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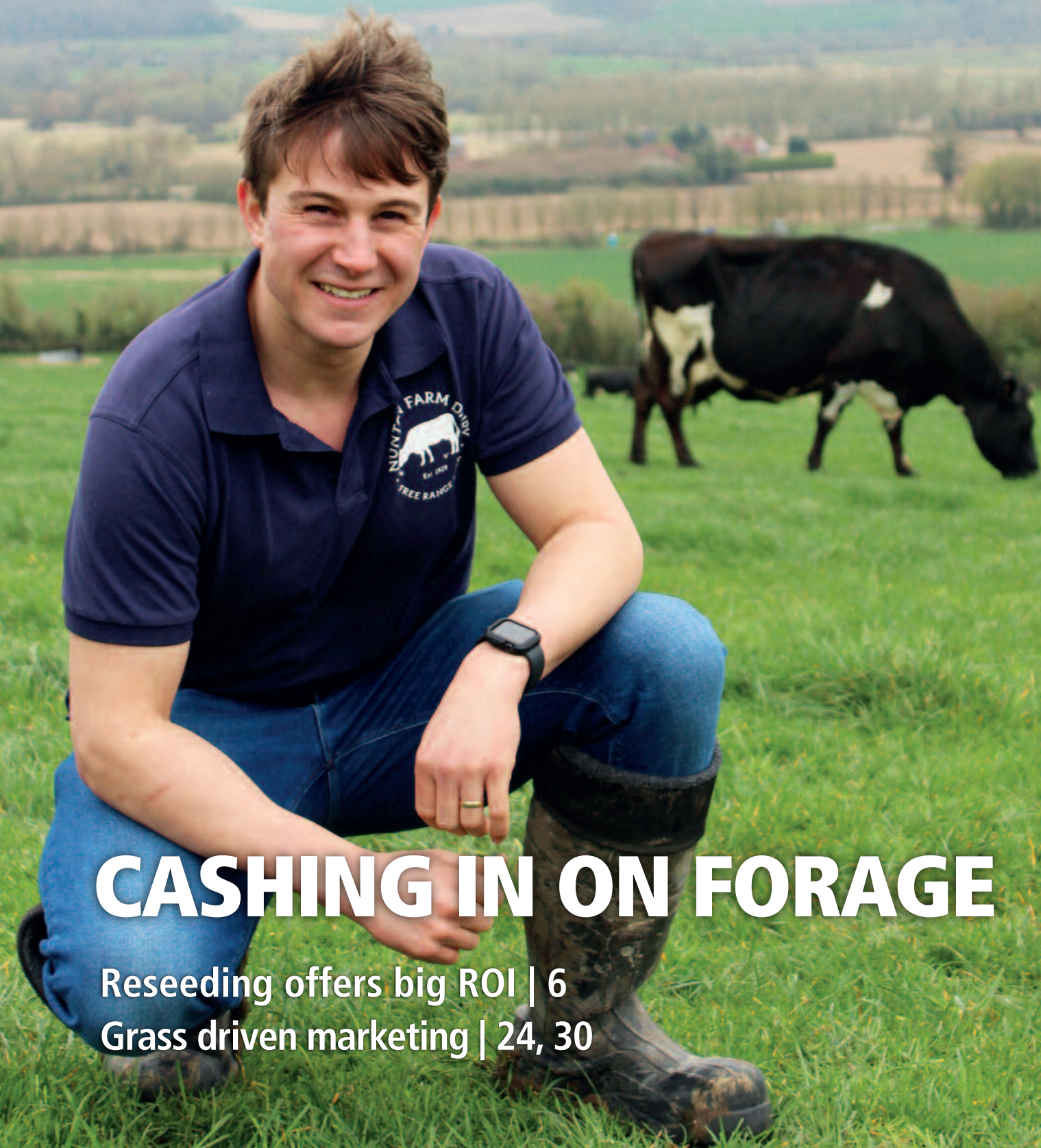


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ISSUE 20: Summer 2019

FORAGER

HOME GROWN FEED FOR SUSTAINABLE FARMING



CASHING IN ON FORAGE

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Grass driven marketing | 24, 30

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Germinal

FORAGER

HOMEOWN FEED FOR SUSTAINABLE FARMING

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From the cover

VENDING MACHINE OUTLET FOR FREE RANGE MILK



Page 24: Nunton Farm Dairy has used the forage message to market milk direct to consumers. They now have two free-range milk vending machines, which bring customers flocking for a pint of the cold, hard, white stuff.

Editor's NOTE

British farmers have a lot to shout about, but creating a strong marketing message to promote ourselves is essential in order to maximise returns, writes Aly Balsom.

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It frustrates me whenever I go into a supermarket and see the dedicated fridge with milk alternatives covered in fancy branding, next to the caged milk bottles in unattractive plastic packaging.

I know I'm not the only one. It's a hot topic at the moment. The question is – how do we get better at marketing and compete against trendy milk alternatives? We need to make milk exciting again – do that, and consumers may be willing to pay more, which (hopefully) will feed back to farmers.

A 2016 YouGov survey undertaken with AHDB Consumer Insights found that 80% of shoppers would be willing to spend more to provide producers with fairer returns. 19% indicated they would happily pay more than 20p extra for four pints of milk.

There's also strong evidence that people are willing to pay more for branded, innovative milk products. For example, kefir – a fermented dairy product, half way between yoghurt and milk has increased in popularity. A 250ml bottle of kefir retails at a minimum of £1.

A growing number of individual farmers are also recognising the value of branding in selling their own milk, direct to customers. Milk

vending machines are popping up at the end of farm drives across the UK, with shoppers keen to 'buy local'.

The grass-fed, forage message is also proving a popular one.

For example, the Wiltshire-based Martin family are selling milk under the 'Free Range Dairy - Pasture Promise' brand from two vending machines; one in a pub car park and one at a nearby farm shop.

One litre sells for £1.10, with customers also paying a £2

deposit for a branded glass bottle (see page 24). It's proved so popular that they're looking for a third location.

As the Martins say - this is not about polarising the industry between grazed and housed herds, it's about finding a way to market milk better. Simon Martin puts it well: "Half the problem is milk is not branded. That's why we end up with a commodity price. Free-range is almost making it a premium, luxury product."

It's a message that is being embraced by some processors too. Somerset-based processor, Lye Cross Farm recently announced the production of the first

100% grass-fed, certified USDA Organic cheese for export to the USA (see page 30). It highlights one of the ways the UK dairy industry can market itself to make the most of export markets – an outlet that will become increasingly important post-Brexit. Our high welfare standards – regardless of system – will also be another strong marketing message.

As well as marketing, in this issue of Forager, there's also an emphasis on the financial benefits of investing in forage. Our Forage Business section (page 6) highlights the significant return on investment from reseeding pasture. On a dairy system, this equates to a net profit per acre in year one of £120/ha, thanks to improved grass yield and quality, leading to more milk – a figure not be sniffed at.

Young farmer, James Drummond, has also turned his family business around by addressing soils, ewe breeding and forage production. This has taken the business from loss to a profit of £53/ewe, before subsidies.

Ultimately, creating a positive future for the industry comes down to making sound business decisions that will build resilience at farm level and backing this up with a strong marketing message surrounding the end product – do that, and we'll be on to a winner. **1**

Next generation

As part of the Next Generation series, Aly Balsom meets James Drummond, whose love of data and enthusiasm for trying new things is benefiting his forage focused business.

When James Drummond looked at the business' accounts and saw that the farm was never making a profit higher than Basic Payment and subsidies, he knew something had to change.

"We were doing a lot of work for no reason. We needed to focus on being profitable and that comes down to forage," he says.

That was six years ago, after James had returned to the family business two years prior. Since then he has adopted a three-pronged approach to improving business performance at Lemmington Hill Head, tackling ewe breeding, forage production and soils.

James believes the three go hand-in-hand, with good ewe genetics needed to ensure optimum utilisation of cost-effective forage. This became clear after he crossed some of the farm's Cheviot ewes with an Aberfield and compared performance to the system's existing Suffolk crosses. The Aberfield cross lambs grew 70g/day more, whilst the ewes were 30kg lighter, meaning stocking rate was 35-40% higher, resulting in improved profit per hectare.

"That was the first thing that convinced me of the value of genetics on a forage system," says James, who was a 2015 NSA Next Generation Ambassador and a Nuffield Scholar.

Since 2012, James, and father Tony, have been phasing out the commercial ewes and replacing them with Aberfield and Aber genetics (see box). There has also been substantial investment in infrastructure, with 10km of fencing put in last year alone. The aim is to reduce paddock size to help reduce labour associated with rotational cell grazing. "The cheapest way to improve profit is to utilise your grass better," explains James.

James is particularly keen to experiment with different forage mixes and is able to closely track performance off different leys thanks to the fact all animals are performance recorded.

Plantain, sainfoin, Aber High Sugar Grasses and white clover leys have proved particularly valuable. Having originally been used to finish lambs, most viable land is now going into these mixes.

James has also found that mating and out-wintering ewe lambs on a kale and swede mix of Triumph and Maris Kestrel, and then moving them on to the plantain mixes, is the best way to maximise long-term performance - something he's looking at as part of the AHDB Challenge Sheep Project.

"This year the hogs on plantain reared as well as ewes on grass," he says. "These ewe lambs reached 95% of mature weight at mating as shearlings, versus a target of 80%."

The changes have paid off, with the 2017 accounts showing a £53/ewe profit, before subsidies. **1**



IN THE HOT SEAT

Name: James Drummond **Age:** 35

Farm: Lemmington Hill Head, Alnwick, Northumberland (Tenanted). 222ha (545 acres) of SDA, LFA and improved upland

System: 850 Aberfield ewes, 420 Aberfield and Abertex ewe lambs, 200 commercial Cheviot, Scotch Halfbred and Suffolk crosses. Primary aim is to produce about 250-280 Aberfield, Aberdale and Abertex breeding rams a year for Innovis. Best ewes mated one cycle with the top 50% lambs kept for replacements and potential rams. B-flock crossed to sell breeding females. Rest finished live or deadweight on a forage system.

What's the biggest challenge you've faced to date?

Last year's drought was a challenge on a forage based system. Having met with the Progressive Sheep Group in May, we pre-empted a drop off in forage so we weaned earlier at 8-11 weeks and sold 250 cull ewes.

What do you think your biggest challenge will be in the future?

A block of gorse hill land - It's 85% gorse and the rest weeds. I want to improve it from something that's producing an average annual yield of 200kgDM/ha to something that can be used for cell grazing ewes pre-lambing next year. I'll probably use forage rye.

What's been your greatest success?

Moving and becoming part of the business. I'm pleased so far with how the business is going.

Where do you see yourself in 10 year's time?

It would be nice to shift from a tenant to owning more land and improving our asset base. And hopefully go on a nice holiday in the Caribbean for eight months of the year!

Name three things in your life which are key to your success?

Doing a Nuffield Scholarship, data recording and alternative forages.

What's the best bit of advice you've ever received?

There's a lot of farmers running businesses but not a lot of businessmen running farms. That makes you think.

Reseeding offers big ROI

The higher grass yields and quality resulting from regular reseeding translates into more meat or milk, which makes reseeding a no-brainer for any forward thinking business, Aly Balsom reports.



Extra expense and time out of production can be some of the reasons farmers give for not embracing a grass reseeding policy, but such an attitude could be holding back business performance.

Closer inspection of the numbers clearly highlight the huge potential return on investment from reseeding (see graphic). This is due to more meat and milk production, as a result of improved grass yield and quality as poorer performing weed grasses are replaced by modern perennial ryegrasses.

Dr Liz Genever, Independent Beef and Sheep Consultant, believes a regular reseeding policy should be part of any progressive farmer's strategy.

"They're not just doing it because they want to reseed, but because they want to drive their businesses forward," says Liz. "Inherently it's an indicator they're a progressive business and thinking about more than just turning up. Silage quality is better and performance off grass is better."

National Agricultural Sales Manager of Germinal GB Ben Wixey is in agreement. He says reseeding has the potential to double production per hectare on farm,

when everything else is right, such as grazing management and nutrient regimes (see box). This has the potential to allow stocking rates to be increased or more silage to be cut and sold. The grass quality increase also makes reseeding a "no-brainer."

"By reseeding, you're increasing the digestibility of the grass and that digestibility is linked to increased metabolisable energy (ME)," explains Ben. "Even with a 0.5MJ/kgDM increase, a reseed will pay for itself in the first year, but it's likely you'll get a 1MJ/kgDM increase."

To get the best possible results, choosing mixes that include grasses off the Recommended Grass and Clover Lists (RGCL) is a must. These varieties will have undergone extensive testing and are proven to perform in England and Wales.

This is something to consider even more closely this year due to EU shortages of grass seed following last year's drought. This could mean that some merchants choose to include varieties from other countries in their mixes to bridge the gap. These will not have been tested under UK conditions and subsequently may not perform as well. Ben urges farmers to double check with their merchant and check varieties are from the RGCLs.

He says the difference in cost


between the best mixes and cheaper mixes that include unproven varieties is only about £10/acre. "If that ley lasts 10 years, that's just £1 per acre per year," he explains.

With seed costs also only making up about 33% of the total cost of a reseed (see table), spending on the best mixes makes sense.

Time out of production also need not put farmers off reseeding. According to Ben, the key is to start by reseeding a smaller proportion of the farm; say 5%, and build to 10-15% from there.

"You'll get more production off that area, which will enable you to do 8% the following year and gradually increase the amount reseeded," he explains. "If you're lower stocked, you may be able to reseed more."

Ultimately a reseeding policy is part of a wider farm strategy to help maximise performance off forage and lower costs.

"All this is about is getting livestock to go into a field and harvest the grass itself and reduce your unit costs. Who knows with Brexit how important that will be, especially if we get tariffs on lamb. Getting your unit costs down will be increasingly important," concludes Ben. 

Why reseed?

£120/ha


Estimated net profit per acre in year one from reseeding on a dairy farm - thanks to improved grass yield and quality, leading to more milk (see Table 1 below).

£89/ha

Estimated net profit per acre in year one from reseeding on a beef farm - thanks to improved live weight gains on better quality and higher yielding grass leys.

25-30%

Typical grass yield increase seen in year one following a reseed.



Better response to fertiliser - Rough stalk meadow grass was found to have a yield response to fertiliser that was 17% less than perennial ryegrass PRG.

+1MJ/kg DM

The likely energy increase seen as a result of reseeding.

+70 days

The typical number of extra grazing days realised on reseeded leys - due to the fact PRG grow earlier and later.

-£22/tonne

The reduction in silage making costs seen as a result of reseeding - thanks to one less silage cut being taken in a year due to increased individual cut yields.

Source: Germinal GB, Practice into Profit - G Mosely, Practice into Profit Project 1998 - 2003

Table 1: Effect of decline in perennial ryegrass content on meat and milk production.

PRG content %	Production (t DM/ha)	Herbage ME (MJ/kg DM)	Lost ME grown (MJ/ha)	Milk equivalent of lost ME (lires/ha)	Meat equivalent of lost ME* (kg LW/ha)	Concentrate cost to replace lost ME^ (£/ha)
95	13.5	12.0				
90	12.6	11.8	13,320	1,885	133	197
80	11.2	11.5	33,200	4,698	332	491
70	9.8	11.3	51,260	7,254	513	759
60	8.4	11.0	69,600	9,849	696	1,030
50	7.0	10.8	86,400	12,226	864	1,279

Source: AHDB Reseeding Guide
ME = Metabolisable energy *assuming 100MJ per 1kg of gain for 350kg growing cattle
PRG = Perennial ryegrass DM = Dry matter ^ based upon 1.4p per MJ of ME

How to get the best from a reseed

- Test and address soil indices at least six months before reseeding - it can take six months for liming to address soil pH, so it's vital to do this in advance.
- Address any soil compaction before reseeding.
- Consider pests - if you have historic issues with leatherjackets, consider using a break crop like a brassica or wholecrop to help reduce larvae issues in light of reduced pesticide availability on new leys.
- Have a fluffy seed bed and roll - you need a fine seed bed and good seed to soil contact for good establishment.
- Graze a reseed rather than silage it - grazing tighter will help grass to tiller.
- Ensure new reseeds get appropriate nutrients - refer to the Nutrient Management Guide (RB209): Section 3: Grass and forage crops.
- Control sward height - rotational paddock grazing will help grass rest and recover.

Benefits v Costs of reseeding

Source: Germinal GB

Reseeding costs £/ha			
Sprays	£37		
Spraying	£15		
Ploughing	£62		
Rolling etc.	£40		
Sowing	£62		
Fertiliser	£111		
Seed	£160		
Total	£487		
	Av kgs DM Yield		MJ ME/ac
Field Old	7,410	10.0	74,100
Field New	8,151	10.5	85,585
Extra MJ ME			11,485
1 litre milk requires	5.3 MJ ME	@	0.28 £per litre
Benefits			
Extra litres/ha	2,167 Litres	£607	Extra income in milk
Net profit/ha	£120 (Extra milk - reseeding cost)		

Specialist leys fuel grass-based system



Kevin McGrade uses traditional methods to measure grass growth and inputs data into his AgriNet computer programme to monitor farm output.

Reseeding to a clear plan to ensure fields are fit for purpose is a key factor in the success of grass-based milk production on a challenging farm in Northern Ireland. Luke James reports.

Heavy land and high rainfall may be a good combination for growing grass, but – as dairy farmer Kevin McGrade is aware – they are factors that inevitably bring challenges when it comes to management, monitoring, and analysing the results.

Farming at Dromore, Co Tyrone – where recent land acquisitions and herd expansion have lifted milking cow numbers to 180 autumn calving Holstein Friesians – he has developed approaches to both grazing and silage making that enable him to make the very best of his circumstances. His benchmark is to maximise milk from forage, and with this currently at around 3,000 litres from a herd average just under 7,000 litres, he is well placed, though always striving for better.

Kevin's attention to detail around grazing management and

silage making is exemplary, but he knows that without the right raw material at the outset, no level of management expertise will allow the farm to reach its full potential.

"We've been taking on new ground recently, where the first priority is usually to reseed, and we are then routinely reseeding on the basis of field performance," says Kevin. "We use the AgriNet grazing management programme, so we have figures from this on which to base our decision-making. But we're also mindful of the fact fields vary in their potential, so it's more often than not a judgement call based on what we expect. And we think about other factors, such as the percentage of perennial ryegrass in the sward and the degree of poaching. Overall we are currently reseeding about 15% of

the farm each year."

This discipline of renewing leys in good time is ensuring high levels of grass dry matter production, which reached an enviable 12.46 tonnes DM/ha in 2018. It is also allowing Kevin to continually incorporate the best grass genetics into his system.

"We're selecting grass varieties on the basis of their performance on the Irish Pasture Profit Index," he says. "We are also moving towards having specialist leys for either cutting or grazing, so we have fields that are fit for purpose."

Currently, silage leys are based on the late heading perennials AberGain, a tetraploid, and the diploid AberChoice, both Aber High Sugar Grasses that are highly ranked on both the Irish PPI and the Recommended Grass and Clover

Forage performance

Grass production increases

Year	Average production (t DM/ha)
2016	10.58
2017	11.45
2018	12.46

First cut silage (2018)

Dry matter (%)	28.1
Protein (% DM)	11.5
ME (MJ/kg DM)	11.4
D-value (% DM)	71.3

Maximising milk from forage

- Regular reseeding.
- Selection of top performing varieties.
- Dedicated leys with good weed control.
- Grass growth measurement.
- Flexible grazing and quality silage.

Lists. The proportion for these silage leys is typically 70% tetraploid and 30% diploid.

Grazing leys are also dominated by Aber High Sugar Grass varieties, with intermediate diploids including AberGreen and AberWolf typically included. Kevin finds these diploids provide the higher sward density that is required in a grazing situation, particularly on his heavy ground.

None of the leys include clover, as Kevin's priority is to maintain clean swards, and he believes dock control in particular would be compromised if he was including clover.

Flexible grazing management

Given his circumstances on a heavy land site in Northern Ireland, Kevin's approach to grazing management is pragmatic. He's installed cow tracks to improve access to fields and takes every opportunity to turn out early in the spring, but he accepts that they may have to come back in if conditions turn against him – as has been the case in 2019. Over the past three seasons, available grazing days has varied by as much as 30 days over a season, so flexibility is paramount.

Cows are strip grazed behind a single wire, this being preferable to paddocks, which Kevin finds too rigid for his situation.

Grass measurement is the key to the ongoing management, with Kevin cutting and weighing representative samples within a quadrant and calculating production based on a judgement of dry matter content. He'll take measurements as frequently as every five days during peak growth periods, with figures being entered into his AgriNet programme to provide a farm-scale overview of


grass production.

During the heaviest periods of growth, surplus grass is cut and round-baled for silage, ideally before it loses quality. Where fields do go beyond the optimum, bales are allocated for dry cows.

Ensuring quality silage

For a period, Kevin opted exclusively for baled silage, primarily for consistency of quality, but with the farm expanding and labour being at a premium he is now making a combination of pit and baled silage.

"We're now aiming to make the first two cuts for the pit and will put third and fourth cuts into bales," he explains. "We're confident of the quality of the grass that we're starting with, due to regular reseeding and good weed control, so we're aiming to cut grass before it goes to head – to ensure we are maintaining that quality."

"We're using a local contractor for most of the work, though we do some of the mowing and the tedding ourselves as required. It's important to have a good relationship with your contractor, so that you can rely on them to work with you when needed." 



Utilisation can vary dramatically between brassica varieties. Rejection of the crop on the right amounted to 2.8tDM/ha, whilst utilisation of Redstart (left) was better.

Utilisation drives performance

With many brassica fodder crops, true value is determined not by how much forage is grown, but by how well the crop is utilised by grazing livestock. Luke James reports.

Kale, hybrid brassicas, forage rape, leafy grazing turnips, stubble turnips and swedes: A wide array of crops useful for all classes of ruminant livestock that can provide everything from summer grazing to the basis of an out-wintering system.

Once considered outdated, brassica fodder crops are now increasing in popularity, partly due to new varieties and alternative approaches to management, but primarily as a result of the widespread drive to increase production from forage.

According to Germinal GB, the recent growth in brassica use is set to continue. As a result there will be a greater need for knowledge and a demand for more precision in the way crops are managed.

Germinal GB National Agricultural Sales Manager Ben Wixey says: "Factors such as nutritional quality, palatability and crop utilisation are becoming more

important as brassicas form a bigger part of farm businesses' forage output. Just as with any other part of the ration, we believe the attitude should be to know what you are feeding and to maximise intakes.

"Utilisation is an essential part of the picture, because crop left on the field after the stock has gone is a lost opportunity and wastage that businesses should seek to avoid."

Recognising the need for greater knowledge, Germinal GB has carried out field trials on farms across the country over the past 12 months, including significant work on hybrid brassicas to gather information on dry matter yields, crop quality and utilisation.

Leaf versus stem

In crops such as kale and hybrid brassicas, the leaf to stem ratio is a key factor in crop quality and subsequent livestock performance. The long-established kale variety

Maris Kestrel remains the market leader for its superior leaf to stem ratio when compared with other kales, because it results in the 80-90% crop utilisation that should be the target.

Newer hybrid brassicas, which have been developed by crossing kale with rape, also vary in their leaf to stem ratio, but there has been little research to date to establish individual variety characteristics.

Germinal GB has carried out field trials on some of the main hybrid brassicas currently grown, measuring the relative dry matter of leaf and stem at different stages of the season and also recording the nutritional quality in the different components.

"Total production potential is important, but the relative value of leaf and stem is arguably a more important level of detail, as is an assessment of what stock will actually eat," explains Ben.

Multiple grazing

Hybrid brassicas have the potential to regenerate after grazing, with aftermaths offering additional dry matter production from second or even third grazings.

Germinal GB included multi-grazing in its 2018/19 farm trials programme, to investigate the value of this practice and establish some key management principles.

Whilst many aspects of the management are consistent with those that apply with single grazed crops, several points specific to multi-grazing emerged.

Ben Wixey explains: "To have the potential for multiple grazing, crops ideally need to be drilled no later than early June. It's then important to manage the first grazing in blocks, as opposed to strip grazing, as this will

minimise the amount of damage done to the crop."

Unlike with a single graze crop - where you are looking to maximise the utilisation - when seeking to multi-graze it's better to move stock on when stems still remain. This will accelerate the rate of regeneration and mean regrowth is available for grazing within six to eight weeks.

Ben adds: "If the second grazing is the final grazing, then manage for maximum utilisation, but if a third grazing is the target then aim to minimise damage and leave the stems to accelerate regrowth. Avoid grazing any later than March as crops can then flower and present a higher risk of toxicity."

Table: Yield and quality of hybrid brassicas - Redstart, multiple grazing, November 2018

		DM (t/ha) **	DM content (%)	ME (MJ/kg)	Protein
First grazing (leaf)		4.0 - 6.0	12-14	12-13	20-24
Second grazing	Leaf	4.0	12.0	12.2	24.4
	Stem*		15.9	11.7	11.6

*Nutritional value of stems sampled in late February was 11.6MJ/kg ME and 17% crude protein, showing a higher than expected quality.


**Overall cost of production at multi-graze location was calculated at 3p/kg of dry matter.

"Unsurprisingly, the stem is of lower feed value than the leaf in all cases, but that does not mean the stem should be considered a waste product. We've found marked variation in stem quality between varieties and - in the case of Redstart in particular - the higher stem quality can be directly correlated with the

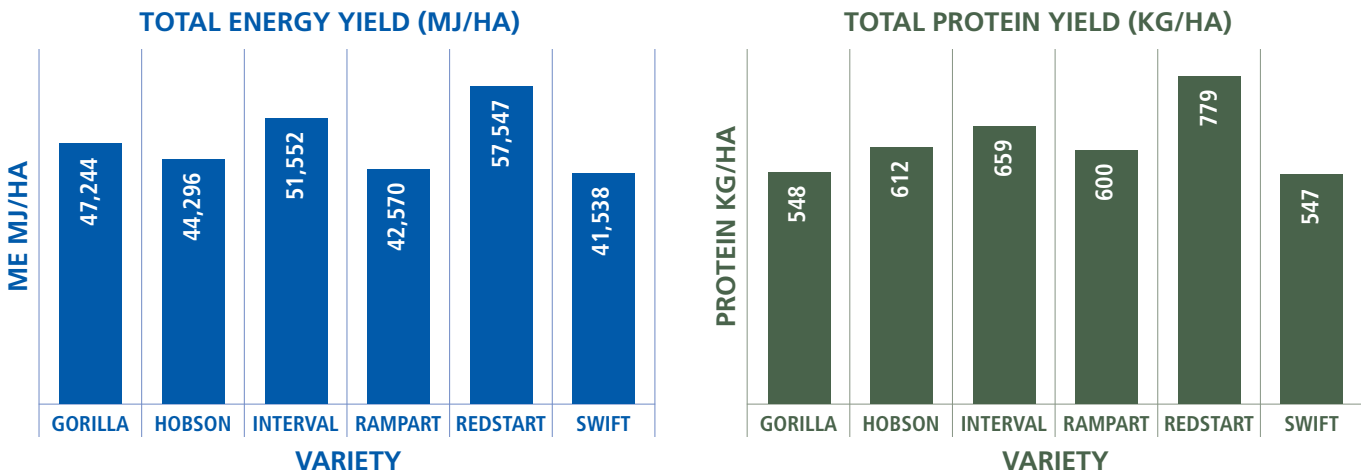
extent of crop utilisation."

Overall qualitative results from the field trials show what a good nutritional balance is provided by the hybrid brassicas, underlining their real value and again emphasising the importance of utilisation.

"Grown to its full potential, a crop of Redstart can deliver up to

10 tonnes of dry matter per hectare," adds Ben. "Feed quality can be as high as 30% protein and 13MJ/kg ME, so a really valuable source of nutrition. That's why we are seeing crops being used to finish lambs or deliver significant liveweight gain in growing cattle on out-wintering systems." 

Energy and protein yield in hybrid brassicas



Tackling forage boosts farm productivity

Full ration traceability, lower feed costs and improved overall farm production are just some of the reasons beef farmer Guy Prudom has adopted a forage focused system, as Aly Balsom reports.

Going organic in 2007 was the “Eureka” moment for Yorkshire farmer, Guy Prudom, who realised that the expense of bought-in feed meant he had to get better at producing more on farm.

He started from the ground up - soil testing a third of the farm every year and raising pH using targeted lime application. Wholecrop spring beans were also planted as a protein source for beef finishing diets. Since then, and despite coming out of organic in 2015, he has remained committed to growing the whole diet on farm. This has involved embracing different forages like red clover, chicory and festuloliums, along with reseeding with perennial ryegrasses.

This means that all cattle produced from the 210 cow suckler herd are finished on a completely homegrown diet, which is predominately forage based. This includes red clover silage, wholecrop beans and crimped barley.

Guy (right) says the homegrown route makes sense both in terms of cost and consumer perception.

“We’ve got full traceability,” he explains. “That seems to be the buzz word at the moment. It’s what our end customer is demanding. And where we farm, it’s very expensive to buy-in by-products so it makes economic sense to produce your own.”

Guy farms with his parents Pete and Christine on three tenanted units near Whitby, Yorkshire, totalling 405ha (1,000 acres). The business is one of AHDB Beef & Lamb’s Strategic Farms.

Breeding strategy is currently in the midsts of an overhaul, with the traditional Simmental, Aberdeen Angus and Shorthorn herd being replaced by Stabilisers. About half the cows are now Stabiliser. This smaller cow suits the farm’s ground on the edge of the North Yorkshire Moors, which means extended grazing at the shoulders of the year should be possible. Their lower maintenance requirements also make them ideally suited to a forage ration, with cows just fed silage, chopped straw and minerals. A little soya is now included in the

ration at calving to improve cow colostrum quality and quantity.

Soils

Ensuring soils are performing at their optimum is an ongoing strategy, with lime applied as necessary from May onwards. The two upland units; High Burrows and Davidsons have seen the biggest improvements in pH, with most land now above 6.3-6.4pH, versus a starting point of <6pH.

FYM is targeted towards fields low in phosphate (P) and potassium (K), with Fibrophos - a recycled product from chicken manure used in energy production - then applied where needed. Nitrogen is only used where essential, mostly on silage ground.

Guy says: “We’ve learnt to grow grass without nitrogen. What you need to grow grass is pH at the right level and P and K. Without getting that right, it’s a waste of time throwing nitrogen at grass.”

He believes it’s this soil strategy that has boosted grassland production considerably, together

with more regular reseeding. “It’s a gut feeling. We’re carrying more stock,” he explains. “Cow numbers have increased from 175, whilst organic, to 210 currently, with further scope to increase in the future.”

Forage mixes

Reseeding has largely been focused on silage ground, with more of the grazing area following.

A mix of late perennial ryegrasses with Timothy have been used on the silage area for the cows. Whilst a red clover ley is grown to produce silage for the store and finishing cattle.

Guy says: “The red clover ley is a high protein silage for cattle. For the soils it’s trying to get some life back into it. The clover has a big root so it goes down forever and acts like a subsoiler if established correctly. Plus it fixes nitrogen. We’re seeing some savings in the amount of nitrogen we’re applying to the following crops - about 50kg/acre of product or 30 units of nitrogen/acre.”

Guy’s also been experimenting with chicory mixed with either later perennial ryegrasses or festuloliums.

The importance of a good seed bed when establishing chicory was highlighted on 3ha (8 acres) drilled with a strip-till drill at Northfields. The wet autumn of 2017 and poor seed bed meant this grew quite patchy, although the heifers grazed on it did well. Another 12ha (30 acres)

of light land at Davidsons, which was spring drilled with a combination drill, has established much better. The hope is that the chicory’s long tap root will help maintain production when land dries out. This has been used to rotationally graze suckler cows.

Wholecrop beans have remained an important part of the system since 2009. They not only produce a 16-17% protein crop for finishers, but also help fix nitrogen, which has saved Guy about 20-30 units of N a year.

Rotational paddock grazing

Stock are rotationally grazed on the perennial ryegrass and chicory leys. Having moved cattle every 2-4 weeks, cattle are now moved every week.

Guy says: “As part of the AHDB scheme I was interested in setting up a paddock grazing system for the suckler cows, so a block of 60 or so acres was divided up into 11 paddocks with 50 or so cow-calf pairs grazing it. Cow numbers are limited to how many a bull can serve.

“It has worked remarkably well, allowing us to ensile 15 acres (6ha) and a further 15 acres was big baled,

which utilised the extra grass produced in the paddocks. Admittedly this land received a covering of digestate the previous autumn so it was in good heart.”

Guy has a gut feel that cattle growth rates have improved on this system as a result of improved grass growth, but it won’t be until the end of this season that he’ll be able to compare weight data to last year.

Benchmarking

Moving forward, the aim is to get a better handle on costs and benchmark data as part of the farm’s involvement in the AHDB Strategic Farm initiative. One of the areas Guy hopes to get better at is understanding margin per hectare.

“If we have a figure for margin per hectare as the year progresses, and we see the figure improving, I know I’m becoming more effective in using my forage,” he says.

Guy says margin/ha will be improved by improving forage production, which will enable cattle numbers to be increased and fixed costs reduced. Running more cattle on the same area will also reduce overall forage costs.


“The focus on forage is about keeping costs down. Improving benchmarking will help highlight which areas we need to focus on to reduce costs or optimise what we’ve got. We need to understand our costs so we’re more sustainable moving forward,” explains Guy. 

Image courtesy of AHDB

Performance in numbers

900g/day

Average daily liveweight gains achieved by heifers on chicory and perennial ryegrass leys.

1.2-1.3kg/day

Average weight gains of heifers when housed on a finisher ration.

600g-1.5kg/day

Post weaning daily liveweight gains, heifers and steers.

Steers - finished at 17-18 months old at 640kg on forage-based ration.

Heifers - out to grass for second summer. When >480kg, housed and put on finisher ration to finish at 20 months average.

Covering your assets

Protecting soil with cover crops following harvest is helping to make crops such as maize more sustainable as Laura Mushrush reports.



"Soil health is in," says Dr Joanna Matthews, Technical Trials Manager for Germinal GB's research station.

As the biology of soil and its importance to the long-term success of a farming enterprise becomes better understood, more agricultural producers are looking for management opportunities to safeguard their most valuable asset – soil. For maize growers, soil protection is best achieved by establishing winter cover crops into maize stubbles following harvest.

Jo explains: "When field conditions aren't right, harvesting maize can cause soil structure and erosion issues from the damage caused by rutted fields. Fields that are then left bare over winter increases the rate of erosion even more. It also makes leftover nitrates more easily leached into watercourses. Not only is this detrimental to the surrounding environment, but it strips away costly nutrient inputs. However, cover crops act as a short-term storage unit for soil nutrients, while

root structures lock soil into place."

Locking in the benefits of cover crops

Soil biology, fertility and structure, have a direct impact on the success of current and future crops. A plant's physiological effect on the soil and its properties can keep nutrient balances in-sync and cycling. Nutrient cycling functions better when a crop is present to loosen soil and transport nutrients and air through root structures.

Because the window for cover crop establishment after maize harvest is limited, producers should consider earlier maturing maize varieties that won't compromise

yield, explains Jo. This also carries environmental benefits, potentially reducing damage caused by harvesting in poor conditions in late autumn.

According to Jo, cover crop species should be selected based on rapid early growth traits and characteristics that best suit the farm's end use. Recently, Germinal GB's forage research station trialled five different varieties of grass and cereals species. An Accord tine drill was used to drill straight into maize stubbles on November 6, 2018 with no seed bed preparation. By November 18, all five plots had emerged.


"The leading variety of triticale

Species	Type	Variety	Seed rate kg/ha	tDMha-1 harvested April 12, 2019
Grass	Westerwold	Libonus	35	2.8
Grass	Italian ryegrass	Gorbi	35	3.12
Cereal	Hybrid rye		200	2.79
Cereal	Triticale	Logo	200	3.98

provided almost 4tDM/ha of added biomass while the Italian ryegrass yielded more than 3tDM/ha," says Jo. "This could be ensiled as bonus livestock feed or incorporated into the soil as added organic matter." New, more winter active, triticale varieties will be trialled this year which may improve this further.

Cover crop destruction

Crop destruction and mechanisms of incorporation depend on the quality of the seed bed required for the following crop. Jo recommends spaying off cover crops with a herbicide in the spring, and then incorporating it into the soil. Not only will this ensure the cover crop won't become a nuisance, but it accelerates the rate nutrients are broken down in the soil.

"The more a cover crop is destroyed and mixes into the soil profile, the faster it will break down within the soil, and nitrogen will be released to the following crop," concludes Jo. "This is a particularly important point to consider when you're using species like clovers, and lush grasses, that have a low carbon-to-nitrogen ratio." 

Selecting for disease resistance

When ryegrass is being grown as a winter cover crop or established for longer term as a break crop, disease resistance needs to be part of the selection process.

"Disease incidences in ryegrass have been increasing across the industry, which can be mitigated by selecting a variety that has been bred for disease resistance," explains Jo. "Disease pressure can restrict a sward's ability to grow, as well as affecting its digestibility and palatability."

Ranked 1-9 (1=poor, 9=good) disease resistance for crown rust and drechslera can be found in the Recommended Grass and Clover Lists.

-  A bare slope can erode 100 to 1,000 times faster than a vegetated one.
-  One third of UK soils are thought to be degraded, with 1 million hectares – 36% of all arable land – at risk of erosion.
-  Up to 2.9 million tonnes of top soil are estimated to be lost to wind and water erosion annually in the UK.
-  In England and Wales, the total estimated organic carbon loss from the soil each year is 5.3 million tonnes, or on average 0.6% of the existing soil carbon content.

Source: Sustainable Soil Alliance: Campaign to Protect Rural England, "Back to the land: rethinking our approach to soil"



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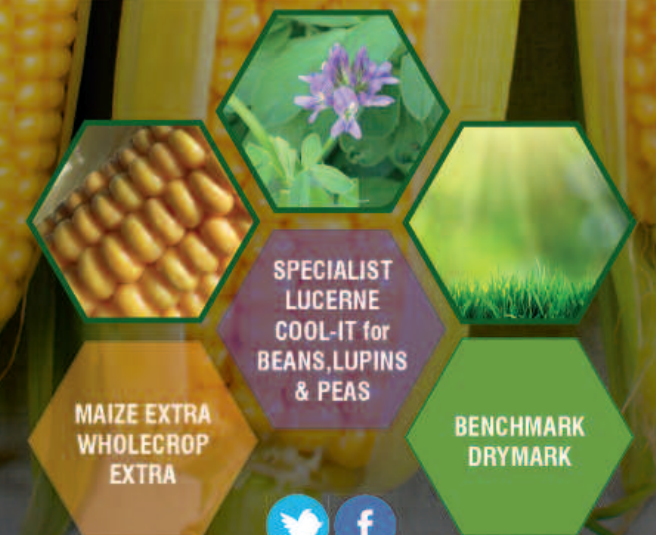
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Suckler Series: Making her pay

Part three: Redesigning the production unit

In parts one and two of this three-part series, we looked at increasing output efficiency and refining inputs by improving fertility and forage utilisation. In part three, we look at how to combine the two for long-term efficiency. Laura Mushrush reports.

Long-term vision is needed to increase profitability in a suckler unit by matching the genetic programme with forage production.

So says European Veterinary Specialist in Bovine Health Management and RCVS Specialist in Cattle Health and Production, Martin Tomlinson of the University of Glasgow.

"Feed is the most expensive input for any suckler system. However, homegrown forage is the cheapest form of feed available," explains Martin. "While it may require a change in genetic strategy and how the herd is managed, redesigning the production unit to best utilise homegrown forage output is going to yield a long-term financial gain."

1. Audit the forage system

The first step to matching the two systems is to audit homegrown forage production. Along with analysing the average amount of homegrown feedstuffs being produced for each type of system a year, regular data recording needs to be in place to capture seasonal growth and quality.

"This data will establish the production level for different forage

systems throughout the year to get a better understanding of when you have high quantities of quality forage and when additional supplementation may be needed," says Martin.

Data should be collated to assess management practices of the entire

Matching a suckler unit's genetic programme with its homegrown forage production has to have long-term vision to increase economic returns.

forage system to determine where there are opportunities to maximise production.

"In a rotational grazing system, for example, dry matter can be compared across the entire unit. This data allows you to track how an individual ley is performing year-after-year, indicating when a reseed is going to give you a return on investment," adds Martin. "Forage analysis is also vital, especially when dealing with conserved forages. If you don't know the quality of the feed, you cannot make accurate

decisions to help improve production."

2. Taking a look at the genetic programme

Redesigning the suckler unit requires a disciplined breeding strategy for replacements, with genetic selection practices balancing maternal and terminal traits.

"Ultimately, we want our replacements to have strong maternal traits like longevity, ease of calving, fertility, high milk yields, good feed conversion and lower mature body weight," says Martin.

While lower mature body weight in females has been a source of debate in the suckler industry, Martin says it is essential to maximising outputs on a forage system. Feed input requirements of an 800kg mature weight cow are going to be significantly more than one with a mature weight of 650kg.

"A lighter cow will reduce feed inputs and increase stocking densities, giving producers a better

return," he says. "It's also important to understand your calf market to produce more kilos of saleable beef compared to adult mature weight. In time, this will help drive profitability."

3. Record and analyse data

Because output pays, attention still needs to be paid to good terminal indices, like carcase traits and growth rates, when making genetic decisions to produce calves for sale.

To ensure output levels are maximised while maternal traits are maintained, genetic selection tools like EBVs and Indexes should be used in conjunction with farm recorded data.

"The aim of the game in suckler production is to ensure we have an adequate flow of highly fertile replacements that are producing calves capable of filling market needs. EBVs and Indexes are great at helping to predict the future performance potential of offspring, however accuracy is an important figure to assess. Good pedigree or genomically enhanced EBVs produce an accuracy of 60% at


birth, with proven sires achieving 80% or more," he says. "By recording more data on farm, system specific phenotype can be added alongside EBVs to analyse individual offspring performance and create feed conversion rates."

At the bare minimum, data collection should include birth weight, weaning weight and sale

weight of calves. Weights should also be taken any time an animal is put through a handling system.

"There is a huge need for the beef industry to step up in the amount of data it is recording, and how it assesses that data. It can be done and adds a lot of value to the business. For example, feed conversion rate is something suckler producers must be looking at improving for the future of the beef industry, but it is quite difficult because a lot of people don't have the required input data," explains Martin. "The minimum standard that all beef farms should have is adequate handling facilities and weighing facilities. The long-term profit from using data to make genetic decisions makes this quite a small home investment."

While there are multiple software programmes available for farm data, a simple Excel spreadsheet or 'little black book' are adequate. The most important thing is that data is analysed to make replacement selection decisions.

"This doesn't have to be complicated," stresses Martin. 



Reducing mature cow weight is essential to maximising outputs on a forage system says Martin Tomlinson, University of Glasgow.



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ARROWQUIP

Lucerne offers multiple benefits to feed and soils

One Shropshire farm is experimenting with lucerne in the hope it will bring equal benefits to cow diets, feed costs and soil health, as Aly Balsom reports.

For dairy farmer David Hares, planting lucerne as a third forage crop has the potential to build in protection against drought, give soils a boost and provide a high protein, high fibre feed for cows.

It's this that spurred him on to plant 10ha (25 acres) of the legume crop as an experiment last year. With his light, sandy soils prone to burning up in late summer, lucerne's long root and drought resistance proved attractive in safeguarding forage production through the year.

"I see lucerne as a drought tolerant crop, which proved itself last year (during the summer heat-wave) when it kept growing when grass didn't," he says. "Most of our grass was yellow and it was at least green."

David sees lucerne as helping to protect the business during such challenging dry weather spells. Its nitrogen fixing properties also mean it has the scope to give soils a much needed health boost after being

down to maize or barley for several years, prior to going into grass.

The potential benefits of including lucerne silage in the ration are also marked. David believes the high fibre silage with good scratch factor will aid rumen health and thus cow performance. At the same time, the high protein content could help lower ration costs in the long-term, if acreage is increased.

"I see it as a protein crop," explains David. "We've put it in with the aim of growing 15-16t an acre a year, over four cuts, which is comparable to maize. But we're getting a forage that's hopefully 20% protein, which will save on buying in blend."

With their Tesco milk contract introducing carbon footprinting, producing homegrown protein, rather than buying in protein, will only benefit their environmental footprint. Lucerne should also reduce the need for straw, which is currently being fed to slow passage through the rumen and get better

ration utilisation. Lucerne should do the same, with the additional benefit of the higher protein.

David also likes the idea of feeding three forages in the ration; grass silage, maize silage and lucerne silage. The belief is this will help forage intakes and rumen health and drive milk from forage from the current 3,000 litres a cow a year, to around 3,500 litres.

David and parents Robert and Jeanette run the 300 cow pedigree Millenheath herd at 202ha (500 acre) Millenheath Farm, Whitchurch. Cows yield 10,500 litres a cow a year at 4% fat and 3.4% protein. Cows are grazed in the summer, but the system is fairly intensive with cows buffer fed all year round. The herd receives a full TMR with the outside diet including the three forages, along with homegrown and milled barley and a protein blend. Cows are then fed to yield through the parlour.


Over the last three years, the Hares have been actively working to improve forage quality, with a particular focus on cutting grass silage earlier and more frequently. First cut is now taken about 2-3 weeks earlier than previously, around the start of May. Four cuts are also taken every six weeks, versus three cuts before. This has led to improved silage quality which has helped drive yields from 9,000 litres a cow a year.

"We're trying to reduce purchased feed without compromising yield," adds David. At the same time, the farm has also moved to three times a day milking and breeding for improved mammarys, legs, feet and health so cows last longer and produce more milk.

With just 10ha (25 acres) drilled so far, the effect of lucerne on the diet has not been marked so far. The fact the crop only produced low yields last year also meant the layer included in the grass silage clamp had little impact. The low performance was a combination of the dry, hot conditions last year, together with the fact lucerne also takes a year to get going.

David says this is the "crunch year" for the crop, although the initial signs are good. "It's got to grow the tonnage. If it can't do that, I might as well grow maize," he comments.

If it's successful, the plan is to grow another 10ha in 2020 to bring the total to 20ha (50 acres). Having two fields at different stages, will also reduce the impact of both crops being in their establishment year when yields are less.

With no artificial fertiliser applied to the crop so far and its natural nitrogen fixing properties, David believes the long-term potential is significant. "It's growing a crop without fertiliser and getting that fibre and protein for the cows," he says. "I think having a third forage in there also helps intakes and milk from forage. We just need the confidence to sow more of it." 



Lucerne's high fibre should aid rumen health, says David Hares.

LUCERNE GROWING AND HARVESTING

Lucerne has a very small seed, which means drilling the crop into a fine seed bed is essential.

David says the first few weeks of establishment are also the most tricky when getting the crop going.

"It's the first establishment and the first few weeks when you have to pay attention to weeds," he says. "It likes warmth. You wouldn't want to drill before April. We treated it like a grass ley, with the same sort of seed bed."

ESTABLISHMENT

- Maize field selected, with good phosphorus (P) and potassium (K) and pH levels.
- Slurry applied at 4,000 gallons/acre one week before ploughing.
- Field ploughed and rolled at start of May 2018 - very light ground so easy to work and produce a fine seed bed.
- Timbale lucerne seed drilled at 8-10kg/acre using a combi-drill.
- Rolled again.
- Sprayed with herbicide early on in establishment to take out chickweed and grasses.

HARVEST

- In its first year, the crop needs to be left to flower before taking first cut, so in 2018 the crop was first harvested in late July.
- A second cut was then taken after fourth cut grass silage in September/October.
- Only slurry applied at 2,500 gallons/acre after silaging. No other fertiliser used.
- This season will be the first where the crop will have to be closely assessed to gauge when to cut. Something David believes will take some practice. He will aim for a balance of quality and not letting it get too stemmy.

Put soil pH at top of business priorities

Getting soil pH right will reward you with better yields and improved nutrient utilisation, as Aly Balsom reports.

Knowing your farm's soil pHs and targeting lime accordingly is a business decision worth making considering low pH could be holding back grassland productivity by 1-2 tonnes of DM/ha per year.

Data from 197 grazing fields analysed as part of GrassCheck Northern Ireland found that 32% of fields were below pH 6 and recorded average yields 1.9tDM less than fields above pH 6.

Chris Duller, independent grassland consultant, has seen similar patterns across the whole of the UK, with 50-60% of the soil samples he's taken this year falling below the target for grassland of pH 6 to 6.5.

He recognises that it's all too easy for liming regimes to slip. However, he says failure to keep on top of soil pH can lead to problems. "It's like going to the dentist. If you leave it a long time, it's expensive and it hurts," he explains.

pH will fall more quickly on fields where silage is taken more regularly, where high levels of nitrogen are applied, on lighter soils and heavy rainfall areas.

Low soil pH will impact performance for several reasons:

1 Phosphorus (P) availability

Low pH will tie up phosphorus in the soil (binding to iron and aluminium) making it unavailable to the plant. This can particularly impact on spring grass yields as that's when the plant needs more phosphorus to grow.

2 Organic matter cycling

Low pH will reduce worm and microbial activity in the soil, which will reduce breakdown of organic material. This can lead to a build-up of thatch which can affect grazing efficiencies.

3 N cycling

The slower breakdown of organic material in the soil will release less nitrogen to the crop and will also limit the fixation of atmospheric nitrogen by legumes.

4 Sward quality

Maintaining soil pH helps maintain the percentage of ryegrass in the sward and prevents weeds and native species from ingressing.

With this in mind, Chris advises soil testing every five years and liming "little and often" to ensure pHs are kept at the optimum pH 6.2. On fields where pH is close to target, using a highly soluble, prilled lime at 50-100kg/acre can be an effective way of raising pH slightly.

Where pH needs to be raised more considerably - say from pH 5.4 - a phased release, ground lime is more appropriate. The key is to ensure lime products are decent quality, with few, large particles. This will promote good uptake into the soils. Ideally lime should have 40% of its particles at <150 microns and a neutralising value of 50%.

Although many farmers will be tempted to apply lime to their worst fields, Chris urges them to target newer leys with higher levels of perennial ryegrass.

"Spending £160/ha on lime can easily see an increase of 1.5tDM/ha/yr on low pH fields where ryegrass is still dominant (50%+) - meaning recovery of investment in the first year," he says.

"It's about prioritising when you go and recovering your return on investment. Your bad fields won't get worse if you leave them, but your good fields will."

GrassCheckGB

Soil pH will be one of the areas monitored by the 50 beef, sheep and dairy farms in England, Scotland and Wales that have signed up to provide data for GrassCheckGB.

The project will monitor the growth and quality of pasture and make predictions of future growth. Findings will be published weekly, enabling farmers to plan and make informed decisions on grassland management.

The initiative is a collaboration between the Centre for Innovation in Livestock (CIEL), The Agri-Food and Biosciences Institute (AFBI), Rothamsted Research, the three GB meat levy bodies, and industry sponsors Germinal GB, Waitrose, Cawood Scientific and Handley Enterprises.

Picture: Targeting lime on newer leys with high levels of perennial ryegrass will bring the best return on investment. Image used with kind permission of Grange Quarry & Concrete Products.



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Stop milk from maize slipping through your fingers

Decisions taken on the day of maize harvest can impact on how well the resulting silage feeds over 200 days of winter.

Maize may have only just gone in the ground, but it's worth considering how you plan to harvest and ensile it come the autumn to ensure it feeds as well as possible, as Forager reports.

There's enough energy in one hectare of fresh forage maize to support 30,000-40,000 litres of milk production, which means it's well worth taking every care to safeguard quality and prevent wastage.

That's according to Volac silage expert, Darran Ward, who calculates this huge production figure whilst assuming animal maintenance is already being met.

He believes the significant value of maize is further underlined by the fact that one cut of maize silage yields a similar amount as three cuts of grass silage, and costs a similar amount to produce. But for maize silage with only one harvest per year, you only have one chance to make it right.

"It's important to appreciate the full value of maize in terms of its ability to support milk production and many farmers underestimate maize silage losses," says Mr Ward. "Typically, up to around a quarter of the tonnes of dry matter ensiled are lost during maize storage. The majority is lost through aerobic spoilage from yeast and mould growth in the presence of air, which causes heating. However, losses

from poor fermentation can also reach 8%."

Harvest date has caught us out in recent seasons with many reporting very high dry matter maize silages, suggesting optimum date for chopping has been missed. Keep regular checks on plant maturity well before the expected harvest date, suggests Mr Ward, and keep in close communication with your contractor so you can plan towards harvest date.

"You should cut when the whole plant is at 30-33% dry matter," he advises. "With modern 'stay green' varieties, the cob may be mature even though the rest of the plant doesn't look it. Also, don't cut too low: there are more mould spores in the base of the crop. And aim for a chop length of 1.5-2cm."

Ultimately, by cutting at the correct timing and using the right cutting height and chop length, it not only optimises nutrient content, but also sets up the crop for a better preservation.

High dry matters and long chop lengths make the crop more difficult to consolidate, trapping air in the silage, which encourages the yeasts

and moulds that cause heating.

Mr Ward adds: "Farmers often take tight control of everything else with maize – such as ploughing, liming, having silage analysed and balancing the ration – but don't take full control of the preservation.

"It's the same with additives. It's easy to omit one, but that means you leave the preservation much more open to chance. Ideally, look for a dual-purpose additive that not only improves fermentation but also controls heating."

Ecocool for example contains *Lactobacillus plantarum* MTD/1, the same bacterium in Ecosyl, which is



Ideally, look for a dual-purpose additive that not only improves fermentation but also controls heating of maize silage, says Volac's Darran Ward.

proven to produce a rapid fermentation. But it also contains a second bacterium, *Lactobacillus buchneri* PJB/1, which inhibits yeasts and moulds. It has been found to keep silage taken out of the clamp cool for more than 10 days.


Mr Ward explains: "Covering both issues like this gives flexibility if you can't guarantee maize will be harvested on exactly the right day. There is an argument that green maize with a higher moisture content needs more help with fermentation. In more mature maize, yeast and mould levels tend to increase."

Similarly, maize preservation can often go wrong during clamping because there is pressure to complete the job quickly. Effective clamping is vital because correct filling, thorough consolidation and proper sealing aid

fermentation and starve spoilage organisms of oxygen. To squeeze air out, you need to consolidate to 700kg of fresh maize per cubic metre.

"Too many clamps are filled in a ramp. But this makes it difficult to fill in 15cm layers, which is the maximum that can be consolidated effectively. Filling in horizontal layers makes that easier," Mr Ward adds.

Sheeting should then create an airtight seal. At feed out, it's important not to be tempted to pull the sheet over the clamp face as this creates a warm microclimate, encouraging yeast and mould growth.

"Ultimately, there's no single step to good maize preservation," says Mr Ward. "It needs a joined-up approach. By improving understanding of what happens in maize clamps, it is easier to take the right steps." 

Checklist for making better maize silage

1. Planning

- Keep contractors informed of anticipated harvest date.
- Clean the clamp and surrounding area to minimise contamination from last year's mouldy silage and soil.
- Begin making the clamp airtight using polythene on walls.

2. Harvesting

- Aim to harvest at 30-33% DM. Too dry is more difficult to consolidate. Too early and starch in kernels is not fully formed.
- Harvest 'stay green' varieties before they die back.
- Don't cut maize too low – it increases risks of soil contamination and mycotoxins.
- Consider a 1.5 to 2cm chop length for easier consolidation.

3. Treating

- Minimise losses by choosing an additive for:
 - Improving fermentation, and
 - Reducing heating (aerobic spoilage).

4. Clamping

- Fill clamp in layers maximum 15cm deep.
- Apply salt into top few inches – they are particularly vulnerable to heating.
- Consolidate to 750kg or more of fresh maize per cubic metre.
- Use an oxygen barrier film with polythene sheeting on top folded with side sheets to create a seal.
- Protect with a woven top sheet, weigh down, use a net to stop birds and bait against rodents.

5. Feeding

- Minimise air ingress by using narrow clamps to allow rapid progression across the face and keep the face tidy.
- Roll the top sheet back – don't pull it back over the face.
- Clean up old silage to minimise contamination from spores.

Source: Volac's Cut to Clamp initiative for maize

Want more information on making maize silage?

Visit: www.cuttoclamp.com/maize-step-1-planning



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Vending machine outlet for free-range milk

Branding their milk under the Free Range Dairy, Pasture Promise banner and selling milk through two milk vending machines, is helping one Wiltshire farm add value to their business, as Aly Balsom reports.

It's common to see drinkers at the Radnor Arms in Nunton sitting at the bar with a pint of beer and a Nunton Farm Dairy Free Range Milk bottle.

After supping on an ale, they can pop outside and top up their bottle using the Nunton Farm Dairy milk vending machine in the carpark. It's proved to be a popular location, not only with pub-goers and locals, but also further afield, with 20% of milk buyers travelling up to 20 minutes to get there.

The vending machine is the brainchild of Wiltshire farmer, John Martin, who farms with father Simon at Nunton Farm, located a few hundred metres from the Radnor Arms. The pair farm in partnership with The Longford Estate near Salisbury. The business runs across 486ha (1,200 acres) and farms 800 predominantly British Friesian cows. Cows calve in two

equal spring and autumn blocks and yield 6,000 litres a cow a year at 4.7% fat and 3.6% protein.

Running a low cost, forage focused system has always been a priority, with attention placed on milk from forage - a figure that sits at 45% of production. 31% of that coming from grazing.

With this in mind, in John's final year studying Agriculture at Reading University, he decided to focus his dissertation on how he might use the forage message to differentiate the farm's milk when he returned home.

He explains: "I wanted to look into it to see if we could get any added value and market our milk as grazing based."

Brand

A survey of about 500 shoppers found that around 85% would choose free-range

milk. However, after contacting several processors, it appeared they were less keen to get involved. John's conclusion was that selling milk on a small scale and promoting their own brand was the way forward.

"It's selling us as a brand and branding ourselves as free-range. Everything else is sold under a brand, why not milk?" says John. Simon agrees: "Half the problem is milk is not branded," he says. "That's why we end up with a commodity price. Free-range is almost making it a premium, luxury product."

The Free Range Dairy Pasture Promise scheme stipulates that cows must be out for 180 days a year. Both John and Simon are adamant this is not about

creating a "them and us" culture between housed and grazing systems, highlighting that there will nearly always be times when cows need to be housed, including on their own system.

Their autumn block are in the shed for about 3-4 months over the winter, whilst the spring block is out-wintered on deferred grazing. Cows at the start of the spring block will be housed for a short time, before being rotationally paddock grazed. The autumns receive a TMR of maize and grass silage and parlour cake over winter, with springs getting the same at turnout.

Vending machine sales

The Martins decided to sell pasteurised milk via the machine to avoid the additional testing and paperwork associated with raw milk. The old milk tank room at the dairy was converted into a pasteurising room with cold storage facility, with the milk tank moved outside.

Milk is collected at morning milking and pasteurised, before being moved using a box trailer to the vending machines. This means it can be in the vending machine within two hours of milking, something John says is one of their "biggest selling points".

The first vending machine went in at the Radnor Arms in July 2017.




About 1,200 litres of Nunton Farm Dairy milk is sold every week via two milk vending machines.

The location was ideal as it required no additional planning permission, was located near the farm, had good footfall and was in a middle class, active village.

Sales grew rapidly from £1,500 to £4,000-worth within two months, largely by word of mouth. The site was so successful that the Martins started to look for a second location. A second machine was subsequently installed seven miles away at Bird & Carter Farm Shop. "As far as I'm aware, we're the first ones to have multiple sites. Or at least when we first did it," says

John, who also sells milk to cafes and Hooves for Coffee, mobile coffee bar.

At present, about 1.2% of the farm's total milk production goes through the vending machines, with the rest sold to Wyke Farms. However, the plan isn't to stop there. John is currently looking for a third location, within 20 minutes drive of the farm and 3-4 more within five years.

"I'd like every machine to be selling 1% of our total production. That's about 800-900 litres a week," he says. 



The Radnor Arms pub has proved a popular location for one of John Martins' free-range milk vending machines.

Milk vending machine - the numbers

Set up costs

£65,000 initial investment for one vending machine, pasteuriser and set-up. Including incidentals like electrics, buying bottles, branding

£17,000 cost of vending machine

£3,500 cost of bottle dispenser

£5,000 cost of modifying shed to house milk pasteurising facility

Income

£1.10/ltr

£2.00 for each reusable glass bottle

1,200 ltr sold a week (through two vending machines) - approximate

7,000 bottles bought to date

£5,000 average total sales a month

Things to think about when installing a milk vending machine

- Location is number one - you need passing traffic and the site to be easily accessible.
- Buy with expansion in mind (pasteuriser and vending machine).
- Approach your Environmental Health Officer at your local council in the first instance about selling milk via a vending machine.
- Facilities - a food grade room will be needed to handle milk hygienically along with appropriate training.
- A Hazard Analysis and Critical Control Point Plan (HACCP) document is required. This details the food safety risks on farm and what controls are in place to ensure milk is safe for the consumer. This can cost about £200 if you employ someone else to do it.
- Ongoing testing - you will need to pay for routine milk hygiene testing. For the Martins this cost £30/go for three tests. Check with your Environmental Health Officer.
- Testing and regulation will be more complex if you choose to sell raw, unpasteurised milk.
- Think about marketing - you will need branding. Social media is a useful tool, with Instagram and Facebook proving particularly valuable according to John.

Avoiding forage impurities

Soil contamination is often overlooked as a reason for poor forage quality. Luke James reports from a grassland machinery event where advice was on offer on how to avoid problems.

Ash content may not be the first criteria to look at when the silage analysis report arrives, but as an indicator of soil contamination it should certainly not be ignored.

If the analysis shows a level in excess of 10% of the dry matter, this may well point to there being a significant amount of soil in the forage and a negative impact on feed quality and even animal health.

Speaking at Kuhn's GrassMaster training day at Harper Adams University ahead of the 2019 forage season, Southern Area Sales manager Tim Holliday explained the significance of ash content.

"Not all of the ash content is bad, as we need to differentiate between internal and external components," he said. "Internal ash accounts for the naturally occurring minerals in the forage, such as calcium, potassium and phosphorus. These are valuable nutrients, and - in a grass-based forage - they can typically amount to around 6% of the total dry matter - or as much as 8% in a legume-based forage.

"External ash is the unwanted part, as this is soil contamination. Apart from offering no nutritional value, the soil may contain harmful bacteria that can affect silage quality or even lead

Table: Economic losses due to soil contamination in silage

	Forage contamination / soil content	
	2%	4%
Energy content of silage (MJ NEL/kg DM)	6.2	6.0
Energy content (MJ NEL/ha) [10tDM/ha yield]	62,000	60,000
Energy loss (MJ NEL/ha/year)	2,000	
Cost of concentrates to replace energy loss	€44/ha (£38/ha)	

Source: LWK Weser-Ems. NEL = Net feed energy available for lactation

directly to animal health issues."

For example, clostridia, which is commonly found in soil, is typically associated with creating a butyric fermentation, resulting in poor palatability and lower feed value. Listeria is also a soil borne bacteria and can cause listeriosis in livestock, which can be responsible for conditions such as abortion.

Whilst animal health issues are easily identifiable, the impact of poorer forage quality may be harder to spot. Nevertheless, the effect on the bottom line is quantifiable, as Kuhn product manager Joseph Tard explained.

"Research at LWK Weser-Ems in Germany has shown the effect that soil contamination has on the energy content of grass silage and the subsequent economic impact. The work compared silages with 2% and 4% soil contamination respectively. The overall energy loss amounted to 2,000 MJ/ha of feed energy available for production. Put

into a typical bought-in feed cost context, this loss could be equated to €44/ha (£38/ha)."

Minimising soil contamination

There are steps that can be taken prior to and during grass harvesting to minimise soil contamination (see box). Bear in mind that dust can be as big a contributor as clods of earth.

Moving grass into windrows for pick up by the forage harvester or baler is undoubtedly one of the commonest sources of soil contamination, said Tim.

"Even in the flattest of fields and on the driest of days, it's not uncommon to see a cloud of dust above the twin or four rotor rake as it speeds around the field in its quest to stay ahead of the forager. That dust cloud, or the larger lumps that are flicked into the swath, are inevitably going to increase the ash content of the silage," he explained.

Belt mergers, exemplified by Kuhn's new Merge Maxx 950, now offer a viable alternative to larger



Soil contamination will have a significant impact on the feed value of grass silage, says Joseph Tard of Kuhn.

format rakes, and all the evidence is that this technology offers a solution to soil contamination and much more.

The Merge Maxx is designed to ensure a clean grass pick-up in order to produce a swathe which is free of stones, soil or other impurities. It achieves this by following the ground contours accurately, despite collecting a 9.5 metre expanse of grass in a single pass. This is a result of three key design elements: articulated pick-up skids, powerful lift-control springs, and pivot points which provide vertical and angled ground clearance. As well as ensuring good forage quality, less debris within the swathe also translates to less time and money spent on replacing blades and other working parts on the forage harvester or baler.

"Early adopters of this machine are reporting significantly reduced ash content and a reduction in the number of stones going through foraging equipment," reports Tim, "and I've even heard stories of it leaving muck residues on the field when a rake working alongside has picked up everything off the field and put it into the silage.

"It's also proving highly efficient in terms of work rates in comparison with the biggest four rotor rakes. It's very adaptable, because of the bi-directional belts, and can create swathes to either side or centrally. In the case of light crops, such as we are seeing in multi-cut systems, three passes of the Merge Maxx can collect 27 metres of grass into a single swathe."

Tips on avoiding silage soil contamination

In preparation:

- Maintain dense swards with minimal gaps.
- Roll and/or harrow fields to remove mole hills and ruts.

During harvest:

- Avoid harvesting in wet conditions.
- Set mowers to the correct cutting height, and adapt for conditions.
- Ensure tedders and rakes are set to collect grass and not soil.
- Adjust operating speeds to suit conditions.
- Avoid driving over mown grass.
- Keep all clamp machinery and clamp apron clean.

“We are overwhelmed with how SexedULTRA 4M has performed in our spring block-calving system, we have got more cows in calf whilst producing enough replacements needed for the herd.”

Tristan & Jaci Dale
Field to Yield Farming, Shropshire.



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*On milking cows



Make quality your priority

Gaining knowledge to help maximise metabolisable energy per hectare (ME/ha) from grassland is one objective at Field Options' long-term mixture trials in Shropshire, as Luke James discovered.

It's now over twelve years since Francis Dunne of Field Options first began his unique approach to grass mixture testing at Harper Adams University.

Since 2006, the company has monitored the performance of forage mixtures to assess how different combinations perform under conditions that are as close as possible to commercial reality.

The programme, now based at the Crop and Environment Research Centre, is into its third sequence of long-term trials, with the lessons from earlier research being used to shape the focus for the next tranche of activity.

"Our overriding objective is to challenge existing thinking and improve the performance possible from forage," explains Francis. "UK farmers tend to grow mixtures, not usually straight varieties, so our focus is on finding the best combinations of grasses, or grasses and legumes. And in the latest trials we're also including herbs such as plantain and perennial chicory.

"We're looking at dry matter yield and quality throughout the season, and we're also able to make a good assessment of sward persistency because our plots are monitored for five years' production beyond the establishment year."

Francis calculates that at 80% utilisation and a milk price of 26ppl, increasing forage production by just 0.5tDM/ha can boost dairy output by around £250/ha. Improving the ME of forage by 0.5MJ/kg would add a further £200/ha. With similar gains possible in beef and sheep scenarios, he's quite clear that generating sustained improvements in yield and quality should be the primary objective.

He highlights the following key lessons on maximising ME/ha from the 2013-2018 trials programme:

Italian ryegrass or hybrid ryegrass?

Traditionally a lot of silage leys have been designed to maximise the bulk

that can be achieved from a first cut and, with high yields and early growth as the priority, Italian ryegrasses have been widely used in this context. However, whilst early season quality may be acceptable in most Italian ryegrasses, D-value tends to fall away later in the season, potentially undermining the early season value.

"We found that the average ME of Italian ryegrass mixtures over the first two seasons of this trial period was 0.65MJ/kg lower than the hybrid ryegrass control," says Francis. "That's a significant shortfall in energy yield potential and should be taken into account when planning a quality focused forage production system."

Short or medium term leys?

The established knowledge is that short-term leys deliver dry matter yields in excess of that achievable by longer-term leys over their 2-3 year life, but with modern ryegrass

breeding moving perennials forward does this still apply? In fact, in the second year of Forage Options' 2013-18 trials, the best performing long-term mixtures equalled – or in some cases out yielded – the mixtures formulated for 2-3 year duration.


"The only exception to this result was in mixtures containing red clover," adds Francis. "What we found was little, if any, yield advantage from shorter-term leys. In addition, the longer-term leys were on average around 0.8MJ/kg better in terms of their quality."

Maintaining a cutting discipline

All the Field Options plots are cut on a 30 day rotation, reflecting the increasingly popular practice of multi-cut silage making. Over the course of the 2013-18 trials programme, the energy yield from all mixture plots averaged just under 12.9 MJ/kg ME.

"Samples are dried immediately after harvest, preserving the potential, so this figure is undoubtedly higher than what would be achieved through ensiling," explains Francis, "but there is a strong message here in the value of maintaining the discipline of cutting your crop at the optimum maturity."

Ultimately, the most successful forage production system will be a combination of selecting a mixture fit for purpose and then managing the crop to maximise its value, keeping quality as the main priority.

"We start by selecting varieties from all breeders, but only those performing in the top 20% on the Recommended Lists, and then try to ensure that their potential is fully realised," concludes Francis. "With different grass species, legumes and herbs all playing their part, it is possible to have quantity and quality, and the gains that are possible from finding the right combination are very significant." 

Selecting the right grass type and maintaining cutting discipline can help maximise metabolisable energy per hectare, says Francis Dunne.

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CHEWING THE CUD

Somerset-based Lye Cross Farm has produced the first 100% grass-fed, certified USDA Organic cheese for the United States. Laura Mushrush speaks to farm operations director, Nick Green to find out how the Lye Cross Farm business has developed and the scope the grass-fed message has to promote British farming.

LM: How did the Lye Cross Farm cheese brand get started?

NG: The business was founded in 1951 by two brothers, John and Sam Alvis. After Sam returned from World War II, they decided to pool their resources and form a limited company with a view of producing milk to make into cheese. This was to add value to the milk they were producing from their initial 200-300 head of cows.

The business has since expanded so milk is produced by the Lye Cross Farm's herd of 1,200 mainly Holstein-Friesian dairy cows, along with 27 other farms on

contract. We now produce about 4,500 tonnes of cheese a year.

LM: 4,500 tonnes is a lot of cheese. How is it sold?

NG: Our focus is on higher retail and selling direct to the consumer via retailers. Our cheese is going to the likes of Waitrose, Marks & Spencer, Aldi, Lidl and Asda. We do wholesale to Whole Foods chains, and export to 40 different countries.

LM: Lye Cross Farm has been in the press recently for the development of the first 100% grass-fed, USDA

Organic cheese sold in the United States. How did the business go about identifying this unique market?

NG: We had two suppliers producing milk from grass-fed only cows who recognised that we could be making better use of their milk because it is unique to the UK. We first spoke to the Pasture For Life Association to see what they thought the market might be for a grass-fed cheese. Whilst they gave us positive feedback, we weren't confident enough that the market would be good enough in this country.

We then asked organic customers coming over from America and received a very positive response. After that initial conversation, those customers conducted some market research to determine if there was a market, what type of product the market wanted, and how big the market was.

LM: What has made a British made, grass-fed cheese attractive to the US market?

NG: It appears there is a backlash in the USA against elements of modern agriculture from certain sectors. There is

resistance against the use of glyphosate, genetic modification and growth hormones as examples. It ties in with that same sector wanting more natural foods such as organic, non-GM and pasture-fed. Cheese made from milk produced from cows fed a 100% grass diet fits into this category. It is very small in the overall scheme of things, but a niche we as a business can supply into and generate a profit from.

LM: What criteria do your grass-fed cheese suppliers need to follow to meet USDA Organic standards?

NG: To meet USDA Organic standards, cheese can't be produced from cows treated with antibiotics or given hormones. Only one of our producers needed to make a management change because he had a few cows that needed to be treated with antibiotics for mastitis. Since their milk was no longer allowed in the bulk tank, he now uses them to suckle calves.

Our site, along with the two individual supplier farms, had to go through an auditing process to ensure everything was

okay for the USDA Organic standards. Once this was approved, we were ready to start making cheese.


LM: Do you think the UK dairy industry and processors need to get better at marketing UK farming practices to make the most of post-Brexit export opportunities?

NG: I believe the UK consumer is becoming increasingly aware of where their food comes from. That said, one of the key elements in choosing what foods to buy is cost and that dictates to many what gets put in their shopping basket. Provenance and production systems certainly play a part in consumer decisions and the more we can promote both to the consumer the better. It will grow, but what we have to remember is the UK has some of the highest food standards in the world so whatever prompts someone to buy something different needs to be positively promoted. As a business we will continue to promote everything that is good about our provenance, our product, our brand and our business values. Hopefully, with all those elements combined we will be

able to take advantage of a more discerning consumer and continue to build our business.

LM: Do you think that there is an opportunity for UK farmers to improve their bottom line by marketing their own products?

NG: Indeed, but people shouldn't lose sight of their core business. If you have 250 cows and are doing a good job at that, in my opinion, focus on farming better to improve technical efficiency. If there is opportunity to do something small scale, like making ice cream or having a milk vending machine, don't let it distract you from your core activity because these things are going to take capital to set up. And until you actually go to market with your product, you don't increase profit – you increase costs.

It's essential to get the business model right before investing. Make sure you have a market, and that it is going to be economical and profitable. There's a lot of people with burnt fingers from doing things because they thought it was a good idea and it hasn't worked out. 



Lye Cross Farm makes 4,500 tonnes of cheese a year from milk produced using organic and conventional farming practices.

