 to 10 kg/ha (3 to 4 kg/ac) of RC in addition to 20 to 22 kg/ha (8 to 9 kg/ac) of perennial ryegrass are recommended depending on the quality of the seedbed and season.

Reseeding in spring rather than in autumn provides a better opportunity to optimise pre- and post-sowing management and overall establishment. Unlike white clover which has a stoloniferous growth habit, RC typically has a deep taproot, an erect growth habit, with larger shoots and a lower shoot density. Stems are formed from the growing points located on the crown at the top of the taproot. Reserves of carbohydrates and N are stored in the crown and taproot, where they are remobilised to fuel regrowth after defoliation.

The crown/growing point of RC is solitary and exposed, making it vulnerable to physical damage by machinery and animals. This means that RC is less suitable to frequent and intensive grazing. Consequently, it is established more often as a silage crop, with infrequent cuts (6-8 weeks), in order to minimise

damage to the crown and allow the canopy to intercept sunlight to replenish carbohydrate reserves. Red clover swards generally persist for 3-4 years under a multi-cut system, although well-managed swards can persist somewhat longer.

Agronomically, RC is best suited to a three-cut silage system, with the first-cut harvested by mid-late May, which promotes higher clover proportions and DM production for the remainder of the growing season. Figure 2 illustrates the changes in RC percentage in silage swards on a DM basis at Teagasc Grange during 2022.

This sward was managed under a three-cut system receiving zero chemical N. The RC content increased markedly after harvesting first-cut silage in May and declined after the third-cut harvest in September, due to reducing sunshine hour's length and temperatures. Increasing the defoliation frequency beyond three-cuts can reduce RC content and its contribution to DM production due to insufficient replenishment of plant reserves, and thus persistence.

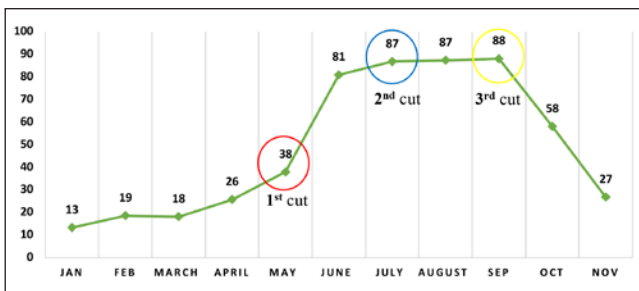


Figure 2. Red clover % on a DM basis in RC-grass silage swards at Teagasc Grange 2022.

'Late' autumn silage harvests can also be difficult to ensile, due to the reduced opportunity to wilt grass coupled with the high buffering capacity of RC-grass silage, and generally have a relatively low yield making it difficult to justify economically. To increase DM concentration to 25-35%, RC-grass silage generally requires wilting in dry conditions for 24-to-48 hours, while ensuring that the leaf is not damaged (shattered) as a result of over-wilting and excessive machinery passes, including tedding and raking. Red clover also has a lower water soluble carbohydrate (sugar) concentration further reducing its ensilability. Therefore, the inclusion of grasses which are higher in sugars than RC as a companion species will improve the overall ensilability of RC-grass silage.

Feed value

Beef and dairy cattle offered RC-grass silage generally have a higher DM intake when compared to those offered grass silage. Red clover contains a greater ratio of indigestible fibre: digestible fibre than grass silage (0.27 vs. 0.19, respectively). While the extent of digestion is reduced for RC- grass silage when compared with grass silage, the rate of digestion of the digestible fibre is faster.

This facilitates a faster rate of passage, lower rumen fill and thus increased DM intake. Red clover has a higher concentration of crude protein (N) compared to grass. Consequently, as the proportion of RC reduces relative to grass in silage swards, there is a corresponding reduction in silage crude protein concentration. Additionally, RC-grass



silages have proportionately more rumen undegraded protein than grass silage, which is of greater nutritional benefit to cattle. Through a combination of increased DMI and increased levels of rumen undegraded protein, animals consuming RC silage can achieve increased levels of performance.

Teagasc Grange Study

A moderate average daily gain (ADG) of 0.6 kg/day is targeted for dairy-beef weanlings during their first winter indoors. Deviations from this target can influence animal growth when returned to pasture. A study was designed to determine the intake, growth, and subsequent compensatory growth at pasture of dairy-beef steers offered either perennial ryegrass (grass-only) or perennial ryegrass plus red clover (RC-grass) silages during their first winter indoors.

Second-cut RC silage swards had a clover content of 87% and received no chemical N, while grass silage was harvested from a perennial ryegrass monoculture receiving conventional chemical N fertilizer (200 kg N/ha annually). Both silages were offered ad-libitum, plus 1.5 kg of concentrate per head/day. Steers fed RC-grass silages showed higher DMI and ADG by 1.4 kg and 0.12 kg, respectively, compared to grass-only silages, despite RC-grass silage being 9% lower in digestibility.

At the end of the first winter indoors, steers fed RC-grass silage were 9 kg heavier but showed no difference by the end of the second grazing season, meaning full compensatory growth was achieved by steers fed grass-only silage. Although RC-grass silage was grown with fewer inputs and resulted in higher animal performance over the winter, its inclusion resulted in lower feed conversion efficiency as it increased residual feed intake by 0.29 kg DM/day. Thus, the economic efficiency of this additional gain needs to be examined further. The high DMI characteristic and ADG of RC-grass silage suggest that concentrate could be eliminated or reduced for dairy-beef cattle over this first winter indoors while maintaining a moderate growth of 0.6 kg/day.

Conclusion

The inclusion of RC into grass silage swards has great potential across Irish ruminant production systems of all intensities. These swards have an enhanced ability over grass-only silage swards to maintain high levels of herbage production and animal performance from significantly lower levels of chemical N fertiliser. Red clover-grass silage swards can reduce the cost of producing winter feed but is dependent on a high level of management to ensure swards remain productive over multiple harvest years. The use of RC when combined with a range of other managements can 'future-proof' ruminant systems by reducing the level of N imported onto farms while maintaining animal productivity.

MANAGING CLOVER ON THE GRAZING PLATFORM

James Humphreys and Daniel Barrett, Teagasc, discuss progress in productivity in clover-based swards.



Red clover silage.

Over that last 25 years we have been steadily improving the productivity of clover-based swards through improved soil fertility, newer blends of varieties in seed mixtures and better grassland management practices. We have developed a profitable system of milk production based on clover swards receiving no fertilizer N that substantially lowers greenhouse gas emissions.

The science underpinning this is that each application of fertilizer N releases a small amount of nitrous oxide into the atmosphere. Nitrous oxide is a greenhouse gas with 265 times the global warming potential of carbon dioxide. Very small losses of nitrous oxide have a disproportionately large impact on the carbon footprint of a dairy farm. Clover makes N available in the soil through the biological fixation of N (BFN) that generates no losses of nitrous oxide.

There has been a ratcheting of restrictions on stocking rates and on fertilizer N use in recent years. At Solohead next year we are restricted to an overall stocking rate of 2.39 cows per ha. It is more profitable to carry this stocking rate without fertilizer N. When managing clover swards the aim is to maintain a high content of clover in the sward. We grow close to 15 t pasture DM per ha per year on the grazing platform without fertilizer N. Around one third is clover or 5 t DM per ha. Every tonne of clover DM grown will supply 50 kg per ha of BFN in the soil. Hence, 5 t clover DM will supply 250 kg per ha of BFN per year. These swards have the same carrying capacity as ryegrass swards receiving fertilizer N input of 280 kg per ha because BFN is used more efficiently (there are less losses) by the sward than fertilizer N.

High yields of clover are necessary for high rates of BFN and high rates of BFN are key to high grassland productivity. Fertilizer N is particularly damaging to clover because it increases the ryegrass to the detriment of the clover. The lower the fertilizer N input the more productive the clover will be. There is a one for one increase in BFN for each unit reduction in fertilizer N input to clover-rich swards.

Even where we apply no fertilizer N, very high rates of BFN over a number of years can also be detrimental to clover content. This can be rectified by taking off a cut of silage; a typical 5 or 6 t DM crop of first cut silage will remove between 150 and 200 kg per ha of N from the soil. This puts the balance back in favour of

the clover. It is good practice to integrate a cut of silage (baled surpluses) into the grazing rotation.

White clover is particularly vulnerable to competition from grass over the winter. A low winter cover allows light down to the clover at the base of the sward and favours survival over the winter. Better survival means more clover in spring and more BFN in the following year.

Perennial ryegrass varieties that facilitate tight grazing (five stars on the utilization index) are a good fit with white clover. Astonenergy is a good example. Hybrid ryegrasses work well with clover because they are very open during the winter and have excellent spring growth. The higher spring growth compensates for a low winter cover.

Since 2018 we have been including red clover in our grazing seed mixtures and it is persisting far better than we expected. It increases BFN and productivity. The varieties include Milvus, Aberclaret and Aberchianti. A typical grazing mixture used at Solohead contains 3 kg diploid perennial ryegrass, 3 kg tetraploid perennial ryegrass, 3 kg hybrid ryegrass, 2 kg red clover and 2 kg white clover per acre pack.

Red clover and hybrid ryegrasses tend to be stemmier during the summer and autumn; bringing more fibre into the sward, which lowers the risk of bloat. Red clover and hybrid ryegrass contents of swards decline over time. However, the perennial ryegrass and white clover components have more than enough capacity to fill out any vacant spaces in the sward. If not, over-sowing white clover seed is more successful in these open swards.

Fixation of N is a biological process that requires a near-neutral soil pH. For this reason we maintain all the paddocks at Solohead at a soil pH of between 6.5 and 7.0 by the application of ground limestone. Clover is less competitive for soil K than ryegrass. Therefore, to ensure that the clover is getting enough K from the soil it is necessary (i) to maintain soil K levels at high index three (around 150 ppm) or (ii) ensure a regular supply of K to the sward during the growing season; particularly to paddocks with low soil K. We attribute the exceptionally good persistence of red clover under grazing at Solohead to high soil K availability.



Post emergence dock control is important to avoid long term problems with docks.

Clover can substantially lower overall fertilizer costs on farms, which improves overall farm profitability. The less fertilizer N that is used the better. On the other hand, it is counterproductive to skimp on lime and fertilizer K.

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