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FORAGER

ISSUE 16: Spring 2018

HOME GROWN FEED FOR SUSTAINABLE FARMING

PUSHING PRODUCTION

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Quality baling Quality forage



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We welcome feedback, suggestions for articles and contributions. **Editor:** Aly Balsom T: 07912 344 219 E: aly@alybalsommedia.co.uk **Advertising:** Sarah Allin T: 01694 731777 E: sarah@abccomms.co.uk **FORAGER** is available free of charge to farmers and industry specialists. To be added or removed from the magazine mailing list please contact: abc@abccomms.co.uk T: 01694 731777. **FORAGER** is published periodically. **FORAGER** Magazine is registered with the British Library ISSN: 2052-0816 (print) ISSN: 2052-0824 (online) **FORAGER** is a Registered Trademark of Germinal Holdings Limited

Editor's

NOTE

Can you up your forage making game this season and challenge yourself to embrace new forage making strategies? asks Aly Balsom.

CONTACT ME

T 07912 344 219

E aly@alybalsommedia.co.uk

T @AlyBalsom

What plans are you making to ensure this year's silage season goes off without a hitch and you are in good stead to produce quality forage stocks?

Visit any forward thinking dairy farm and ask the same question and the answer is increasingly the same; "We're taking more cuts through the year at shorter intervals."

This multi-cut approach is catching on, and the reasons are clear - better silage quality, lower bought-in feed costs and improved performance from forage. Put like that, it's a no brainer.

A recent Germinal and Volac farmer survey found that 89% of the 150 respondents were aiming to increase milk from forage, with 42% wanting to increase the number of silage cuts they take.

56% had made no change to the number of cuts they were taking in recent years, with a third of producers only currently taking two cuts of silage a year - highlighting the huge scope for improvement.

In Scandinavia - where the multi-cut approach originates - farmers commonly take 5-6 cuts a year. This may not be possible in all locations in the UK, but instead, this year, try and challenge yourself to take one more silage cut than you usually would. By reducing cutting interval to every 30 days, silage quality will see a marked improvement. Starting earlier in the season is also part of the improved quality story - something over half of farmers surveyed recognised.

Challenge yourself to take one more silage cut than you usually do

However, when cutting more frequently, it's important to adhere to some basic rules of multi-cut silage management. Only by doing so will you be able to realise the full benefits of such a system and avoid potential issues with fertiliser uptake and clamp slippage. Our multi-cut advice piece on page 12 goes into details on the dos and don'ts of the system and is the start of a series of articles we'll be doing on growing and feeding this higher quality forage.

Such an approach is just one example of how adopting new thinking and forage technologies can help bolster production potential. Soil mapping and variable rate fertiliser application is another area of growing importance on grassland systems (p14-17) - gone are the times when livestock producers can write off such technology as only being relevant in the arable world.

Regular reseeding is another one that Forager readers will be all too familiar with, yet 24% of farmers surveyed were only reseeding 0-5% of grassland a year. Can you up your game with your reseeding policy? Can you try new forage varieties and systems to boost forage production on your farm? Picking varieties and mixes that suit your farm (see multi-species leys on page 18) or thinking about different ways to grow and feed fodder (see fodder beet options on page 22) all have a valuable part to play. Ultimately it's about thinking outside of the box and challenging convention. **F**



Next generation

In this edition's Next Generation feature, we visit Nick Cavill in Somerset, to find out about his new dairy enterprise milking 120 crossbreds, once daily.

Having started his first milking job at 13 with no farming background, now aged 30, Nick Cavill has realised his dream of setting up his own dairy farm.

In March this year, 120 crossbred heifers will calve for the first time at Manor Farm, Godney, where Nick has set-up a once a day milking system from scratch. All of this has been funded from 17 year's worth of work which has focused entirely on achieving the end game of milking his own cows.

He started by milking before and after school in his early teens, before being employed as a herdsman. During his 'down time' in-between milking he then set up his own contracting business to build more funds, which he ploughed into starting a heifer rearing business at Manor Farm. Having built capital and the ability to borrow, he then extended his Farm Business Tenancy to 10 years and started the process of converting the farm into a milking unit.

The fact the farm is made up of predominantly peaty ground and has areas prone to flooding, means the rent is relatively cheap, which has helped get the business off the ground. The land type limits improvement works, but perennial ryegrasses have been stitched in where possible.

Land type has been one of the reasons for choosing the simple, low input, once a day system. The limitations in terms of machinery use on ground also complements the business' organic Arla contract.

He believes the once a day template is a win-win in terms of lifestyle and profitability. He says: "The combination of having young children, not living on the farm, having cows grazing and the massive potential margin are the reasons I chose this system."

As cow numbers increase there will need to be substantial investment in tracks. The plan is to rely on grazed grass, with no concentrate fed through the parlour and silage bales used as a buffer when necessary. Cows will be rotationally paddock grazed across the 30, 3ha (8 acre) paddocks. **F**

Business projections

- 2,400 litres a cow a year (target 3,000 litres in year two)
- 5% fat and 4-4.2% protein
- Budgeted COP of 15ppl
- Budgeted on a three year organic milk price of 35ppl (currently projected to be 44ppl+bonuses in year one)

In the HOT SEAT



Name: Nick Cavill. **Age:** 30 **Farm:** Manor Farm, Godney, Somerset

Acres: 185ha (456 acres) rented ground (four landlords)

System: Will calve 120 organic, crossbred cows milked once a day in March 2018 in a six week block. Also runs a contracting business including 15 full time and sub-contracted staff.

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

Cash flow. I had a heifer rearing contract that came to an end and then had 87 calves on a Meadow Quality contract, but health challenges meant they were not profitable. That meant we had a 12 month period where we had the cost of rearing 200 animals (heifers for the dairy and the 87 calves), plus rent with no income. Local businesses have been very supportive as we approached them before the problem happened.

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

I still think cash flow for the next two years. On paper it looks like it will work smoothly but it probably won't. There's always going to be somewhere where money needs to be spent.

What's been your greatest success?

I don't consider myself successful as success is measured by if your company can pay the bills on time. The time when I can pay the bills on time and live the life I want, I'll count myself as successful.

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

I'd be disappointed if I hadn't bought my own farm in 10 year's time. That's the ultimate goal. I'll use this farm to make good money as rents are so cheap and then raise enough money to buy my own farm and manage two units.

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

My kids and wife Becca - they're my drive; a fantastic team of guys, and my love of cows.

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

Don't spend too much money future planning as you might never get there, i.e. don't push yourself too far too quickly.



Contractor communication

In our new Forage Business series we look at the importance of a good contractor relationship to making quality grass silage. Business management consultant Ian Powell of The Dairy Group offers some valuable insight.

Whilst owning your own machinery can mean you have greater control over silage making, the reality for most larger scale livestock operations is that a contractor is often the best option.

The degree to which they're involved can vary from farm to farm - from providing a complete cutting-to-clamping service to fulfilling key elements of the process alongside the farm's regular staff.

Given the importance of quality forage to any ruminant livestock business - and the critical nature of timing and speed of operation to achieving the best outcome - a good relationship with the contractor is not something that should be taken for granted.

1. Communication is key

Don't leave it until the last minute to contact your contractor. Contact them early in the year, clearly setting out your requirements and expectations. This is particularly important if you are changing from what you've done in previous years, such as cutting earlier for example.

Use email if possible, as this provides a record of what's been agreed, and then reiterate what's planned closer to the time. It's just not worth taking any chances because when the season is upon

you it may be too late to find an alternative plan.

Let your contractor know in good time if you are planning to change your usual practice, such as cutting earlier.

2. Know what you want and make it clear

There are a lot of variables in grass silage making. All aspects, such as timing of cutting, degree of conditioning, target dry matter, duration of wilting, length of chop, application of an additive, and so on all having an impact on the quality of silage you'll be feeding

next winter. The only way to really be in control of these variables is to make it clear to your contractor what you are aiming to achieve.

Most contractors will have a default position on many of these variables and will do their standard job unless you specify otherwise. Again, it's better to plan ahead so that if you want the conditioning unit on the mower adjusting or the length of chop of the forager to be something other than a standard setting, the contractor is given some notice.

3. Is your own input a help or a hindrance?

Many arrangements will involve the contractor working in tandem with the farm's own staff and equipment. It's important to challenge any contribution you are making - it may be counterproductive.

Many farmers like to take control of the pit filling, and that's fine because ensuring you have sufficient compaction and that sheeting down is done thoroughly is a critical element. However, anything that slows the contractor's progress significantly may not be good for the relationship or silage quality. Also, laying out capital on machinery that's of limited use at other times may not be economical in the long-run, even though it may appear to reduce the contractor's bill.

4. Agree the details in the quotation

Disagreements over the cost of the job are not helpful to any relationship, so agreeing the detail up front is important, particularly if you are starting out with a new contractor. Is fuel included or are you supplying it from your tank? If you are supplying it, how are you recording what's been used?

If you are in the position of putting your work out to tender, then details such as the fuel question are important so you are sure you are comparing like-with-like. **F**



Ian Powell, BSc Agriculture, MBIAC, is the Managing Director of The Dairy Group, a privately owned dairy consultancy business covering the whole of England. Ian has a wealth of business management skills which he utilises in his consultancy work with his clients which include milk processors, suppliers, groups of farmers and individual businesses.



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Grass utilisation key to profit

The 'Grass Rich' route for profitable farming businesses was highlighted at the recent Positive Farmers conference in Cork, where grass utilisation, labour efficiencies and farmer mental health were some of the topics up for discussion, as Aly Balsom reports.

Producing 1kg of milk solids for every 1kg of grass utilised is a useful target for all dairy farmers, according to the head of animal & grassland research at Teagasc, Dr Pat Dillon.

Data from Ireland's National Farm Survey 2015 looked at the top, bottom and average producers ranked on profit per hectare and compared them with the Moorepark "Next Generation" research dairy herd.

Results showed that the research herd of high genetic merit cross breeds was producing 1,300kg of milk solids per hectare for every 13t of grass utilised (see graph).

Pat told *Forager*: "Overall the bottom 20% are producing more milk solids, (than grass utilised) but relying on concentrates. You want to close the gap between milk solids and grass utilisation for maximum efficiency." Pat said the Moorepark herd was able to grow and utilise grass effectively by

adhering to the basics of good grass management practices and building management around the grazing wedge.

These included:

- Going into opening covers of 2,400-2,500kgDM/ha on 1 February
- Finishing the first rotation in the first week of April
- Achieving 10 grazing rotations throughout the grazing season
- Extending the rotation from mid August onwards

Having high genetic merit cows - selected to complement the grass-focused, spring block calving system - was also part of the recipe to success. The Moorepark herd is the highest EBI (Economic Breeding Index) in Ireland (similar to £PLI). The herd produces 5,413kg of milk and 443kg of milk solids per cow and achieves a 92% in calf rate at 12 weeks. Pat said high fertility

helped with the grass utilisation story, allowing calving to coincide with peak grass growth.

Positive Farmers cofounders, Michael Murphy and Con Hurley also placed grass utilisation - together with grass growth - high on the list of the priorities for those farmers striving for a profitable future.

In Ireland specifically, they see these two parameters as the key drivers in helping the country surpass the target of doubling milk production by 2020 as set out in the 'Food Harvest 2020 report'.

At present Ireland's dairy pastures produce an average nine tonnes of dry matter per hectare of which seven is utilised as grass and silage.

Michael said: "If grass production and utilisation were increased to modest targets of 12t and 9t respectively then the extra two tonnes of grass utilised per dairy hectare would see a profit

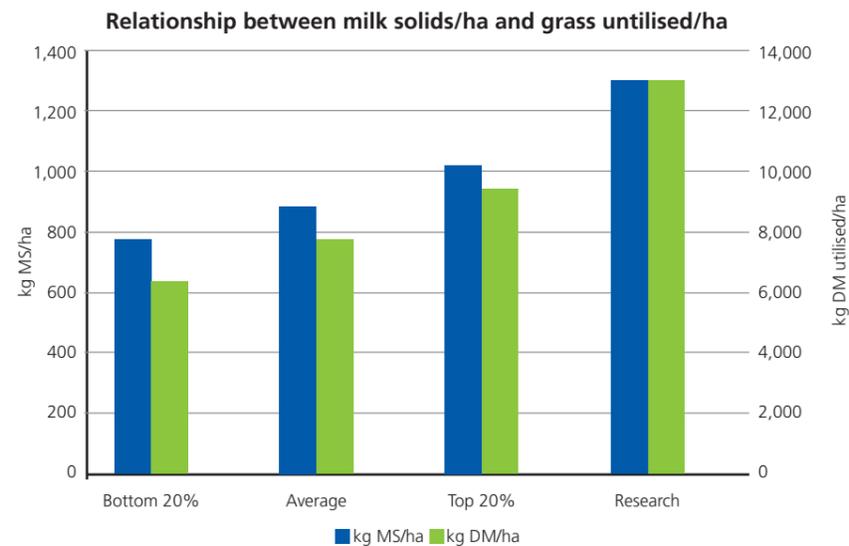
Building management around the grazing wedge and breeding the right cow help to maximise grass utilisation.

increase of €322 (£286) per dairy hectare, or almost €12,000 (£10,661) per farm. Milk production would also increase."

However Con believes that farmers should be lifting grass production and utilisation to an "ambitious, but realistic target" of 14t grown and 12t utilised.

At a national level, this would give an Irish milk output of nine billion litres of milk - well ahead of the 2020 target.

"The key point to grasp here is that this almost doubling of milk production is primarily a result of the increased tonnage of grass grown and utilised per hectare," he added.



The grass-rich route - how to maximise profitability on spring calving systems

- Increase the amount of grass grown per hectare
- Utilise as much as possible - up to 85% target
- Irish farmers and UK farmers in favourable grass growing areas should target - 75% grazed grass with the rest 18% grass silage and 7% concentrate feed
- Stocking rate must be 100% aligned with grass production per hectare and the farmer's ability to manage this to achieve the above figures

Milking time and cow care drive labour efficiency

Time spent on milking and cow care are the biggest influencers to overall farm labour efficiencies, according to a Moorepark labour efficiency study.

Thirty-eight, labour efficient, spring calving farms took part in the survey which focused on the busy calving period. Herd size averaged 195 cows. The results suggested that labour and cow care were the most time consuming tasks, taking up 33% and 17% of time respectively. Cow care included winter feeding.

Justine Deming (right) who carried out the research said there were some key things that the top 25% of labour efficient farms were doing compared to the bottom 25%.

This included:

- Having fewer places to cart feed to every day
- Stomach tubing calves colostrum
- Putting calves out to grass at six weeks old rather than nine weeks old
- Having larger parlours
- Having a backing gate
- Feeding with a tractor and sheer grab versus a feeder wagon
- Good animal health

Farms averaged 15-17 hours labour input per cow, excluding machinery costs. However, Kiwi farmer Chris Procter said he was achieving 11 hours of labour a cow a year.

He said minimising lame cows, having a dedicated calf rearer and ensuring only 10% of cows went round twice on the rotary all helped with efficiencies.

He added: "Having limestone tracks and rubber on entry and exit to the parlour helps with lameness and means we only have to pick up 20 cow's feet a year (excluding routine trimming)."

continued on page 10



Justine Deming

Feed at night for more daytime calvings

Feeding cows at night could reduce the number of inconvenient night-time calvings, resulting in improved labour efficiencies and more opportunity to ensure calves get the colostrum they need.

Farm observations on 27 spring calving units in 2017 suggested that farms that fed in the evening had about 80-90% of calvings take place during the day, compared to around 60% when feeding during the day. Emer Kennedy from Moorepark said the concept revolved around the fact cows would be full and ruminating and thus less likely to calve. She stressed that further research in a controlled environment was needed to quantify the true benefits. However, to ensure the best results she suggested:

- Feeding at 9pm to 9am
- Pushing up feed at 10pm
- Introducing the routine two weeks before the start of calving
- Providing enough feed space per cow

Sound bites from Positive Farmers

Nollaig Heffernan, staff consultant:
"Let's stop complaining and waiting for good employees to come in the gate and make sure you're the reason for good employees to come through the gate."

John Moloney, Chairman of DCC Plc:
"You have to earn the right to grow."

Aussie farmer, **Chris Procter** on staff:
"I will pay for any staff training they want - it's a cost but well worth it."

Farmer, **Jerry Murphy** from the Shared Vision Discussion Group on developing skills: "Responsibility is key. If you take ownership of a job, you see the consequences."

"Make sure you get really well trained. Do the right courses. But spend at least three years with bloody good farmers and at least one of those years outside the country," Positive Farmers co-founder, **Michael Murphy's** message to young farmers.



Sian Bushell, succession planner:
"You become a far better employer if you've been employed by someone else."

Think your way to less stress and greater productivity

Taking 10 minutes out of the day to practice mindfulness could help farmers refocus their attention and help them cope with worries outside of their control, like whether the milk price will go down or a cow might get sick.

Farmers who practiced mindfulness in an eight week pilot study reported a 22% increase in purposeful focus, a 25% decrease in stress and a 24% increase in self discipline.

Nuffield Scholar, **Holly Beckett**, who undertook the study, said there was a wide body of scientific evidence showing that the simple practice of concentrating on your breathing for a few minutes each day could rewire your brain to focus more.

"It's about the changes you're making in your brain. It's increasing your awareness so you're more aware of the thoughts you're having so you can say 'this is an unnecessary thought or something I can't do anything about'," she explained to Forager.

Research suggests that meditating on a daily basis, in the morning, is likely to bring the most benefit to the mind, in a similar way to going to the gym every day is good for the body.

Holly emphasised that it was not about blocking out your thoughts, but learning to recognise them and either engage with them or let them pass. The main benefits would then be found by linking this improved mindfulness with goal setting. "It's about pointing your mind in the right direction," she explained.

Thinking positively about what needs to be done would then influence outcomes. For example, boxer Muhammad Ali used to practice setting goals in his subconscious mind prior to a fight. He lost five fights out of 61.

He used to visit the area where he was going to fight in advance and sit and write the perfect moment when he won. He'd describe how he'd feel when he won, including what he saw, tasted and heard. He called it "writing future history".

The same principles could be adopted by farmers to help achieve their business objectives. Holly added: "If you're clear about your expectations, if you're clear about your goals and engage this central executive area of the brain, it will do just what needs to be done, when it needs to be done and you'll achieve it effortlessly, and effortlessly is the opposite of stress." 



Visit focussedfarmers.com to view a free 12 part video series on how farmers can practice mindfulness. You can also try the "Headspace" App in the App store.

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Tips to get the most from multi-cut silage

A growing number of farmers are recognising the benefits of taking more silage cuts through the season, but there are some golden rules to ensure the full potential of these multi-cut systems are realised, writes Aly Balsom.

“Multi-cut” is the buzz word around many forage focused farmers at the moment, with 40% of 150 farmers surveyed by Geminal and Volac saying they were planning on increasing the number of silage cuts they take per year.

The reason? The potential to improve silage quality, save on bought-in feed costs (see example calculation) and improve efficiencies off the same farm acreage, with the view to producing more from forage - something 89% of farmers surveyed said they were trying to do.

Multi-cut increases the frequency of cutting through the season by reducing the time between cuts from the usual six weeks to around 30 days. In doing so, grass is cut younger and leafier, producing a quality (see box), higher dry matter silage. Cows are then able to eat more of this lower fibre, 35% dry matter (DM) silage. Thus forage dry matter intakes are

increased, allowing higher cost bought-in feeds to be displaced, offering scope to reduce diet cost considerably.

In Scandinavia, farmers routinely take 5-6 cuts a year. However, in the UK, Kite Consultant, Sam Evans says rather than being caught up by a number, the aim should be to simply increase the usual number of cuts on your farm.

He says: “Rather than doing say three cuts, I’d say; can you do one more cut than you normally do? You’ll then be cutting more regularly and get leafier, quality silage.”

He has the following tips to get the most from multi-cut this season:

1. Cut earlier

Usually you’d aim to cut just before the seed head emerges. With multi-cut, the aim is to cut about two weeks before. So if you usually go in mid-May, think about

going around the start of May. This means you’re cutting younger grass, which fits with the principles of producing quality forage.

“The younger the crop is, the more energy, less fibre and more nutrients it’s got in it and it has a higher feed value,” explains Sam.

2. Be open to displacing bought-in feed in the diet

The benefits of using better quality silage to displace concentrates are potentially huge, but to see the full benefits, being open to feeding more forage is a must.

Sam adds: “Farmers need to change their mentality. As well as trying to improve forage quality, we’re trying to displace feed. So farmers need to increase dry matter intakes from forage at the same time.”

All the usual principles of providing plenty of feed space apply, as does adopting a regular

reseeding policy to produce the best quality crop of grass. Sam also believes the type of grasses grown is also important. This usually involves moving away from Italian ryegrasses and growing perennial ryegrasses to ensure all fields are the same and to deliver consistency across cuts

3. Plan fertiliser application

Timing of fertiliser application becomes critical on a multi-cut system as the aim is to cut about every 30 days.

“Those farmers that failed with multi-cut last year generally didn’t have the systems in place to put fertiliser on in time. The difference between those farmers and the ones that did it well was that they missed out on one cut in the year,” comments Sam.

Plan ahead and talk to your contractor in advance. The aim should be to apply fertiliser as soon as the forager comes out of the field. This is crucial to ensure sufficient nitrogen utilisation by the plant before the next cut and to avoid contamination issues in the clamp.

Generally the total amount of artificial fertiliser applied through the season is the same as a conventional silage system, but just applied little and often.

4. Watch wilt times like a hawk

As the crop is lighter and leafier, it can very quickly go too dry in the field. If the contractor is delayed it may be worth rowing up quickly so it doesn’t go too dry. The aim should be 35-38% DM.

5. Think about clamp management

The drier crop means clamp heating can be a challenge on larger clamps where it’s difficult to get across the face quick enough. Splitting the clamp in two may be worth considering. Using an additive to help make it more stable is also valuable.

When crops are ensiled below 30% DM, clamp slippage has been an issue on some farms, which emphasises the importance of monitoring DM.

6. Plan how you are going to feed it

Consider ration balance. With multi-cut you can feed more fibrous feeds alongside it, like

beetpulp, as well as lower energy bought-in feeds as the crop is higher in energy. **F**

Benefits from multi-cut silage

Cutting more frequently typically brings:

- A 0.5-0.7MJ/kg DM increase in ME
- 2% point increase in crude protein
- A three point increase in D value
- A reduction in lactic acid and a higher pH so the silage is more rumen friendly
- Increase in forage DMI
- Some farmers report an improvement in milk constituents likely due to improved rumen health from feeding more forage, however this is not a given

Cost and quality comparison depending on cut frequency

| Number of silage cuts | £/t of utilised fresh weight (FW) | DM % | ME (MJ/kgDM) | CP (%) |
|-----------------------|-----------------------------------|------|--------------|--------|
| 3 cut silage | 40.25 | 28 | 10.8 | 14 |
| 4 cut silage | 43.79 | 35 | 11.5 | 16 |

Cost advantages

Example Farm: 180 cows, averaging 28 litres a cow a day and fed a grass silage-based ration supplemented with a blend.

On a three cut system it would cost £3.66 per cow per day in feed (including forage cost, based on a silage cost of £40.25 per tonne of silage utilised and dry matter intakes of 11.2kg a cow a day and concentrate costed at £193/t).

By increasing the number of cuts to four, the quality of the silage produced is improved by 0.7MJ ME/Kg DM (see table). The cow is also able to eat more of the younger, leafier crop which displaces some concentrate, thus reducing purchased feed costs. This means forage DMI increases to 14kg a cow a day.

So on a multi-cut, four cut system it costs £3.18 per cow per day in feed costs (using a concentrate cost of £197/t to ensure rations are balanced comparably).

The benefits from moving from a three to a four cut silage system:

£3.66 - £3.18 = 48p/cow/day saving in feed cost between systems.

48p x 180 cows x a 180 day winter = £15,552 saving in feed costs.

Theoretically, cows should be able to produce more milk as there is more energy in the diet. The extra silage energy equates to an equivalent of 0.75 litres of milk.

0.75 litres x 180 cows x a 180 day winter x 27ppl milk price = potentially £6,561 worth of extra milk income.



Step by step guide to soil mapping

Improved fertiliser efficiencies, reduced costs and better yields are just some of the benefits grassland farmers could see from embracing GPS soil mapping technology. Aly Balsom finds out how it's done.

Soil mapping and variable rate fertiliser application may have traditionally been viewed as arable technology, but more widely available and lower cost variable rate spreaders, means it's something that's now equally applicable to livestock farmers.

Combine that with a growing realisation that livestock producers need to make more from cost-effective forage and treat grass like a crop, and the reasons not to use it are few and far between.

All farmers will recognise that certain fields or parts of fields don't perform as well as others, maybe due to soil variation or landscape changes. By soil mapping they can quantify variations and identify areas that are high or low in nutrients within fields. Inputs can then be targeted accordingly, using variable rate application. This avoids over applying nutrients in certain areas, thus saving money and avoiding environmental issues. Nutrients can then be targeted at

areas that need it, potentially leading to an uplift in yields.

Simon Griffin, technical manager for SOYL, says there's real scope for grassland farmers to benefit from the technology.

"In the past, the perception was that livestock farmers invested in livestock and grass was an add on. But now, more are looking at it as a high input/output crop and



Applying variable rate P, K, Mg and lime has been shown to bring a £34/ha benefit compared to flat rate application, says SOYL's Rory Geldard.

maximising its value as a feed. Attention to detail and fertiliser is essential to the management of that crop," he says.

Simon and SOYL's business development manager, Rory Geldard, run through how soil mapping is done and how it can be used:

P, K, Mg and pH soil mapping

1. Fields are mapped out using GPS

A specialist soil mapper will come out on a quad with inbuilt GPS. They will then drive round each individual field to map it out on the quad's computer. The computer will then generate a sample grid in that field's boundary. Generally there will be 100m grids in 1ha.

2. Soil samples are taken

The computer will generate points on the map where soil samples need to be taken. There is generally one soil sampling point per hectare.

Sixteen soil samples will be taken within a 5m radius of the quad bike at each sampling point. These will be combined in one bag.

Soil samples are then sent away for standard P, K, Mg and pH analysis.

3. Colour coded maps are produced

Colour coded, field specific soil maps are then produced using the soil analysis results. Separate maps will be generated for P, K, Mg and pH. The colours relate to standard soil indices for these nutrients (see map example).

4. Fertiliser plans are constructed off the back of the maps

The maps are sent to the farmer who can then choose to act on the information himself, seek advice from their own FACTs qualified advisor, or use one of SOYL's own FACTs advisors. For example, for the Red areas on a P, K or Mg map, more nutrient will need to be applied to that area and less or none in the Green or Dark Blue areas. Calculations will be based around available nutrients from mucks and

slurries on an individual farm, with any shortfalls topped up by bagged fertiliser. On areas with a pH below optimum levels for crop growth, liming will be necessary. Recommendations are based on each nutrient, so there is the need to either choose a product with the appropriate amount of N, P and K or use straights. This means an extra pass may be required, but it will save in fertiliser by allowing more targeted application. For example, for P, Triple Super Phosphate (TSP) could be applied and for K, Muriate of Potash (MOP) could be an option.

5. Variable rate fertiliser is applied to grassland using GPS

A producer can then decide whether they want to apply nutrients using their own variable rate spreader or get a contractor to do it. There is also the option to convert a spreader so it is variable. SOYL has an 'i SOYL' kit which enables a tablet to 'talk' to any spreader if it has an electronic

control. If the spreader is variable rate compatible, this system can make it GPS guided with variable rate spreading. SOYL quotes a cost of £495 for this technology.

Nitrogen mapping

1. Satellite imagery highlights biomass

Satellites are able to take images of variation in grass growth within a field which is related to crop yield and growth. Maps are then generated once a week using different colours to highlight areas of low and high biomass.

2. Fertiliser can then be targeted

Farmers can then work with their advisor or SOYL representative to target their pre-determined total nitrogen rate for the year, rather than applying a flat rate across all ground. Typically there could be a 25% adjustment either side of the usual application rate. More N will be applied on low biomass areas and vice versa. **1**

Targeted fertiliser application - the benefits

3-8% - the potential grassland yield benefit from targeted nitrogen application (currently seen on arable, but likely on grass)

£34/ha - the benefit of variable rate phosphate, potash, magnesium and lime compared to flat rate application (as seen across 1m hectares of grass, arable and vegetables)

£5.50/ha/year - the cost of P, K, Mg and pH mapping

£8/ha - the cost of weekly nitrogen mapping from mid Jan to May-June

*Source: SOYL

See page 16 for machinery considerations when undertaking variable rate spreading.

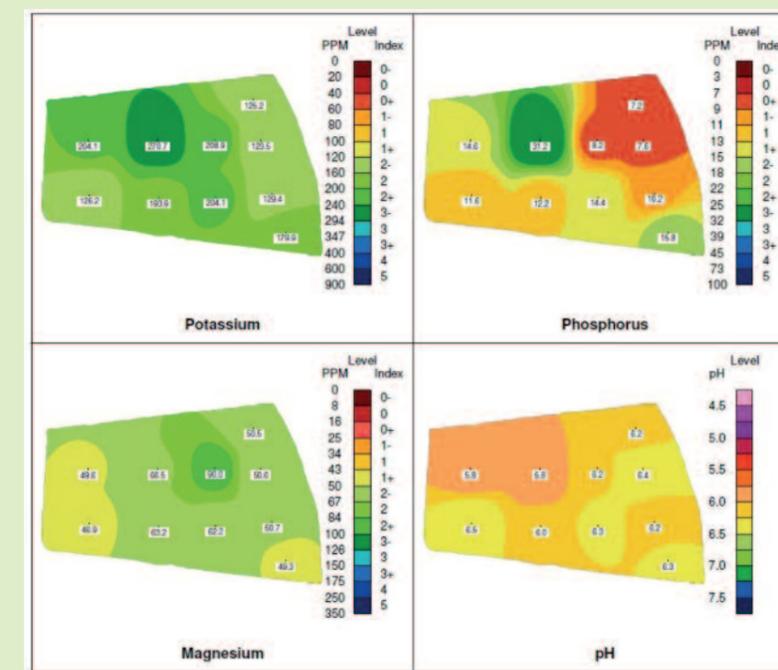
FIELD EXAMPLE P, K, Mg and pH maps produced through soil mapping

In this example, the field is deficient in phosphorus in the top right hand corner and could benefit from targeted, higher application of phosphorus (perhaps TSP) in this area. In comparison, the green area in the middle of the field does not need any P.

Potassium indices are good and a low rate of around 70kg/ha could be applied to all of the field, except the dark green area which doesn't require any K.

Low pH in the top left corner means this area could benefit from a higher rate of liming.

Magnesium levels are acceptable.



Gearing up for variable rate

Rea Valley Tractors' precision agriculture specialist Tommy Adams talks through the key machinery requirements for variable rate spreading on grassland.

Although 60% of livestock farms that we see will be involved in some form of precision farming, relatively few are yet going as far as variable rate spreading. Most that are involved will be using GPS as a guidance system for increasing the accuracy of fertiliser spreading or spraying.

There are big advantages to be gained from variable rate application, as we are seeing increasingly in the arable sector. For the livestock farmers that are now involved with variable rate, the common goal is to create a more even yield of grass across the field. We are seeing more and more livestock farmers monitoring their slurry applications and this can then prompt the next step into applying bagged fertilisers at variable rates to balance the nutrients from the slurry. There are several machinery factors to think about before undertaking variable rate spreading:

1. GPS receiver

First things first, you will need a tractor with a GPS receiver. These are now relatively common on modern tractors, with 80% of our new tractor sales including a GPS receiver.

As an example of the cost, a new John Deere SF6000 GPS receiver would be in the region of £2,700.

2. Automatic rate control

To apply fertilisers at variable rate, you need to have a spreader where application rate can be adjusted automatically on-the-move; this will not be possible on the more basic machines.

The best example of a machine with automatic application rate adjustment would be Kuhn's Axis twin disc spreader range. All but the more basic models in this range operate with a system called Electronic Mass Control (EMC), which is available on both hydraulic drive and mechanical drive machines.

The EMC system measures the mass of fertiliser as it passes across the spreading discs, providing significantly greater measurement and control than is possible with conventional weigh cell technology.

Linked to GPS technology, and other innovations such as Kuhn's Coaxial Distribution Adjustment (CDA) feature, these machines offer as good a solution to precision farming needs – including variable rate application – as anything. Other machines offer automatic rate control based on weigh cell technology, so can be used for variable rate applications but will not offer the same speed of response and accuracy.

3. Control unit

You will need a control computer either on the tractor or on the spreader that is capable of variable rate spreading. Some of the more basic tractor displays will not be suitable, but increasingly our modern John Deere tractors are going out with larger integrated stand-alone displays capable of controlling the spreader to apply variable rates.

Spreaders will either be ISOBUS-compatible or not, and in the case of non-ISOBUS machines you will need the spreader's basic control unit to link into the tractor's computer. For example, on a non-ISOBUS Kuhn machine, the spreader will have a Quantron E-2 control unit, which can be linked to the tractor's unit via a specific cable.

With ISOBUS spreaders, the machine will have its own computer (e.g. Kuhn has the CCI terminal). With additional 'unlocks' these terminals can control the spreader to do variable rate, using the tractor's GPS receiver.

4. Uploading data

The information for variable rate can come from soil maps (created by an agronomist who has taken soil samples usually to establish pH or levels of P, K and magnesium), or may come from yield maps.

Whatever the source, files are transferred to the control computer (on tractor or spreader) via a USB stick, or possibly wirelessly.

It's then a case of selecting your field and your fertiliser product and the machine will interpret what's required.

5. Yield maps and more

Variable rate fertiliser spreading on grassland is

already being integrated with variable rate slurry applications and there is now increasing interest in using grass harvest data to fine-tune crop nutrition. Technology to measure dry matter yield and other constituents such as protein, starch and fibre at the point of harvest is now available with systems such as John Deere's Harvest Lab on modern forage harvesters. This data not only gives an instant measurement of what's in the crop but can also be used to create maps that can either show the effects of nutrient applications and/or determine future applications.

The Harvest Lab technology has more recently been developed to analyse slurry applications in real time such as nitrogen and phosphorus levels, knowing the exact amount of nutrients that have been applied across a field we can adjust fertiliser rates to account for the variation. 



Tommy Adams is one of four precision agriculture specialists covering Rea Valley Tractors' trading area from north Cheshire to south Shropshire and from Derbyshire into Wales.

His role includes fertiliser spreader testing to NSTS standard, something that he recommends as an annual pre-season check for all fertiliser spreaders.



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Forage diversity tackles drought challenge

Multi-species leys are proving the recipe for success on one drought prone Welsh farm, as Forager reports.

Ensuring a diversity of plant species in grazing leys means Monmouthshire farmer, Mark Egerton (below) can be confident that grass production will continue even during periods of low rainfall.

This is essential, considering cattle from his 90 cow herd of spring-calving Hereford and Angus cross sucklers are finished at 18-21 months old on grazed grass and high energy buckets alone.

The light land and steep slopes at Treveddw Farm, Pandy, receive very little rainfall, meaning that perennial ryegrass leys have traditionally struggled during dry periods. However, the incorporation of new cocksfoot varieties, Timothy, a range of clovers, and more recently, plantain and chicory, mean depressed yields are a thing of the past.

Mark recalls: "I've found the perennial ryegrasses don't cope

with the long dry spells no matter what level of nitrogen is applied, especially on the higher fields with their steep banks."

As a result, ten years ago, Mark began experimenting with introducing different plant species into his grass and clover leys to help them grow better through the dry spells. He decided against using festuloliums as he was concerned about their persistency in a grazing ley. Instead he began by using a mixture with cocksfoot as a third species.

Challenging conditions

Francis Dunne of Field Options says the broad spectrum of plants helps pastures cope with challenging conditions.

"Although perennial ryegrasses have high yield potential and energy density, they lack drought

tolerance and perform less well in low fertility situations. Their mineral profile is limited, and spring growth can also be poor," he explains.

"Having a broader spectrum of plant species gives a longer season of growth and reliable production in more challenging conditions of dry and wet, or low fertility. But each situation will benefit from a different range of species."

He believes cocksfoot breeding programmes have "come a long way" – with minimal heading after 20 June. The best varieties are also more palatable, and less prone to producing tussocks, than the traditional varieties.

Mark says the cocksfoot is more suited to grazing systems due to its growth habits. "I have a policy of never topping and will take a small silage cut if necessary to maintain the rotational grazing," he explains. "Cocksfoot is not ideal for shutting up for silage – it really needs to be grazed every five weeks, especially in early summer, else it goes to seed. It can be hard to keep on top of, but the cattle love it."

Diversity

Five years ago Mark embarked on further expanding the diversity of species in his leys by under sowing long term grazing mixture Endurance into a barley crop. This mixture is made up of Aber High Sugar Grasses, including intermediate perennial ryegrass, AberAvon, with the white clovers AberDai and AberPearl. Timothy was also mixed in, together with the legumes, Yellow Trefoil and Birdsfoot Trefoil. Further fields have been sown with this in all the following years.

Mark says the results have been

marked: "Last year, despite the very low rainfall, a 2016-direct-drilled ley kept growing so well that I left a group of steers on it to finish. And it was still growing in November."

Francis says the different species bring varying attributes to the sward. The perennial ryegrasses create a dense base and compete well in the sward, whilst AberGreen has good summer production and excellent persistence and is ideal in stressful conditions.

At the same time, Timothy is earlier growing and more tolerant of drought and wet than ryegrasses. It is also higher yielding in grazing regimes, provides extra mid-season dry matter, is very palatable and has a long season of growth. The legume, Birdsfoot Trefoil also performs best in dry soils with poor fertility.

Establishment

However, Francis warns that getting establishment right is key to the success of these types of leys. He explains: "Some species are not as vigorous as perennial ryegrasses, and need warmer soils for ideal establishment. So, multi-species mixtures should not be sown too early, or very late."

Last summer, Mark direct-drilled his highest field – at 220m – with an updated version of Endurance. This incorporated additional herbs to further improve production, palatability and to enhance the mineral profile of the pasture. This included deep-rooting herbs, Tonic plantain, Puna II chicory and yarrow.

Mark explains: "The ground there is always dry and low in nutrients. It's very sloping in parts and difficult to get contractors to venture there for silaging. I could see the chicory was already up and growing at the end of January. And I expect to see the benefits of the ley coming through this spring."

Mark is a strong believer in having diversity of species in his leys. He adds: "Managing multi-species leys is no different from looking after conventional grass/clover leys. They don't need molycoddling. You just have to keep on top of them and don't let the cocksfoot go ungrazed for more than five weeks." 



Heifers grazing an Endurance ley with red clover.

Treveddw Farm Facts

- 75ha (185 acres)
- Located in a rain shadow on the eastern side of the Black Mountains
- Average annual rainfall of 40 inches (102cm). 26 inches (66cm) fell last year
- Fast-draining silt loam soils
- Rotational grazing system
- Low, flatter land reserved for silaging, sloping fields grazed

Multi-species leys facts

- Underperforming leys are selected for multi-species leys and soil indices addressed before drilling
- 2.7ha (6.63 acres) currently down to multi species mixes
- Leys either direct drilled (in August when competition is reduced) or full reseed undertaken - moving to direct drilling to help retain organic matter and moisture
- Seed rate of 10kg/acre when direct drilling and 14kg/acre on a full reseed
- Direct drilled leys will have fertiliser applied when the crop is established
- Full reseeds get 50kg K on the seed bed plus a 0.48.48

Tips on managing multi-species leys

- Select mixtures with species proven for the growing conditions and field objectives
- The small seed of some species will need a fine, firm and warm seedbed
- Observe the shorter window of establishment: mid-April to late August
- Perennial weeds need to be controlled prior to sowing multi-species leys
- Adjust grazing management to optimise palatability and capitalise on the extended growing season

To read more about Mark's rotational grazing system, see the Winter 2015/16 Forager at foragermagazine.co.uk

Hitting 4,000 litres from forage

Better quality forage and improved utilisation has helped turn around the fortunes of an autumn calving herd in Shropshire, which is achieving almost 60% of production from forage, as Luke James reports.

A change of mindset, driven by a determination to reduce the farm's reliance on bought-in feed, has seen Shropshire dairy farmer Alan Watkins increase milk production from forage significantly over the last decade.

Changes have been gradual and relatively inexpensive, but the headline result is that this 280 cow crossbred herd is now producing close to 4,000 litres of its 7,000 litre average yield from forage. With a concentrate feed rate comfortably under 0.3kg/litre, this has transformed the business at Hall Farm near Ludlow, and significantly increased its resilience to milk price volatility.



Reseeding grassland has been at the centre of the revolution, with this impacting positively on grazing performance and grass silage quality. A shift away from pure Holsteins to a three-way cross has been another significant factor.

"We first introduced crossbred cows having lost a batch of Holstein breeding heifers to TB," says Alan. "The cheapest option at the time was to buy-in crossbred replacements, but we soon came to realise these cattle were easier to manage with better fertility, easier calving and reduced lameness."

Alan now adopts a three-way cross using Norwegian Red, Montbeliarde and Holstein/Friesian. This means cows are smaller and hardier and better suited to the system. The herd calves from August to December, but with the better fertility in the crossbreds and the use of sexed semen, the aim is to tighten this further.

As with the switch to crossbreeding, the introduction of a regular grassland reseeding programme came about in response to a crisis. In 2012, the maize harvest proved a particularly difficult one, with Alan suffering a poor crop, together with many farmers across the country. This resulted in forage being very tight the following winter and subsequently he resolved not to allow it to happen again.

The farm's consultant, Tom Benson says the solution has been to reseed around 20% of the grassland each year since then,

using the best available grass and white clover leys.

He adds: "This has increased forage production significantly, both in terms of the available grazing and in the quality of the grass silage. The herd is now able to produce 10 litres/cow/day from forage consistently, whether grazing or during the winter months, which equates to 4,000 litres/lactation at its peak, which is exceptional by any standards."

An extended grazing season and better grazing management, plus consistently better yields of maize silage, have all contributed to this uplift in performance from forage. Alan has also introduced out-of-parlour feeders, which has brought better control of concentrates.

Tom says: "We'd targeted a feed rate this year of 0.26kg/litre but as it stands we are under this, at 0.24kg/litre. That's down to good management and a range of other factors, but quality forage lies at the heart of it."

Alan uses Aber High Sugar Grass for all his grassland reseeding, choosing the diploid perennial ryegrass mixture Aber HSG 3 with white clover for his grazing platform and the hybrid and perennial ryegrass combination of Aber HSG 2 Early Cut with red clover for his silage leys. Since the new leys have taken effect, he has seen his grazing season increase by approximately two months, whilst grass silage yield and quality has increased significantly.

"We now have the cows out from mid-March through to early



The herd is able to consistently produce 10 litres per cow per day from forage.

November, so our grazing season is closer to eight months than the six months it used to be," he says. "We put in concrete tracks eight years ago to improve access and now strip graze the paddocks, moving the fence twice a day to maximise utilisation."

"We're cutting our silage earlier and more frequently, taking our first cut in the first week of May instead of two weeks later. The result is better quality silage that the cows are milking better off."

Constantly seeking further improvement, Alan introduced pre-mowing (see box) with an old drum mower during June last year to further improve grazing efficiency. It's something that he believes increases dry matter intake and leaves a cleaner aftermath, promoting better regrowth, so is intent on doing more of it in future. **T**

4 The Four Fundamentals

Tom Benson, who works as a consultant with dairy businesses across the country, refers to the 'four-Fs' as the fundamental elements required for profitable dairying in the current era.

Feet
Fertility
Forage
Finances

He's also a strong believer in the concept of cross-breeding, seeing the hybrid vigour that results as an essential element in achieving success with his 'four Fs'.

Pre-mowing:

Benefits of pre-mowing:

- Improves grass utilisation
- Better alternative to post-grazing topping
- Prevents heading of grass and weeds
- Complements good grazing management
- Leaves clean aftermath and even regrowth

When to use pre-mowing:

- Mid-May to July
- Ideally in dry conditions
- Entering a drier period when regrowth is slowing and rotation needs extending
- To improve utilisation of higher grass covers (3,000 – 3,700kgDM/ha)
- When grazing is the sole forage (with concentrates fed in-parlour or out-of-parlour)

When not to use pre-mowing:

- In wet conditions
- Where grass covers exceed 4,000kgDM/ha (cut and bale instead)
- If buffer feeding / when grazing is minimal
- When grass quality is poor

Top tips:

- Cut up to 24 hours before grazing
- Cut low
- Strip graze, giving usual allocation
- Clean up allocation at first attempt
- If in doubt, reduce the grazing area and move the fence later
- Don't over-use – think about cost

Source: Tom Benson Consulting

Alan Watkins' Shropshire herd is now producing close to 4,000 litres of its 7,000 litre average yield from forage.

You can't beet it

There are numerous ways fodder beet can be fed. Laura Mushrush looks at the options.

The diversity in which fodder beet can be fed and harvested provides farmers with huge potential to maximise milk and meat production from this homegrown forage, according to director of Field Options, Francis Dunne.

However, where this sister species to sugar beet really makes its case is in its feed value of highly digestible fibre and a high content of relatively slow releasing sugar.

Francis says: "Essentially, fodder beet and sugar beet are the same species, but instead of chasing after high sugar content, fodder beet is grown for its high freshweight yield. Sugar beet invested heavily in developing high yielding, energy beet and improved seed technology for the AD sector, the livestock sector is now in a good position to cash in on improved field performance and enhanced feed value."

As a result, livestock producers

now have access to fodder beet varieties ranging from low dry matter (DM) types at 11% DM, to high DM varieties upwards of 22%. Most traditional varieties fall in the middle of that range at 14-18%. And whether it's a good crop or a bad crop, fodder beet will always have at least a 12.5 MJ/kg ME in terms of energy.

However, Francis says harvesting and feed use go hand-in-hand with the dry matter value of a crop, making it essential for producers to have a clear plan before incorporating it into the operation.

He runs through the different ways fodder beet can be grown and fed and key considerations:

Graze it

Sheep

While out-wintering sheep on fodder beet is a great option, dry matter content becomes a bigger

concern for palatability and grazing ease.

"Fodder beet DM and the amount of root that grows out of the ground are directly correlated – the higher the DM, the less root exposure above soil," explains Francis. "Only choose varieties that are 15% DM and lower for grazing sheep. This will cause less wear on their teeth, while maximising their access to the crop."

Strip or block grazing can be used with sheep, but they tend to only graze the crop down to the soil surface. As a result, Francis advises going through with a cultivator to bring the remaining beet above the surface once a section of the crop has been grazed.

Out-wintering cattle

With a DM yield double that of brassicas such as swedes and kale, fodder beet is becoming a realistic

option for out-wintering cattle, especially on light land.

"A fodder beet crop will typically yield around 14tDM/ha, whereas kale and swedes average 7-8.5tDM/ha," says Francis. "With sheep you have the option of block grazing or strip grazing, with cattle you have to ration it carefully with strip grazing."

As with sheep, roots need to be at least halfway out of the ground for grazing. Beet for out-wintering cattle should also be 11 to 16% DM. Producers will also need to supplement cattle with at least 30% of their DM intake coming from another fibre source such as silage, hay or straw.

Chop it

Mixed rations and feeding whole beet to sheep

When being fed in a mixed ration for sheep, beet can be chopped for best utilisation. In this situation, high dry matter beet can be fed.



The higher the fodder beet DM, the less root exposure above soil. When grazing sheep, roots need to be at least halfway out of the ground and under 15% DM. For cattle, DM can be 11 to 16%.

"While there are auger buckets available to chop fodder beet, it doesn't require special equipment. Chopping it in a feeder wagon first before the rest of the ingredients

are added works well," says Francis.

When feeding whole beet, dry matter should be kept below a 15% DM. Fodder beet fed whole doesn't need to be chopped, but

continued on page 24



Because DM yield doubles that of brassicas, such as swedes and kale, fodder beet is a more realistic option for out-wintering cattle.

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producers feeding beet whole on pasture can improve utilisation if the roots are roughly broken up.

This can be done using an auger bucket or even feeding it through the back of a cleaned-out muck spreader – just as long as its broken into pieces which can more easily be bitten by sheep. Chopping also allows higher dry matter, more nutritionally dense beet to be used.

Mixed rations for cattle

Fodder beet must be chopped down to the size of chips before being fed in a mixed ration, as given the opportunity, cattle will

Nutritional value of fodder beet

Dry matter: 12 – 23%
Crude protein: 12 – 13%
D-value: 78
ME: 12 – 13MJ/kg ME

Fodder beet establishment tips

Light sandy soils
 Fine seedbed essential
 Soil temperatures over 7°C
 Pelleted seed with fungicide and insecticide coating
 Seed rate 105,000 seeds/ha
 Drilling depth 2–3cm (a little deeper when dry so seed is in moisture)
 Specialist beet fertiliser (including salt)
 Good grass weed control

pick it out of the ration and not eat anything else.

Again, this allows higher dry matter varieties to be used to optimise stock performance, with chopping methods mirroring those for sheep mixed rations.

Clamp it

“Beet is safer in a clamp than being stored in a field. Recent mild winters have encouraged many farmers to lift beet as it is required,” says Francis. “This is a risky strategy if we get a season like 2010-11 or another blast from Siberia like 2018. Frosted beet does not keep.” Fodder beet, like potatoes, needs air circulation during storage if it is to remain stable. Clamps should be no more than 2.5m high or 10m wide.

The beet needs to be fairly clean to optimise air circulation and the clamp should be covered with a breathable, waterproof sheet. If there is risk of severe frost, this should be further covered with a loose layer of straw.

Francis says: “If done well, beet will store through to April. Storing for longer than this requires the beet to be chopped and ensiled with a dry feed to absorb the valuable sugars and avoid effluent loss.”

When chopping beet for a clamp, chop it with a feeder wagon at a ratio of five tonnes of fodder beet to one tonne of dry feed. Commodities like soya hulls, sugar beet pulp and wheat feed make a great absorbent.

| The performance of fodder beet compared to alternative forages | | | | | | |
|--|------------------|--------------------|-----------|-------------|-----------------|------------------|
| | DM Yield T / Ha | DM% | 'D' Value | ME Mj/Kg DM | Crude Protein % | Utilized Cost/Mj |
| Fodder Beet | | | | | | |
| Roots | 14.2 | 10-20 ¹ | 78% | 12.6 | 12.0 | 0.9p/Mj |
| Tops | 3-4 ² | 10-13 | 65% | 10.4 | 15.0 | -- |
| Swedes | 7.0 | 8-12 | 82% | 13.1 | 11.0 | 0.9p/Mj |
| Kale | 8.6 | 15 | 63-69 | 10.6 | 14.0 | 0.9p/Mj |
| Maize | 15.1* | 28-38 | 67-73* | 10.9* | 8.0 | 0.9p/Mj |

Sources: NIAB Fodder Beet List 2001. Marginal Sites Maize list 2007* & Fodder Crops 1993

Note 1: Depending on variety.

Note 2: Beet Tops die back in the winter, so this will not be available for late grazing.

CASE STUDY: Benefits of clamped beet



Norman (left) and Peter Tomkinson (right) find fodder beet to be the highest yielding crop they can grow.

By Luke James

Dairy farmers N & JM Tomkinson of Beffcote Farm, near Stafford, are now in their fifth year of ensiling beet for inclusion in the milking ration of their 430-cow herd.

Clamped at a ratio of 5:1 with sugar beet pulp (or soya hulls), it's providing a palatable and high energy ingredient, fed at 10kg/head/day freshweight from the diet feeder. The mix also includes grass and maize silages, a protein blend, molasses, ground straw and Trafford Gold.

Peter Tomkinson says no other homegrown fodder produces as much yield as fodder beet: “We grow it to minimise the feed we have to buy in, to make best use of our ground. Maximising milk from homegrown forage helps us to keep our carbon footprint down, which is an important target for us as members of the Tesco Sustainable Dairy Group.

“When it runs out we've noticed that yields tend to drop, and we see more incidence of cystic ovaries, for example, so it's clearly providing a valuable source of energy for the milking cows.”

The herd averages 9,300 litres/cow at 4.05% butterfat and

3.45% protein. The Tomkinsons grow around 14ha (35 acres) of higher dry matter beet, usually drilling in mid-April to produce a crop that they will start lifting in early October. It's part of a rotation that includes wheat, oilseed rape, maize and grass, so it's no surprise to hear that they grow the beet ‘as an arable crop’.

“We're looking to maximise our output, so we treat it with the same disciplines of any other arable crop,” adds Peter. “We've achieved as much as 39 tonnes/acre freshweight, so beet does make a significant contribution to our homegrown feed.”

The policy is to lift 2ha (five acres) at a time, to spread the workload and use up clamp space as it becomes available.

The beet is cleaned, chopped in the tub mixer, and mixed with either sugar beet pulp or soya hulls, depending on cost and availability.

“We mix five tonnes of beet with one tonne of sugar beet pulp or soya hulls as this helps to soak up most of the moisture,” explains Peter. “We then layer it in the clamp, tamping it down with the loader bucket, up to a height of about five feet - you cannot drive on it, and it'll spread under its own weight if we go any higher. It's then sheeted as you would grass silage; we use a layer of cling film, a plastic sheet and a wind sheet on the top.”

Peter says there is very little waste from this process and no effluent, with the resulting fodder going into the ration at around 30% dry matter and with an energy value of over 12MJ/kg ME.

The crop will be lifted in sequence over the winter, as workload and clamp space allows, with the field being cleared ahead of spring cultivations, with a crop of maize usually following it.



“We grow it to minimise the feed we have to buy in, to make best use of our ground. Maximising milk from homegrown forage helps us to keep our carbon footprint down.”



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Giving new grass leys a head start

Undersowing cereals with forage has the potential to increase field production, as Laura Mushrush finds out

“Livestock producers growing their own feedstuffs can dial up production intensity by undersowing forage into spring cereals,” says Germaine forage specialist William Fleming (right).

Along with fully cashing in on land’s production potential by not leaving it barren, it also takes time pressure off producers by not having to sow and establish a new ley post-harvest.

“Undersowing this spring could be particularly important to producers who are worrying they are going to find themselves short of silage or forage stocks,” he adds.

Getting it into the ground

As with any reseeding or establishment of a new crop, soil tests should be done in good time, with attention paid to soil fertility and structure. According to William, for best establishment, cereals must be planted first - at a slightly lower rate - and allowed to establish to a height of around 2 inches before forage seed is drilled or broadcasted

in. Cereals and forage can both be drilled the same day, but not at the same time.

Ideally, the field will be ploughed to prepare the seed bed for the cereal crop and drilled at 40 to 50kgs/acre (100 to 120kg/ha), 2.5 to 4cm deep, and then rolled to prepare a fine and firm seed bed for the grass ley. Grass should then be broadcast or drilled in, no deeper than 1cm, ideally after the cereal crop is established.

Harvesting

For farms in areas where wet harvest conditions may be a concern, William says an undersowing system works best when the cereal crop is taken as a wholecrop when grain is at the soft, cheesy stage.

“This can be very successful, producing 6 to 8 tonnes DM/ha in the first wholecrop and also gets the crop removed early on when field conditions are more likely to be suitable,” he explains.



When crops are harvested by combine for a hard grain, headers need to be set higher, at least 2.5cm above the top of the grass to prevent combine clogging.

“This may be a challenge if the cereal crop drops flat prior to harvest,” William says. “The high moisture in the grass may also cause issues in getting straw windrows to dry out enough for baling, which can also damage the ley if left in the field for too long.”

undersown to perennial ryegrass.

In mid-April, spring barley is sown with a combination drill at an approximate rate of 50kg/acre, reduced from the normal 75kg/acre seed rate to allow light to reach grass seeds, which are sown at full rate, allowing them the chance to develop and tiller out.

“The same day we drill spring barley, we follow it up with the grass seed and then run a set of rollers over everything to give it a nice seedbed,” says Angus. “I’ve tried a few different sowing methods for the grass seed, such as broadcasting, but what I’ve found to work the best is a tine harrow with an air seeder.”

Throughout the growing season, the farm fertilises the field as a normal barley crop but holds back on herbicides so the undersown grass ley isn’t compromised. Because silage is a huge focus for their homegrown feed supply, spring barley is taken as a wholecrop by a contractor in mid-August.

“Since we only have one silage pit, we put a three-foot layer of wholecrop right through the entire pit – which works out to 3kg/head/day. This stores really well

when sandwiched between grass silage,” explains Angus. “The chopper leaves the spring barley stubble at about 8 inches high, so we’ve started to experiment with mowing a few sections of the field afterwards to give grass a better shot at catching the sun. It’s worked

really well.” By October, 6ha (15 acres) can be taken for silage and 6ha can be zero-grazed prior to a neighbour overwintering sheep on the new ley, which help remove barley stubble for grass to tiller out.

Benefits

Along with cutting down on the added time and money it would take to work a field and establish a new grass ley, Angus says the ability to take a wholecrop and silage crop in the same growing season has made a big difference in their efficiency.

“It’s a massive benefit when you’re approaching the end of the growing season and are starting to run out of grass to be able to go to your newly established field and take a cut off for the cows,” he says. “Never in a million years could you get wholecropped, ploughed and then be able to take another cut of grass off.”



Undersown grass ley is already established once a wholecrop is removed.

CASE STUDY: Undersowing to push production

Undersowing spring barley with perennial ryegrass has enabled the Hodgson family to maximise production off their limited land resource.

Angus Hodgson farms 260 pedigree Holsteins at Midtown Farm, Caldbeck, Cumbria, in partnership with his parents, Michael and Debra. The farm runs across 185ha (457 acres) of owned and rented land.

Angus says: “In our area, it’s rare for land to become available, so we knew we had to make the most of the acreage we had to increase the amount of homegrown forage we were producing.”

As a result, 10 years ago, the trio decided to try undersowing perennial ryegrass into spring barley. Initially, they were hesitant to say the least, Angus recalls.

“When we took the first

wholecrop of spring barley off what had been undersown, it was very worrying,” he says. “The grass was a short, fine stubble and there didn’t seem to be a lot of it. But three weeks later it really thickened out and completely transformed.”

The homegrown system

Now, each year 12ha (30 acres) of Italian ryegrass is ploughed and drilled to spring barley and then



Tips from Angus

If you have a field that is always wet, don’t undersow in it. If it can be helped, don’t harvest a crop if conditions aren’t right – otherwise you’ll be dealing with a mess of a grass ley for the next three to four years.

The mix matters

Midtown Farm’s agronomist, Shirley Loughrin of Tynedale Agronomy, has been integral in improving the operation’s undersowing system.

Last spring, under her advice, the farm switched varieties and started utilising a mixture with Aber High Sugar Grasses.

Shirley explains: “This was chosen to try and get better quality when compared with the straight Italian ryegrasses they have grown in the past, still providing the bulk that was required to fill the pit.”

The mix used by the Hodgsons is designed to enhance the D-value in the clamp and includes AberEcho hybrid ryegrass, AberEve hybrid ryegrass, AberClyde intermediate perennial ryegrass and AberStar intermediate perennial ryegrass.

Within days of the first wholecrop cut being taken with the new grass mixture, Angus could tell a difference.

“There have been years when we’ve had to scratch a lot of seed in with a harrow after the wholecrop is taken off because there are patches in the field where the grass didn’t establish well,” he explains. “Even though it was a very wet year, 2017 was probably one of the most successful we’ve had for undersowing. The grass seed is stronger and better established and came up quicker and with a thicker stubble.”

The diverse forage system at Midtown Farm

- 12ha (30 acres) drilled to spring barley and then undersown to perennial ryegrass
- 16ha (40 acres) of winter wheat which is crimped
- 14ha (60 acres) of Italian ryegrass for zero grazing
- 31ha (77 acres) of permanent pastures and hay meadows
- 101ha (250 acres) of three to four-year perennial ryegrass leys on a three-cut silage system

Maximising the quality of round bale silage

Grass silage quality has undoubtedly improved for Powys sheep farmer and contractor Tom Hill since he started using a baler/wrapper combination machine with film binding capability. Luke James visited just before lambing started in earnest.

Quality forage is important to Tom Hill as a farmer and is also a priority for many of the customers that he bales and wraps for as a contractor.

It was part of the reason that he opted to replace two machines – a square baler and a bale wrapper – with a single round baler/wrapper combination with innovative technology that uses film, instead of string or netting, to bind the bales.

After a first season producing close to 3,000 round bales, he's happy with the switch and convinced about the merits of film binding.

"I see film binding as the future if we are going to focus on efficiency and rely more on quality forage," says Tom. "I'm not aware

that film binding is possible on square bales, so we've taken a change of

direction and rationalised our business to a one-man and one-tractor operation that is a lot more flexible and efficient."

Tom believes film binding is achieving a far better seal overall and reducing the risks of air getting into the bale due to damage. On his machine he can use the same film for binding as for wrapping, so it's simpler and cheaper overall and there's no untangling of netting from wrap when it comes to disposal.

He adds: "I've been very happy with the quality of the silage that we have at home and we've had positive feedback from farms where we've continued to provide a baling and wrapping service."

Tom's baler/wrapper combination is a Kuhn i-BIO+, sourced through Martin Hall at Teme Valley Tractors.

It can be used either with conventional net binding or with the unique film binding system. The machine uses two film reels to bind the cylindrical side of the bale and offers several advantages, not least the ability to use standard sized rolls (25 µm, 1500 m, 750 mm), therefore eliminating the need to order separate binding and wrapping film. Switching between film and net binding is quick and simple as the two systems are separate, making it easy to adapt the service to meet customer requirements.

"Flexibility is important, particularly for the contracting work that we do," adds Tom. "We can use the film binding system or bind with netting if that's what customers prefer – it means we can bale silage, hay or straw. The machine also allows complete



Sheep farmer and contractor Tom Hill says film binding silage reduces the risk of air getting into the bale if damage occurs.

control of the wrapping process, so we can select the number of film layers and adjust the amount of film overlap with the push of a button.

"We can also opt to chop or not chop, or change the chopping intensity, all from the cab, depending on the crop and what's required."

Farming at Old Hall Farm, Sarn, Tom has some steep ground himself and is used to working in a wide variety of situations, including some smaller fields.

Manoeuvrability is therefore important, which the compact and relatively lightweight (3,700kg) i-BIO+ offers. Powered by a 120hp New Holland T5 tractor, he's achieving work rates of 30–35 bales/hour, and – he believes – working more efficiently than he would with a separate baler and wrapper.

"A baler will work more quickly than a baler/wrapper combination, but there are efficiencies in the combination that can easily be overlooked," says Tom. "For example, you often have to reverse out of a row to drop off a bale, whatever the machine, but with the combination the binding and wrapping is all going on whilst you

Kuhn's i-BIO+ with film binding technology offers an efficient solution to quality forage production.

are doing this, so it's not all lost time.

"It's also worth remembering that bales are wrapped immediately – there's never a time-lag between baling and wrapping – and that could make a difference to silage quality at the end of the day."

The importance of quality forage

Tom Hill runs a flock of 250 Mule ewes that are put in lamb to Suffolk or Charolais rams, scanning this year at 198%. Ewes come inside in early January and are fed round bale silage through to lambing from the middle of February.

This year the ewes are fed a fixed amount of silage each day, rather than being offered it ad-lib in ring feeders, something that has improved the efficiency of feeding significantly.

"Bales need to be high quality and mould-free, but this method of feed-out is proving far better than ad-lib as ewes are in good condition and there's very little waste," adds Tom.

Ewes and lambs go out to grass 2–3 days after lambing, with lambs being creep fed to ensure most are sold finished by the end of July. **1**



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CHEWING THE CUD

Laura Mushrush sits down with Dr. Jude L. Capper, livestock sustainability consultant and 2017 Dairy Industry Woman of the Year, to discuss her dos and don'ts for producers wanting to effectively communicate with consumers and defend their industry. Jude, a former vegan, is one of the masterminds behind #Februdairy, a month-long campaign dedicated to celebrating and promoting facts about the UK dairy industry.

LM: More than ever, the farming community is under heavy pressure to explain their practices to not only a curious consumer, but to extreme activists who want to see an end to animal agriculture. How has this pressure increased in the last few years?

JC: In contrast to 20 or 30 years ago, when we had to visit the library to research a topic, we now live in the internet world, where we can access information in seconds. That's great in terms of being able to find out more about how food is produced – which is an area of interest for many consumers – but also means that misinformation can spread very quickly.

LM: What are the most common questions you find consumers wanting to know about the food they put on their tables?

JC: In many developed countries, there's a huge disconnect between consumers and agriculture, which means there are often more questions than answers. I couldn't begin to list all the questions I've heard or read. However, it's clear that people want to know more and that their beliefs are often skewed by newspaper or social media headlines that can lead to mistrusting food production. Most people are still highly supportive of agriculture and farmers - it's important to remember that the people who are opposed to livestock farming are very much in the minority.

LM: How can farmers communicate these messages?

JC: There are so many ways, online as well as in-person:

- Face-to-face chats are always great, though they're limited to one or two people at a time. Never be afraid to answer a question from a friend or neighbour in the pub, at school pick-up or in the supermarket.
- Social media sites such as Twitter, Facebook and Instagram give us a great opportunity to reach lots of people.
- Blogging, writing an opinion piece article and other forms of more traditional media, but may be less interactive.
- The new "Facetime a Farmer" (www.facetimeafarmer.com) initiative puts consumers and teachers in touch with farmers so that questions can be answered.
- Hosting farm tours or participating in Open Farm Sunday (www.farmsunday.org) and other situations where you show consumers around your farm can be a really great way to help educate and inform, particularly in your local community.

LM: You know firsthand how ruthless activists can be, especially on social media platforms when things can be said without accountability. In extreme cases, we see the terms "murderer" and "rapist" projected towards farmers for utilising practices like AI and raising livestock for human consumption. What is your advice to producers when faced with this level of vulgarity?

JC: Remember that you do not have to engage. When I first started tweeting in the #Februdairy campaign, I received a lot of abusive tweets – often I simply muted or blocked those people. If somebody came up to you in real-life and started a conversation with "****-off" you wouldn't want to engage with them – that applies on social media too.

If people have genuine questions, then having the conversation is great. If the question is phrased as "You are endorsing rape and murder of sentient beings when you breastfeed pus-filled hormone juice from other species" then the conversation is unlikely to go well. Walk away and don't engage.

LM: First instinct for most people when their livelihood and integrity is questioned is to go into defence mode. Should emotion be removed, and a focus placed on facts instead?

JC: This is a difficult one. We don't communicate well when we replace emotion with science. However, it's important not to get defensive or abusive. Often, it's best to turn the emotion around – talk about how much you care for your livestock and farm and how that shapes what you do.

LM: As you mentioned, social media has a lot of positives. What kind of successes have you had using it?

JC: We can reach thousands of people with a simple photo, video clip or infographic and really enhance the public image of farming. Every positive post that we put out, particularly those with photos or videos, can make a real difference to maintaining the goodwill that a lot of people have towards food production.

LM: What kind of successes have you seen farmers have with social media?

JC: Some farmers are doing an absolutely great job on social media via a combination of answering questions and posting positive images or videos. It's important not to simply promote your farm/system or to bash other systems or ways of farming, but to think about the whole agricultural process and industry. What would you want consumers to know? What do you want them to think of when they see the word "farmer" or "farming"? The best farmers out there are those who are respectful yet don't tolerate nonsense, show the realities of farming without painting an overly beautiful or bleak picture, and who are simply honest about what they do and what it means to them and their family/friends. 



Jude Capper's tips for advocating your industry

SHARE YOUR VALUES. We all care about the animals, the land, water and air and about producing safe, high-quality food and fibre crops. We need to help consumers understand that we share the same values as they do.

BE TRANSPARENT. If we hide information or try to pretend, then we create even more mistrust.

KEEP IT SHORT AND SIMPLE. It's tempting to launch into long complicated technical explanations, but keep it easy to understand.

STAY POSITIVE, POLITE AND PERSONAL. Never resort to being rude or using foul language, even if the person you're talking to does. The moral high ground is a good place to be.

KNOW WHEN TO WALK AWAY. Sometimes conversations are acrimonious, especially with the more militant activists.

