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GRASSROOTS

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Farmers are one step closer to breeding more climate-friendly cows

First year of methane research shows promising results

New research has confirmed bulls' genetics play a role in how much methane they emit, highlighting the potential for farmers to breed low methane-emitting cows in the future. The welcome news comes following the first year of a research programme run by major New Zealand artificial breeding companies LIC and CRV.

The research, funded by the New Zealand Agricultural Greenhouse Gas Research Centre (NZAGRC), measures methane emissions from the burps of young bulls set to father the next generation of New Zealand's dairy cows.

Results from year one, where the feed intake and methane emissions from 281 bulls were measured, found there is genetic variation in the amount of methane emitted after accounting for the feed eaten by the bulls, with the lowest bulls emitting around 15-20% less methane than the average.

LIC Chief Scientist Richard Spelman says these results are a big step forward for the research.

"The amount of methane a bull or cow produces directly relates to the amount of food it eats - generally speaking the more an animal eats, the more methane it will emit.

"But after accounting for differences in the bulls' feed intake, we're still seeing genetic variation in their methane emissions, proving genetics do play a role. We have a sliding scale from bulls that are low-methane emitters (less than 18g of methane/kg of dry matter eaten) to bulls that are on the higher end (more than 28g of methane/kg of dry matter eaten). This is the variation we were wanting to see and we're excited to use it to our advantage."

Although the research is in the early stages, Spelman says the results show promise to help farmers meet environmental challenges.

"This methane research is a long-term project but it has the potential to make a real difference to farmers in the future by providing another tool to reduce their farm emissions.

"New Zealand farmers are striving to meet the challenge of being profitable and sustainable, and research like this will help ensure reducing a farm's emissions doesn't have to come at the cost of reducing its milk production."

CRV Grass-Fed Genetics Manager Peter van Elzakker says "it's pleasing to see that the first-year results of our trial align with the company's methane trial work with Wageningen University in the Netherlands."

"The findings in New Zealand are a significant step forward in our work to develop tools to help New Zealand dairy farmers reduce their emissions. They give all of us even more confidence genetics can be part of the solution."

Harry Clark, Director of the NZAGRC, is equally pleased with these early results.

"Breeding represents a long-term and cumulative way that farmers can reduce their greenhouse gas emissions. Low-methane selection is now available to sheep breeders and the signs are positive that we might be able to deliver the same for the dairy sector," he says.

Richard Spelman says the next step in the research is to see if the genetic variation responsible for methane emissions in growing young bulls is replicated in their daughters.

"This year, in partnership with Pāmu, we will breed from bulls that we've identified to be high or low methane emitters. After their daughters are born, we'll measure their emissions as growing yearlings and during their first milking season to ensure they're representative of their fathers. This is where the rubber will really hit the road in our aim to offer farmers a low-methane breeding solution."

Pāmu Chief Executive, Mark Leslie, says "Pāmu and Focus Genetics have an important role to play bridging the gap between science and commercialisation for the benefit of industry. We are pleased to see such positive results from the first year of this trial. It is vitally important that the agri-sector continues to move forward on emission reduction initiatives, and this trial is an exciting further step.

"This trial fits well alongside the dairy beef Progeny Trial at Renown Farm and the Informing New Zealand Beef (INZB) Progeny Trial at Kepler, which rely on our longstanding partnerships across industry, plus the progress we have made developing breeding values for methane efficiency in our sheep programmes."

The second year of the research is now underway with methane emissions being measured from approximately 300 young bulls from LIC and CRV's 2022 Sire Proving Scheme.

LIC collaboration drives Cogent's market share

Super excited about the opportunities that the distribution agreement with LIC offers to UK farmers, Cogent managing director Stuart Boothman says it's a key part of a long-term strategy. He believes the new offering to professional, progressive and sustainable producers is beyond parallel in the marketplace.

Today Cogent is a business employing more than 200 people covering the whole of the UK, with a separate international arm that covers 45 additional countries.

Total straw sales top 2.3 million and the company has doubled in size – both in terms of turnover and staff numbers, since 2017.

Keen to stress that this is a long-term contractual agreement, Stuart says now, having such a good offering to grassland farmers, puts in place the 'final piece of the Cogent jigsaw'.

"Now we have a package that'll suit any customer, dairy or beef," he says. "The synergies between the two companies are really good, with each party bringing something different to the mix."

The new relationship is also appealing to LIC Europe's general manager, Mark Ryder, who points out that relationships like this are key to our success outside of NZ. As a global leader in grassland genetics, our significant investment in NZ relies on relationships like this to ensure we can extend the value that our NZ farmer shareholders enjoy to farmers with similar focus' around the globe.

With origins dating back to 1909, when the first organised routine milk recording service commenced, LIC has had a long history of providing world-leading innovations for the dairy industry. This commitment to research and development and new product development continues with LIC's strategy to deliver innovation led growth and closely aligns with Cogent's strategy and vision.

"Between the two companies we have an offering beyond compare," says Mark. "We can offer our superior grassland genetics to a broader audience, and Cogent can offer their beef programme to our existing customers. It's business as normal, the same members that used to make up the LIC team will work with their existing, and potentially some new, customers.

Stuart emphasises the opportunities offered by Cogent's highly successful beef programme describing it as a key addition to the LIC offering, and to the addition of top New Zealand dairy genetics for grassland farmers as a benefit to the Cogent team.

"We allocate one salesperson to each customer so each farmer only gets one person calling up their drive," he explains.

"It won't be difficult to tweak this in the future should we need to."

The new partnership got underway about two years ago when it was announced that Cogent would be working alongside LIC on storage and distribution. Long before this there had been various agreements between the businesses on the production of sexed semen.

Today sexed semen accounts for 46% of Cogent's UK sales, with 4% coming from dairy conventional and 50% from beef on dairy semen. Growth in sexed semen has been phenomenal worldwide.

"Looking ahead, genomics offers us a huge opportunity to drive genetic gain on farm and improve the efficiency of our base cows. But to do this we have to ensure only the best are put to sexed dairy, so breeding the best replacements.

"In the next tier, the fertile cows need to go to sexed beef sires, and the bottom tier to conventional beef."

Finally he adds that he's been working on this agreement for some time, and reiterates that this move forms a key part of Cogent's strategy going forward.

"This certainly isn't a tick box exercise, it's a deliberate move. And one I am super excited about."

Excitement that is shared by LIC, Ryder confirms this is a long-term measure and LIC will continue to work among the 5 million cows in NZ to maximise herd improvement and through the Cogent relationship, will make the outputs available to more UK farmers.

Identifying your best performers to fast-track genetic gain

North Otago farmer, Francois Tillard, is among hundreds of farmers who have signed up for LIC's female genotyping service to identify their best heifer calves long before they step up to the milking platform.

When selecting the right bulls for its Sire Proving Scheme, LIC has, for the past decade or so, used DNA information to complement ancestry information – making for more accurate decisions on which young bull progeny should best-serve the industry in future.

But now the same leading-edge genomic technology is being offered to farmers who are interested in knowing who their best heifer calves are likely to be, long before the young stock steps up to the milking platform.

Knowing the DNA make-up of young progeny, including how key traits are shaping up, provides improved reliability of the young animals' breeding values, together with an opportunity to breed from the best animals earlier (to breed the next generation of replacements at a younger age).

Farmers using the technology can utilise the same tissue sample sent to LIC for DNA parentage testing.

North Otago farmer, Francois Tillard, is among hundreds of farmers who have signed up for the female genotyping service:

"For years it's been all very well to access the best bulls through genetics suppliers like LIC, and they produce very good outcomes," Francois said.

"But what we as farmers control are the cows, and we just want to look after that side of the genetic equation. I want to create the very best cow I can on farm, and I'll do that through the breeding choices I make... I'll do that by looking at the traits I want my cows to express the most."

Francois is a system 5 farmer whose crossbred cows weigh between 500-520kg and produce an average of 650kg milksolids a year. He wants to breed a better cow, taking that average up to 700kg milksolids a year, without adding to the average liveweight of the cows.

"We started by getting rid of our bottom cows," says Francois. "Our next step has been nominating a bull for every cow, using Customate Plus. Once we've done that, we go in with genotyping and embryo transfer, and when you're down that path there's a fair bit of money involved, so you want to put all chance on your side to only get your above-average performers."

Francois exclusively uses AB replacement semen to mate the top-50% of his 800-strong, split-calving, herd.

The new genotyping service helps him to make more secure decisions about what cows and yearlings should be used for breeding.

To form an overall picture for final decisions, Francois says he still relies on cow-family information, which he rates as highly as the genotype information.

"I have a really good daughter of a cow, 1066... all her daughters have been really good, she's been amazing.

"She's had a heifer and the genotyping is looking really good; that heifer has gone straight away into our ET programme before she has even been mated, because I know she's going to be fine... there's no way her progeny will be under performers.

"There are about 400 cows we don't keep progeny from. In the autumn and spring, we produce 100 embryos from ET activity, so usually 40-50 of those cows will be carrying embryos. Remaining non-replacement stock are mated to beef or short gestation dairy (final 10 days of AB)."

In terms of what he wants from his replacements, Francois says he's ruthless: "I want a cow that looks perfect, if there's any suspicion about cows that are under two years old, they get culled in the autumn."

Francois chases strong udders, strong capacity, and high fat and protein breeding values.

PROFIT, PRODUCTIVITY AND NPK

Listen to our latest webinar with world renowned eco-soil scientist Dr Christine Jones. Offering an accessible and inspiring perspective to the pressing worldwide challenge of restoring topsoil, her talk attracted a lot of UK and Irish farmers keen to look at the whole issue of regenerative agriculture.

Below are some of the key points of her presentation, but go to **https://youtu.be/l_yYMjVKMrM** to listen to it all.

- Nature's default setting is diversity for a good reason.
- In our efforts to simplify and streamline our farming systems for mass food production we've largely ignored this.
- Growing monocultures was not conducive to diversity in soil microbes and has led to us using more and more chemicals and artificial fertilisers to support crop health and growth.
- Artificial fertilisers have a further negative impact on soil microbe populations – so as soil microbes disappear, plant health and productivity flounders.
- Soil microbes are nature's way of converting soil minerals and nutrients into a form that can be utilised by our grazing swards and crops.
- Via photosynthesis, plants draw carbon dioxide (CO_2) down into the soil and (should) deliver carbon-based exudates to attract microbes to their roots.
- The microbes (should) use this carbon exudate as fuel to grow and proliferate and in return process vital nutrients, making them available for the plant to take up.
- Inorganic fertilisers are in a more available form therefore feed the plant directly – blocking the natural symbiotic relationship between plant and microbes.

Record graduation rate a testament to genomics

Twenty-seven young bulls join LIC's Premier Sires teams in time for peak mating. The 2018-born bulls secured their spot in the team after their superior performance predicted by genomics was validated by herd testing data from their first crop of daughters, now being milked on farms across the country.

Simon Worth, LIC's Livestock Selection Manager, says the co-op's continued investment into genomic science is helping to drive profitability on farm by identifying elite artificial breeding sires at a young age.

"With genomics we combine a bull's DNA and ancestry information to get a more reliable prediction of its performance at a young age. We've been investing and refining the use of genomics in our breeding programme for decades, and this year's graduation rate is a testament that this cutting-edge science is delivering results and predicting star performers with accuracy."

Simon says this time of year is always a highlight for his team who are responsible for LIC's breeding scheme; from the contract matings through to selecting young bulls to join the co-op's Sire Proving Scheme.

"It's a phenomenal graduation rate, there's no doubt about it. We're really pleased that these selected graduating bulls were sired by 17 different bulls so in addition to turbo-charging the genetic merit of our Premier Sires teams, they're also ensuring genetic diversity.

He says being selected for a Premier Sires bull team is no easy feat.

"The bar is set extremely high, and rightly so. When we select our bulls, it's first and foremost about how they rank on Breeding Worth (BW). If they tick that box, we then assess them for a range of other traits farmers are looking for in their cows.

"The addition of these bulls is based on extreme indexes, and a balance of production efficiency, udder conformation and management traits that help farmers breed better cows."

Using elite bulls to sire the next generation of replacements is an important tool to help farmers tackle climate challenges.

"Breeding the best cows, faster is key to helping farmers remain profitable and sustainable. A strong focus on herd improvement and consistent use of high-BW bull teams will deliver results on-farm by breeding cows that produce more and are more emissions efficient."

He says not only did this year's Spring bull graduates break an LIC record, they also made an impact on the industry's Ranking of Active Sires (RAS) list, which ranks bulls from all breeding companies according to their Breeding Worth.

Of the top-30 bulls across all breeds*, eight are the co-op's new spring bulls with one of the new graduates occupying the number one spot – KiwiCross bull Gordons Flash-Gordon.

Dairy herds across the country will be using these genetically superior young bulls for mating now through LIC's range of Premier Sires bull teams.

"The beauty of our fresh semen service means we can select a bull to join a team one day and his genetics can arrive on-farm the next day for insemination, so we can deliver that genetic improvement on-farm almost immediately for farmers to capitalise on."

*data as at 9 December Animal Evaluation run

- Inorganic fertilisers are like a 'drug' that we should be weaning ourselves off to allow this relationship to re-establish, and soil microbes to flourish and feed plants naturally.
- To kick start this process we have options – plant diversity is an excellent one.
- Not only does each plant family have its own ideal growing conditions, leaf and root architecture, it also attracts a unique group of microbes.
- Diverse swards (at least 4 plant families) dramatically increase the diversity of soil microbe populations. It's critical that no inorganic fertiliser or chemical is used at any point as seeds come with their own microbiome.
- Diverse swards perform as well as fertilised monocultures in terms of dry matter grown, and also have greater tolerance to drought, flooding and pest resistance.
- The diversity of soil microbes allows nutrients to be 'shared' with neighbouring plants that might be struggling.
- The diversity of soil microbes also increases soil carbon which improves both the water retention and water infiltration through improved soil structure.
- These are the reasons why the multitude of plants in unmanaged spaces always look so healthy... diversity of plant and soil microbes are supporting the whole system.
- Until we can get plant diversity fully established, we can support our plants and soil microbes by offering organic forms of fertiliser and bio stimulants.

The IBB programme and 'The Forwards' bulls.

The Irish Bull Breeding (IBB) programme is going from strength to strength. Starting off in 2020 we now have some of our stalwarts sitting high up on the ranks.

Both Moorehill Max & Bopuru Bro have been widely used over the last two seasons. With Max getting his second crop of daughters this coming spring and Bro excitingly getting his first crop on the ground.

Max is still sitting high on the active bull list with a current gBW of 428/52. An F12 with a good blend of milk and fertility. Max has good fat and protein percentages of 5% and 4%. He has strong udders and good capacity.

While Bro, the full NZ Friesian pedigree bull is sitting at a massive gBW of 411/53 and has a good balance of milk and fertility. Fat of 5.3% and protein of 4%, with liveweight of only 539kg he's an ideal Friesian to increase milk solids and fertility on farm. The daughters of his sire, Cairo were well liked by UK farmers.

So how does the IBB process work?

It begins by screening calves born on a weekly basis throughout February & March. From here, over 400 calves were selected to be genotyped for Economic Breeding Index (EBI). Based on these EBIs around 60 calves were selected. These calves get ear notched so we can get a wet tissue sample, which allows us to produce a gBW on the 60 bull calves.

Once the gBW's come back, we drop the number down to 15 calves. From these, all the dams are inspected and TOP scored. This removes dams with poor udders, feet or conformation traits. Following on from this we make our final selection of calves for our annual intake.

Once selected these bulls head across to the UK where they are stationed at Cogent's collection centre in Cheshire.

The bulls are collected here dependent on semen requirements with straws processed into the industry leading sexed product, UltraPlus which offers 3% higher conceptions rates than the previous industry leading technology SexedUltra4M. The bulls are also collected in conventional semen and spend their time in a state-of-the-art unit designed to give them the best care possible.

These bulls are set apart by not only their figures but their origins and it is important we recognise that. The IBB programme has built a foundation around the best NZ cross bred genetics available in Ireland. These cows are proven in Irish conditions and this is a key feature of these bulls with the Irish climate very similar to what we see in the UK, just with a little more rainfall. This means farmers can have confidence that these bulls will work in a UK system perfectly and offer genetic diversity through the selection on offer. Whether you want, Friesian, Crossbred or Jersey there is something for everyone in the IBB line-up.

Showcasing the best of BW and SCI for the UK grazing market

The December 2022 AHDB proof run has seen our LIC bull, Diggs Hardcopy climb the ranks to number 3 on the SCI index. He, along with the bulls we market from New Zealand are daughter proven bulls. Their proof reliability of 80%+ gives comfort that the movement in the bull traits will not shift dramatically. These bulls have been around long enough to have daughters milking and still hold high ranking positions in the indexes. Now is the time to use them on your herd.

Our sexed Jersey bull offering is strong, the sires bring high milk solids while simultaneously lowering liveweight and by using them sexed, surplus bull calves need not be considered.

The first cross animals from a Friesian Jersey cross F8/J8 are well liked by farmers and you will gain some hybrid vigour to help boost production, fertility and conformation in the progeny.

Diggs Hardcopy

Great bull made up of F10/J6 he is a Sovereign son with a strong gBW of 487/89 and is number 3 on the Spring Calving Index (SCI) at £533. His liveweight of 507 kg produces 5.5% fat and 4.2% protein along with positive milk and strong fertility at 9.3.

He will bring capacity without height to the cows and desirable udders, he is A2A2 with a short gestation length of -7.7, and suitable for heifers with his easy calving credentials.

A great addition to any herd with his daughter proven rankings in both BW and SCI.

Glanton Desi Banff

Banff is a J16 bull with a good number of daughters in his proof, his gBW of 516/97 and SCI of £458 make him a good choice for crossing Friesian cows.

His fat at 6.7% and protein at 4.8% with good fertility and liveweight at 483 kgs. Banff is well liked by farmers, he has strong management traits, daughters will easily adapt to milking and will be fast milkers with placid shed temperaments.

He has capacity however smaller in stature so will help to bring the size down in your cows.

Tironui Superman

Superman is a J16 bull with his gBW at 452/97 and his SCI at £430. With fat at 6% and protein at 4.8%, he brings some real milksolids to the herd.

Another good all-rounder with capacity, a liveweight of 460kg, good udders and solid management traits. He is a good addition to any herd.

Greenmile Tomahawk

Tomahawk is an F12/J4 bull bringing plenty of milk and good fat and protein at 4.8% and 4%, he is a daughter proven bull out of Glen Koru Ethos. His gBW is 390/83 and his SCI is £417.

If you are looking for BW or SCI this bull has both, he is fine to use on heifers or cows and delivers desirable management traits and strong udders. His liveweight at 510 kgs and low stature will help to reduce size.

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Three herds run as one on a low-input system in Cumbria

"I'm looking all around me at what future challenges we are going to face. We need to adapt new challenges early, to be early adopters, to stay at the top of our game. It takes time to make changes and adapt."

Wise words from James Tweedie who farms at South Dyke on the outskirts of Penrith, Cumbria, in partnership with his parents Gordon and Margaret.

The farm is nearly all grass, with a 120ha grazing platform for the milkers, and a 100ha support block for silage and youngstock. Some 7ha-8ha of fodder beet is grown for half the herd who are outwintered.

The family has been using LIC genetics for more than 30 years, and father Gordon was one of the first in the area to start grazing 'early on' and was ahead with the concept in his area.

Perhaps the most unusual aspect to the farm is the fact that, with 380 milking cows, there are three different breeds, but they're all run as the same unit. Currently there are about 140 pure Jerseys, 200 pure Friesians and 40 Friesian x Jersey cows.

"One of our plans is to level up on numbers so we have roughly the same number of each breed," explains James, "so that's led to us using more sexed semen and changing some of our breeding policies."

Because of this, much of the herd are currently young animals in 1st and 2nd lactation as they move away from what was a more Friesian orientated herd.

"We're shifting a bit with the long-term aim to have 1/3,1/3 and 1/3 in terms of breeds. We're only breeding from our top genetic cows and our aim is to keep the cows in the herd for 5 or 6 lactations. That'll cut down on costs and give us more flexibility.

James has nothing but praise for LIC's herd improvement tool, something he's been using for the past two years. "I have started to see the cows in a different light, and this has helped immensely with what and how we breed moving forwards."

Giving an example, he looked at the figures for an older Friesian cow weighing 600kgs who was giving 540kgs/milk solids but eating more to get to that level. A comparison with a 425kgs Jersey giving 630kgs/milk solids soon showed him which was the most efficient.

"Weighing the cows once a year takes about 2.5 hours and when fed into our milk recording figures gives us invaluable results through this tool. We've started to realise the difference between the most and least efficient cows. And it's not always where you expect it to be.

"Historically we did have a lot of information, but we weren't taking it all into account. Now we have the evidence that it's not necessarily the highest yielders that are the most efficient."

It has led James to be much more selective in terms of what cows and cow families he uses to breed his replacements from. "I think it takes the emotion out of it. We're all tempted to keep one or two cows that don't get into calf first time around, but for us that is wrong. We want high fertility and will only breed from cows that take first time. That keeps our calving block tight."

One of the new aims is to breed lighter

weight cows. A few years ago, the average weight for the herd would have been around 500kgs with some of the Friesians quite a bit heavier. Today it is closer to 480kgs, and the aim is to reduce it further to 450kgs.

"In our grass-based system we are quite low input. In an average year we'd feed below 500kgs concentrates/cow and the bigger animals would obviously be eating more.

"We're lucky that here in Cumbria we're on dry, high land and can graze from early February to mid-November. Last year the cows were out until November 22. The aim is to graze between 280 and 300 days, depending on the weather, and to take a maximum of two cuts of silage from the support block and the grazing platform when we have excess growth."

The paddock-based system means grass is measured weekly and with 12-hour breaks there is a lot of work around

regularly moving the electric fences. The paddock size varies, anything from 1ha to 7ha, and with stone walls around the edge of some, James says the farm is a 'real patchwork'.

A spring calving herd, February is a very busy month with all 380 cows calved down inside a nine week block. Any that fall outside this are culled or sold. Fertility has been a key trait the farm has looked for, and the results speak for themselves with their six week calving rate at 75% in 2019 and 92% in 2020.

"Our overall aim is to have a high genetic herd within the UK context and so we need to be ruthless. Other key parts of our breeding policy are improved efficiency and, as I have said, lower liveweights."

A few years back the empty rate was between 10% and 12%, by 2022 it had halved to 6%. "We can't afford to be sentimental, we want to increase our use of sexed semen and that means we need cows that get in calf to first service."

Production figures do vary depending on the breed. The pure Friesians average 6000 litres at 4.7% fat and 3.8% protein. The Jerseys do 4400 litres at 6.4% fat and 4.5% protein. The Jersey x Friesians are at 5000+litres with 5.3% fat and 4.1% protein.

About 60 bull calves are reared as stock bulls each year, and the family have built up quite a reputation with grazing farms across the UK for their young stock. Surplus heifer calves are kept on the support block and sold as in-calf heifers, providing valuable cash flow.

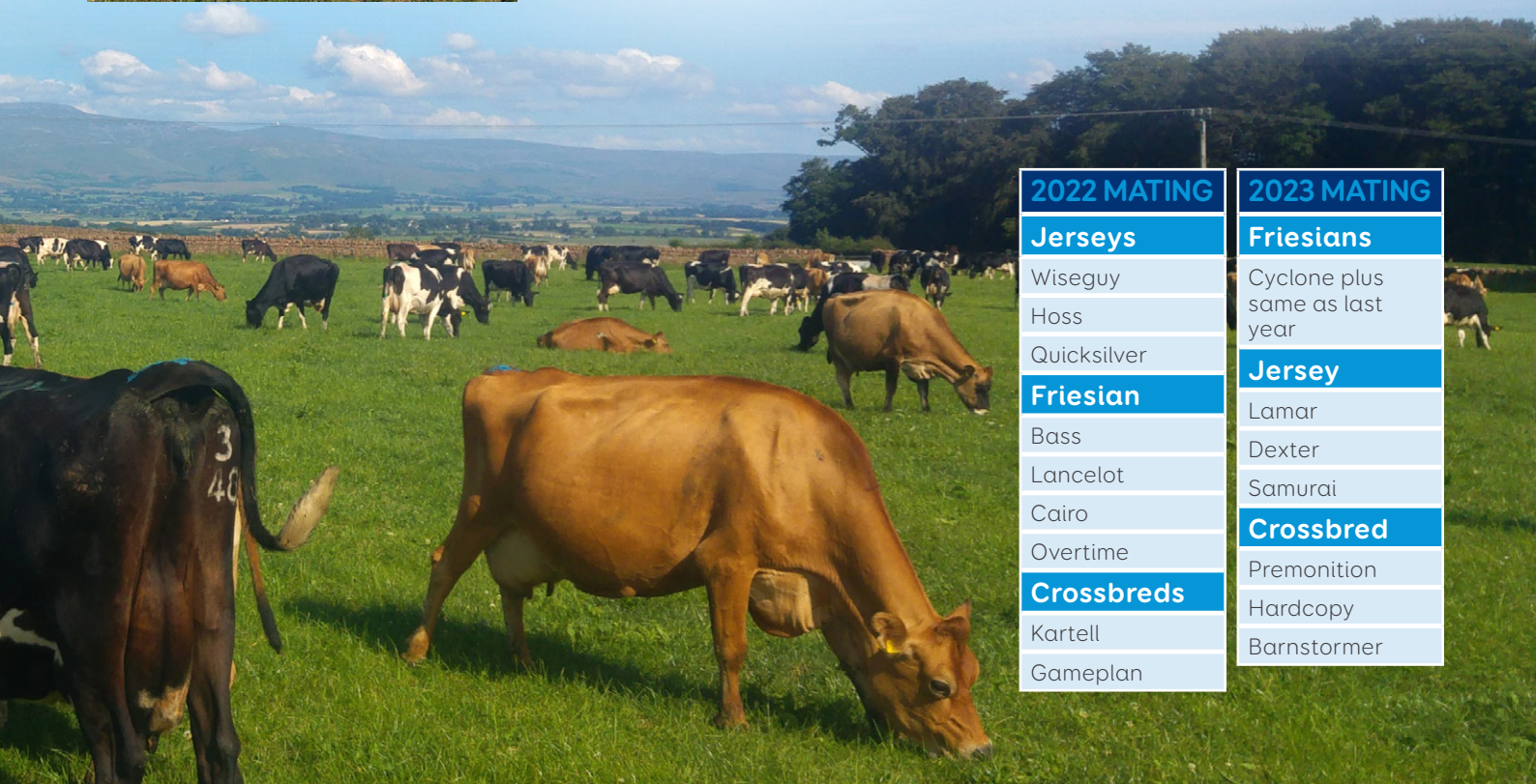
Looking ahead James says he is very confident in the future, and believes he is farming in exciting times. "We do face

some huge challenges, but the pace of progress (ie: genetics) is exciting and we're totally committed to breeding a really good herd of cows and seeing how far we can take them. We also have to engage with the public better.

"Having a grass-based system ticks all the boxes for sustainability and we need to engage more with the public. I am concerned about rising costs, but that's why it's so important we only breed from the most efficient cows.

"My advice would be to keep your system simple, make sure you're running a low input system, look at reducing N by incorporating more white clover in your swards and look at multi-species leys.

"I believe we've got exciting times ahead."



2022 MATING
Jerseys
Wiseguy
Hoss
Quicksilver
Friesian
Bass
Lancelot
Cairo
Overtime
Crossbreds
Kartell
Gameplan

2023 MATING
Friesians
Cyclone plus same as last year
Jersey
Lamar
Dexter
Samurai
Crossbred
Premonition
Hardcopy
Barnstormer

Align Clareview cows enjoying a deferred diverse sward

Pasture to Profit consultant Bess Jowsey writes about her recent trip to New Zealand

"I returned from a lengthy stay in my homeland of New Zealand after a four-year Covid induced hiatus. This article is a commentary of my observations and conversations of and about the dairy industry with various farmers and industry partners on my travels.

"On the face of it, nothing much has changed. There are still a lot of cows. They're outdoors grazing in large herds, everywhere. There were a few sheeted plastic cow housing barns around which I had not seen in past visits. But, after 14 years within the dairy industry in the UK and Ireland, my main lasting impression of most NZ dairy farms is still a comparatively tiny cluster of concrete, steelwork and small tin buildings for a vast number of milking cows, and sand coloured cow tracks disappearing into the distance.

While in the North Island, I attended Day 1 of the four-day NZ Fieldays (the largest agricultural show in the southern hemisphere). It was held in early summer for the first time (due to Covid lockdowns) and the word on the street was that farmers would be too busy to attend at this time of year. As it turned out the predictions were right. Blamed on the timing and some unseasonably shabby weather, attendance was about 65% of the 120,000+ visitors that typically come through the gates. On the plus side for me, I managed to get around all the parts of the vast site that I wanted to see, including a visit to the LIC stand where I caught up with a cheeky chap that some of you may remember!

Two other stands also stuck in my mind.

The first was a quiet area dedicated to the health of NZ farmers. The Hauora Taiwhenua Health & Wellbeing Hub offered free health checks. Basic blood pressure, blood sugar levels and skin cancer spot checks through to confidential mental health support. It provided an easy opportunity for farming families to take the time to look after the number one asset on the farm – its people.

The second was in the Innovation building, where I investigated a prototype system that pumps sea water with

excessive nutrient levels through a series of troughs containing seaweed. The seaweed uses photosynthesis and the nutrient to grow rapidly, providing a valuable renewable product for stock feed or a soil conditioner. The now 'cleaned' sea water can then be pumped back into the harbour.

I got a strong sense that, similar to the UK, there is a lot of interest in regenerative farming, and whether it can provide some solutions for the ever-increasing regulation on environmental outcomes. While I was mostly home for a holiday, I also did visit some farms.

My main motivation was to visit farmers who had embedded regenerative practises into their production systems, have scale (500+ cows) and would be prepared to share their profitability compared to their own previous performance and current regional performance. This proved to be extremely interesting for me. Visiting farms in the Waikato, Canterbury and Otago they had varying levels of irrigation, varying terrain and varying motivations behind their decisions to use regenerative practises.

Miah Smiths OAD regeneratively managed herd

Miah and Jenny Smith farm in the Central North Island turned to these alternative approaches when their 'by the book' 20+ years of NZ dairy farming experience wasn't working on the ex-forestry thin, degraded volcanic soils. A reluctant visit to a talk by soil ecologist Dr Christine Jones forced them to question their methods, and gradually they've adopted a system that's now working physically, environmentally, socially and most importantly delivering financially.

Kiri Roberts manages Clareview Farm for the Align Farms group in mid-Canterbury. Align Clareview entered into its own regenerative farming study in 2019 due to a lack of research in this space for Canterbury farmers. Half the farm/herd is managed regeneratively, and the other half conventionally, so they're able to draw direct comparisons on all aspects of the physical and financial performance of the business. They chose to fund this internally, deliberately avoiding involvement with industry partners who may seek to influence the farm to suit their own agenda. They felt it would be a more independent farmer-led study on the viability of this type of farming to offer other farmers in their region some guidance... even if it was what NOT to do. Align Clareview share all of their comparative results on their website, and provide some excellent commentary alongside to give further explanation (both good and bad) for these results. See Regenerative Study - Align Farms (https://alignfarms.co.nz/regenerative-study)

The farms I visited were in general, success stories. I did hear of examples where farmers adopted regenerative agriculture and things went horribly wrong. As I only heard these second-hand I'm unable to provide further comment, but what I think it demonstrates is the need for further research and clarity in the New Zealand context. With the greenhouse gas emissions, freshwater farm plans, community expectations and international consumer preferences all challenging conventional farming systems, it's possible that regenerative farming may be part of the solution.

To this end, two multi-million-dollar collaborative research projects were launched while I was in NZ, both aiming to bring some scientific verification to regenerative farming and how aspects of this can assist farmers to progress into the future.

One of the biggest talking points among the farming community was the proposed 2025 greenhouse gas emission charges. The responses when I asked their opinions varied greatly.

Thankfully the NZ government has recognised that biogenic methane should not be categorised the same as other greenhouse gases, due to a lower long-term impact than is often portrayed in the media. The proposed GHG charges reflect this. Many questioned 'why bother' when NZ contributes less than 0.2% of the worlds global GHG emissions[1] - it's never going to make a difference.

With over 50% of this tiny amount produced by agriculture and its related processing[1], in the eyes of the NZ community, farmers need to be looking for solutions to address this in order to reach its climate related commitments.

If not already, the main reason why NZ farmers should get on board is because their international customers expect it of them. Climate change and carbon footprints are at the top of their priority list, therefore, to remain a preferred producer and a leader in low carbon food production they need to continue to seek solutions for improvement.

Around 75% of NZ agricultural GHG emissions are methane from livestock[1].

Bess with Mike Bailey; ex-UK Pasture to Profit consultant on LIC stand at NZ Fieldays

There is currently a whole raft of technologies in development targeting to reduce methane at a farm level. These include genetics, low emission feeds/crops including GM ryegrass, feed additives, direct-fed microbials, methane inhibitors and even a methane vaccine. Many of these technologies are being developed internationally as well, however these may not be as applicable for the NZ pasture-based production systems.

In conclusion I have every confidence that NZ dairy farmers will remain the innovative and forward- thinking community that has allowed them to prosper over the years; provided they stick to their knitting... which is cows and grass (with maybe a few tweaks).

[1] New Zealand's Greenhouse Gas Inventory 1990 - 2020; published Apr 2022

Boundary between dairy and forestry - near Taupo

What does Walford's breeding plan hold for their future performance?

The 2022/23 season has seen the first LIC-bred heifers entering the herd from the original Holstein cows. With the farm moving to a milk contract with Joseph Heler Cheese this season, the hope is that these heifers will help lift the milk fat and protein percentages to take full advantage of the contract. So, what can be expected from these heifers and others to come? Sean Chubb reports.

The heifers that entered the herd this year are from Beaut, Hammer, Kelsbells and Sierra. These bulls were picked to meet the requirements set by Walford college of keeping a black and white herd. In the second autumn mating season, this requirement was lifted and the bulls used were Integrity, Gameplan and Kelsbells. The heifers from these bulls will be entering the herd next year.

These bulls were used to meet the long-term mating goals for the farm. The aim is to achieve an average liveweight of around 550kg producing 1 to 1.1kg of milk solids to liveweight, or around 600kgMS. With the Holsteins averaging around 680kg of liveweight and average milk solid production being 532kgMS, there was a need for movement in both directions to achieve this goal.

The need for a reduction in the liveweight was greater than what the average liveweight suggests, as the cows had not met their genetic potential for liveweight because of poor rearing. This has resulted in the first LIC-bred heifers entering the herd likely to reach a mature liveweight of around 650kg.

As liveweight is very heritable, the herd will see a faster movement in this trait compared to milk solid production. For this reason, it's important that the farm undertakes regular weighing of the cows and heifers to ensure that the liveweight doesn't drop below the target.

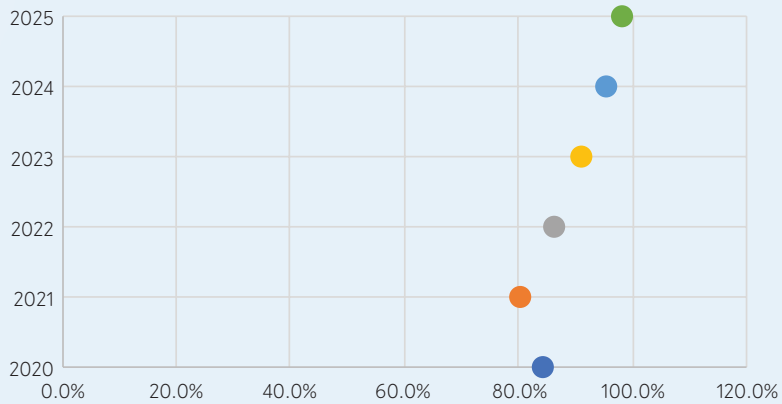
The farm currently weighs the calves at birth and at regular intervals through to calving, Now the herd is all within the autumn block, the plan is to weigh the cows on a yearly basis. These weighing events will give the farm greater insight into herd liveweight and where it is heading, and enable the breeding to change in time to stop the liveweight of heifers dropping below the targeted mature liveweight.

So, what can be expected from the coming heifers? Given all the changes that have happened on farm over the last three years, and the limited information that can be obtained around the original herd before the monitor farm started, we are limited in our predictions.

The below graphs show what could be expected from the herd through selectively breeding from the top performing cows and culling from the bottom.

The herd should outperform these predictions as crossbred cows have been purchased to bring cow numbers up to the ideal level faster, and these figures do not account for hybrid vigour that will be obtained through the use of Jersey and KiwiCross® bulls.

Year	Fat %	Fat KG	Protein %	Protein KG	MS	MS%	Vol per cow
Cows 2020 #134 cows	4.02%	291	3.31%	241	532	7.25%	7,335
Cows 2021 #91 cows	3.98%	275	3.33%	231	506	7.27%	6,957
Bottom 10% (10)= of the 2021 cows	3.82%	215	3.30%	186	401	7.04%	5697
Difference	**-0.16%**	**-60**	**-0.03%**	**-45**	**-105**	**-0.23%**	**-1260**
Herd after bottom 10% to beef	4.00%	283	3.33%	235	518	7.28%	7112
Average Bull Team BV 3 years		**39**		**18**			



With the changing of milk contracts to Heler's, and being paid for fat and protein, it's important to capture the maximum increases in the fat and protein where possible. The Heler's contract offers a base price for litres and bonuses for every percent of fat and protein.

Working on last year's level of fat and protein (4% fat and 3.3% protein), 210 cows doing an average of 8000l would see the farm earning £746,762 from milk sales. Through improving the fat and protein levels up to 4.5% and 3.8%, while keeping cow numbers and average production the same, the farm would see their revenue increase to £804,720.

The increase in fat and protein would also offset any loss in milk volume, through having levels at 4.5% and 3.8% respectively, the volume of milk would need to drop below an average of 7400 litres per cow before the revenue is less than £746,762.

So, what can be done to ensure that the farm is maximising the increase in fat, protein and milk production?

Firstly, the farm needs to be selectively breeding to make the most of the bulls that are being used. Up until now this hasn't been an option, as the transition to an autumn block meant that heifers had to be taken from cows that made up the original herd. But now that the farm is nearing full numbers and not every heifer calf needs to be kept, this can be done.

The need for selective breeding has been highlighted with the introduction of the first LIC-bred heifer. These heifers have shown a large variation in their production and level of fat and protein. So far this year, the heifers are averaging 23.3 litres with a range of 16.3 to 31.7 litres, the fat is averaging 5.13% with a range of 3.58% to 6.70% and the protein is averaging 3.76% with a range of 3.32% to 4.49%.

Selective breeding will still see a range within the heifers for their litres, fat and protein, but there should be higher averages and the range will be lower.

Culling the bottom performing cows also needs to be undertaken, but this can only be achieved through obtaining good mating results.

The mating results have been steadily improving since the monitor farm process started. This has been achieved through focusing on the eight principals of mating success. These being: genetics, calf and heifer management, calving pattern, body condition score and nutrition, cow health, heat detection, AI practices and bull management. These improvements are now allowing for greater culling pressure on the bottom end of the herd.

The other benefit of improving the mating performance is that the average age of the herd will increase.

When the monitor farm process started, the average number of lactations was 2.3, resulting in very few cows reaching their third and fourth lactation – when a cow hits her peak milk production. With the herd growth slowing, the number of replacements needing to be kept is set to decrease, this will help increase the average number of lactations in the herd.

The last three and half years has been about building the foundations within the herd and on farm, now the farm is set to take advantage of this through maximising the income from the new milk contract.

If you're interested in how the farm progresses over the next couple of years with the introduction of the LIC-bred heifers, please join us at our future farm open days.

MARCH 29

The next OPEN DAY at Walford College is going to be on March 29.

The topics will be:

- Was preferential feeding of light heifers worth it?
- The performance of the first LIC breed heifers
- Replacing maize with fodder beet

Dry weather
Walford

Growth curves and the changing climate

Pasture to Profit consultant Piers Badnell questions whether we need to review growth curves in light of climate change

"Have your growth curves changed? If they have, then is this compromising efficiency and profit potential?

A key driver of profit in a grass and forage-based dairy system is the cost of production. Reduce this and it should help drive profit. Relationships supporting this are maximising grass as a percentage of the diet (David Beca – GrassRoots Issue 4) and increasing grass utilisation per hectare (as seen by Teagasc work in Ireland – https://www.teagasc.ie/crops/grassland/grass10).

The reason for this is, the more grazed grass a cow eats, the more you save on purchased feed, forage costs, power and machinery plus labour. Additionally, she spreads her own manure, so saving on labour, power and machinery. These savings really ramp up if over 50% of her diet is grazed grass.

The standard grass growth curve we've worked with historically supports a profitable spring and autumn grass-based system when we have the correct stocking rate for our individual farm growth curve.

If you manage your average cover well through the season, then a spring calving demand of 40-50kg DM/ha/day and an autumn calving demand of 50-60 kg DM/ha/day suits most farm circumstances and the historic growth curves have matched demand.

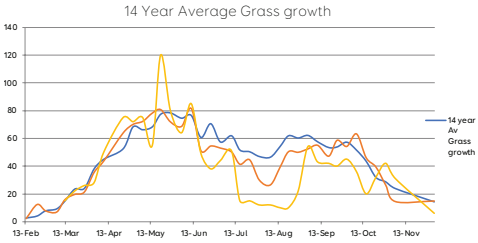
But what if growth curves are changing? Most of the country, with exception of Scotland and Northern England, has just come through 2022 with another severe drought similar to that experienced in 2018. At the end of 2018, many who were old enough likened it to 1976, and thought "Well that was 40 years ago and so we shouldn't have another of those in my working life", but then 2022 came along.

Now we must consider that the historical growth curve is an average line and averages can hide a multitude of sins in the range.

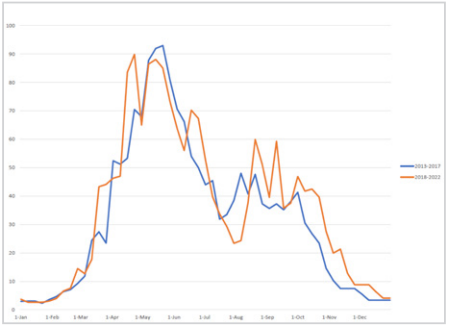
You may be thinking I'm adding 1 and 1 and making 11 here, but high autumn growth drove high average covers from a very mild and 'growy' autumn in 2022, with growth rates all around my area of Southern England 20-30kg DM/ha/day by the end of November where traditionally those growth rates would be 0-10kg DM/ha/day. This got me thinking, are our growth curves changing?

The following are two examples, the first from Lydney Park in Gloucestershire.

The graph shows the last five-year average growth in red, and the previous 14 years in blue. Both follow each other until early June, when the red line is well below the blue, until mid-September. Historically Lydney Park has had good growth through the autumn, but certainly the red line is above the blue in early autumn.

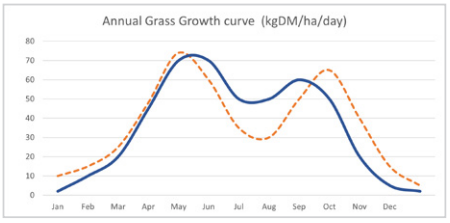


Another example is from the Mundays farm near Crediton , Devon.



This shows a deeper drop in summer, but higher growth from early September all through the autumn.

I've looked at a number of businesses' average growth curves for the past five years compared to the previous five, and the following graphic is generally what I've seen. The full line is traditional, the dotted line the past five years. Again, beware of averages as they can hide a lot.



Am I saying all your growth curves are radically different? No, but I am saying it may be worth you considering that the dotted line could be the new normal as climate change looks here to stay.

What are the potential consequences of this change?

When we have strong autumn growth and very high covers, spring utilisation will suffer especially in a wet spring, because very heavy covers shade the base and slows regrowth, potentially causing a feed shortage approaching balance day.

Do we need a second balance day approach in early autumn where we drive average cover low to take account of autumn/winter growth? This could be the case in autumn calving situations where demand is low in early September and achieved by taking silage cuts.

Instead of raising covers in the spring calving herds in August, as traditionally done, should we leave this until September? Or do we devise ways to graze longer into the autumn with autumn and spring calvers.

I hear two cries now - one being what about getting autumn cows in calf? Well, I know of autumn herds who graze certainly for the first three weeks of service with no detrimental effects

on fertility. The key here is consistency. If it's an awful day the cows still go out, but not for so long.

For example, on a wet day for two hours and on dry days end of milking to lunch time. This will be in the region of 5-6kg DM grass per cow. This is 5kg DM less silage needed, and grazing is higher quality with grass at 20%-30% crude protein. Autumn herds feeding maize in the diet can feed lower protein concentrate.

The second almost deafening cry I hear is "My ground is too wet they'll trash the paddocks". The answer to this is that it won't work for all businesses, but it will for more than you would think. How do I justify my comment?

Firstly, track and gate infrastructure and lateral thinking of how you use them. Second, as seen this last autumn after a dry summer, land that's heavy and non-grazeable once wet (I do concede some farms are like this). Due to such dry conditions in the summer, this land has not filled up with water yet as I write in mid-December, and as such is travelable!

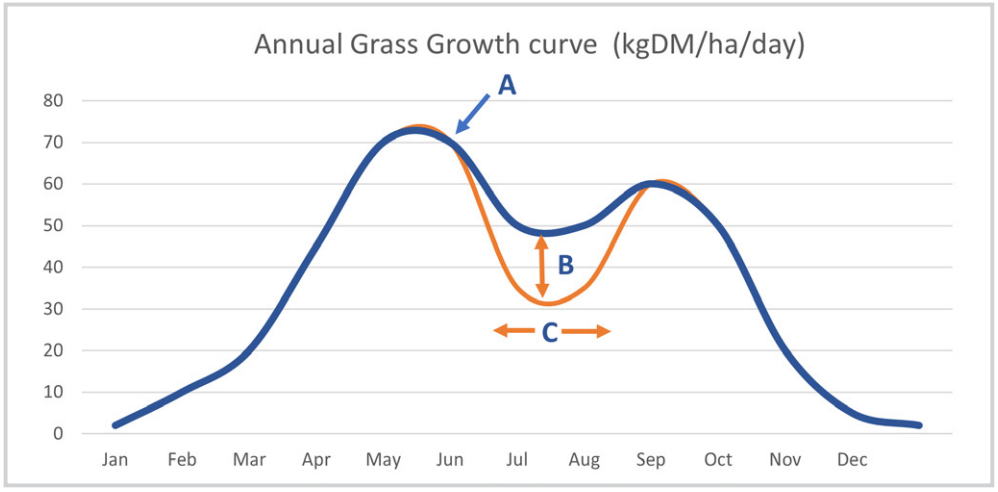
One member of a group from the Blackmore Vale in Dorset at a meeting in November mentioned that where he would struggle to get cows on normally, he could now drive over with his Land Rover.

Historically, the end of November target for average cover has been 2100/2200kg DM/ha, however if these very mild autumns are now the new normal, maybe we need to review this. My reason for saying this is that when we have mild winters and daily grass growth is an average of say 5kg DM; there are 60 days from the end of November to 1 February, which means around 300kg DM growth is added to closing covers.

In a wet spring, there is the potential for very poor utilisation, plus knock on effects into the second round, and then we're coming up to mating for spring calvers.

Perhaps the last round should be shorter to give a flatter wedge so that the top covers are not beyond 3000kg DM, which could be very difficult to utilise in a wet spring.

Taking another look at the following graphic, it seems sometime in mid-June growth drops more quickly and deeper (see point B) so look at soil moisture, grass growth, weather and growth potential. Make decisions; do you need to feed supplement? Then perhaps go early with a little, then it's easy to increase if needed, or pull out if it rains, small early actions keep grass ahead of cows longer.



If grass production and growth drops, then the stocking rate needs reviewing unless we can do something about it. Can we arrest this drop in growth (A) above, and shorten (C) the time period so we're supplementing for less time?

Point (B) is when we should be assessing our position. Has it been dry, what's my average cover like, what's the forecast like, is it forecast to be dry and hot? If so, act early and feed the wedge. Start supplementing early to maintain average cover. Those that went early with supplements did come out of the dry better in feed availability and cow body condition.

Options to arrest the drop

- Introduce supplements early – feed the wedge, as some did successfully this year
- Reseeds do have better persistency in the dry
- Slow the round, early graze at full third leaf
- Review grass species mix, cocksfoot has deeper roots and grows at lower temperatures and is dry tolerant. Festuloliums which are a cross between fescue and ryegrass also have higher tolerance to the dry
- Plenty of work coming out of Ireland on grass clover swards
- 6-8 species – PRG, cocksfoot/Timothy, white clover, red clover, chicory & plantain, see Teagasc 2018 Johnstown work
- Six-species sward – 12.5t DM/ha.
- Ryegrass 300kg of N – 11.2t DM/ha.
- Ryegrass 150kg of N – 9.4t DM/ha.

Stocking rate may need to be reviewed, which doesn't mean a definite change, but a review on the risk and circumstances.

Does this matter? Yes, I think this potential change matters a lot. When growth is below demand we must feed, be that a little concentrate in a small deficit, or concentrate, silage and palm kernel in big deficits for example. This reduces grass in the diet and raises costs because of purchased feed, power and machinery and labour.

Raising costs will have a negative impact on your profit, remember the relationship between cost of production and profit mentioned at the beginning. But to add to this work, from AHDB's Milkbench, when you add 1p/litre to your cost of feed this impacts the total cost of production by 1.3 to 1.6p/litre. This has also been seen in work around the world.

Due to the war in Ukraine, and bounce back post Covid, input costs are high and the milk price is potentially under pressure. We need to make sure we don't get caught in a situation that's hard to get out of. Pasture deficits are expensive, so it may be worth taking a look at how your last five year average growth looks when compared to your demand.

Grass utilisation and lowering cost of production drives profit, so matching demand to growth is key.

I don't have hundreds of farms data to back up my view, so there's a note of caution and how you read this will depend on your view on risk. But I do suggest you take a good look, and see if this discussion is applicable to you.

Changes at Walford

Key changes at North Shropshire's Walford College farm came under the microscope at the British Cattle Breeders Club annual conference at the end of January when Sean Chubb, LIC's Business Development Consultant, and Tom Moore, farm manager, joined forces to present on the topic of Resilience through crossbreeding.

In 2018, when LIC were first involved at Walford there were; 187 cows in milk, 70 heifers under 12 months of age, 92 heifers between 12 and 24 months old, an average production of 8421 litres and a calving interval of 437 days. The herd was fully housed with year-round calving. Problem areas included cost control and animal health.

Calf health problems started with poor rearing facilities and practices, leading to high calf mortality and low growth rates and therefore genetic potential was not being achieved.

A plan for improvement was drawn up and included:

Turning the cows out with the aim of:

- Having the cows at grass for 9-10 months
- 12 – 14T DM/ha yields with grazed grass replacing silages and concentrates
- Achieving a yield of 6000 litres from forage

The plan also included:

- Creating an autumn block
- Matching grass growth better on farm
- Enabling calving outside on standing hay
- Making management easier as all cows would be at the same stage of management

And there was going to be a change to a solids milk contract which would enable the value of milk to be lifted by increasing constituents, better suited to a grazing system.

It was clear a new cow was needed. One that could graze up to 18kg DM of grass per day while maintaining milk production and consistently achieving residuals of 1500kg DM to keep grass quality. Getting to this point would allow lowering the cost of feed and cost of production.

The aim was to go for a 550kg liveweight mature cow to maximise the energy available for milk production. With the walking now required, this would lead to less pressure on the cows.

Fertility needed to be improved, with a 12 week block the farm would be targeting 78% of the cows in calf within 6 weeks with a 6% empty rate. 95% of the heifers would be retained into the second lactation.

The first bulls used were Hammer, Sierra, Kelsbells and Beaut, followed in the second season by Integrity, Kelsbells and Gameplan.

Heifer performance so far

Liveweight – the first LIC bred heifers calved down around 580kgs so will reach a mature liveweight of around 640kgs.

Looking at the calf weights of the second crop of LIC bred heifers, expect these heifers coming out of the Holsteins to be around 550kg – 600kg.

Production

	Fat %	Protein %	Milk solids	Litres
Top 25%	4.95%	3.48%	245.85	2923
Average	4.69%	3.46%	198	2432
Bottom 25%	4.45%	3.44%	144.16	1856

Given the stage of lactation the heifers should end up producing around 470kg/MS this year, this indicates that as mature cows they should be producing around 555kg/MS.

In comparison, the herd only achieved 532kg/MS average in the year they were bred.

Through purchasing crossbred cows and keeping excess heifers, the herd now sits at 210 cows with 55 R2 heifers and 72 R1 heifers coming through. Production has held between 7500 – 8500 litres through the transition, while the milk from forage has increased to around 5500 litres. With the farm now moved to an autumn block, the calving interval now sits at 370 days.

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