FORAGER

Issue 28 / Summer 2022

CLOVER

Why is it a superhero?

THE POWER OF PERENNIAL RYEGRASS

HOW TO FILL FEED SHORTFALLS

INCREASING THE VALUE OF FORAGE

DAIRY

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Sowing future seeds.

CLIMATE-SMART GRASS ON TV

BBC's 'Follow the Food' series recently featured Germinal's research farm in an episode looking at what needs to be done to meet the protein needs of a rapidly growing population. Germinal's Paul Billings explained to James Wong how the environmental and production benefits of Aber High Sugar Grasses allow livestock farmers to be more efficient at producing milk and increasing liveweight gain.

Watch now at **bbc.in/3LIIXhi** (Series 3, Episode 4 - 'Protein Planet')

GRACE WELLING IS BASIS QUALIFIED

Congratulations to Grace Welling, Herbage Seed Production and Product Development Officer at Germinal Horizon Wiltshire, who has achieved her BASIS Certificate in Crop Protection. This means she is now qualified to offer agronomy advice to UK farmers and seed growers. Grace did so well in her BASIS qualification she has been short-listed for the Barrie Orme Shield, awarded to the most outstanding candidate passing the BASIS Certificate in Crop Protection IPM exam.

BASIS

GERMINAL ON THE ROAD

Have all your forage and reseeding questions answered by dropping in on the Germinal stand at one of the shows the Grass and Forage Production Specialist team is attending this year.

Wed 22nd/Thurs 23rd June	Groundswell	Lannock Manor Farm, Hertfordshire
Saturday 25th June	Carbon Calling	Sleastonhow, Kirkby Thore, Penrith, Cumbria
Wednesday 27th July	National Sheep Event	Three Counties Showground, Malvern
Wednesday 14th September	UK Dairy day	The International Centre, Telford, Shropshire
Wednesday 16th November	Agriscot	Royal Highland Centre, Edinburgh

Can't wait? Call 01522 20868714 to contact your local Germinal specialist.

BUILD YOUR GRASSLAND KNOWLEDGE

What is the best way to fix P&K?

Are clover varieties becoming more competitive?

Can lucerne be direct drilled?

These are just a handful of the questions posed to the presenters at Germinal's recent webinars. Covering a wide range of topics, the webinars are designed to provide you with information to make your grassland management as effective as possible, plus give you the opportunity to share any challenges you are having and put questions to the team.

You can watch recordings of all past events by visiting the Knowledge Hub on Germinal.co.uk and clicking on 'Webinars'. Here, you will also find the answers to questions there wasn't time to address during a presentation.

Recent webinars include:

- How to Fill the Forage Gap amid Price Rises
- Are multi-species swards right for your farm?
- Managing multi-species in your rotation
- Growing Lucerne
- Boosting forage supplies using brassicas
- Choosing the right grass mixtures
- Making reseeding work for you
- Assessing swards and winter grazing plans
- Successful outwintering with good brassica management

WHY CLOVER IS A SUPERHERO


Clover crown


Clover root nodule

Clover sales are rocketing as farmers move to more self-sufficient models of production to combat the astronomical input price hikes. But how can clover help? Kate Yarwood finds out.

Why is everyone talking about clover?

Prices for the big three inputs – feed, fuel and fertiliser – continue to rise. While clover has been touted as a secret weapon for some time, this year the secret is out as farmers re-evaluate their options for filling the forage gap.

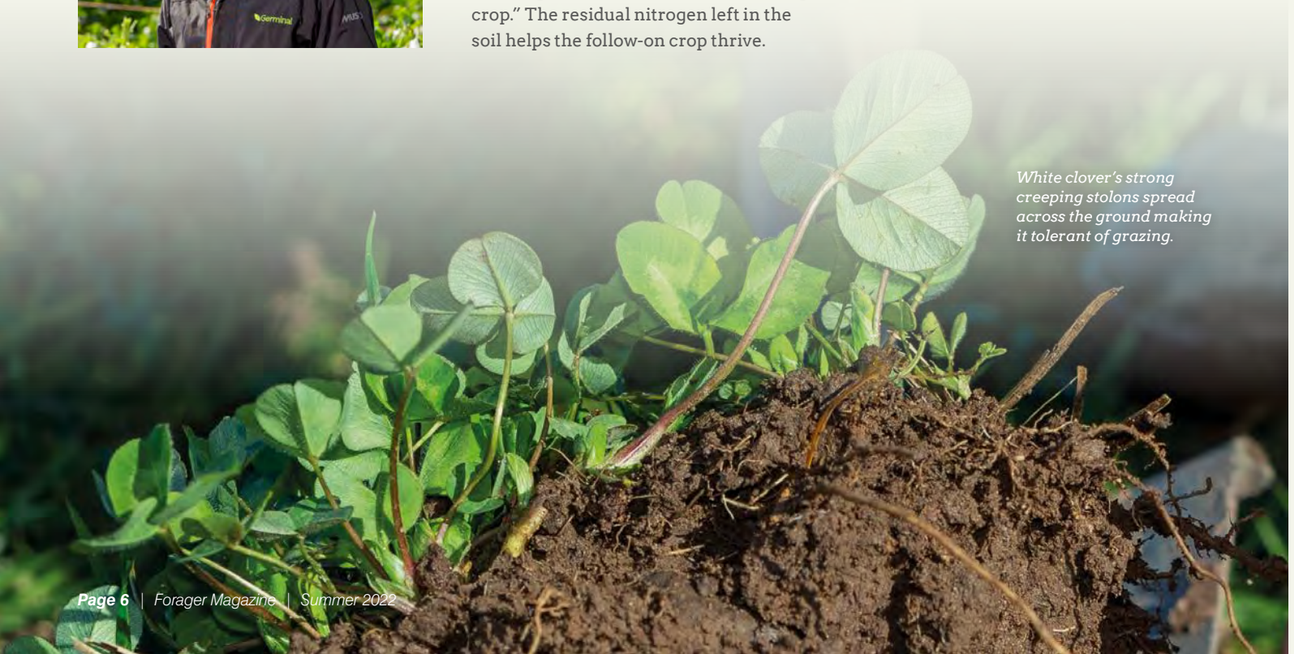
"The headline is usually about clover's nitrogen-fixing properties," says Adam Simper, grass and forage production specialist with Germinal. "Clover has nodules on its roots, where Rhizobia bacteria live and fix nitrogen. If the nodules have a reddish-pink interior, this indicates nitrogen fixing is happening."


Adam Simper, Germinal

Nitrogen fixing tends to happen in warmer months from May onwards. "You need about 30% clover in the sward to fix around 150-250kg N/ha per year. We expect it to take 6-12 months after drilling before fixing happens and, once clover is well established, you could see 75-100kg transferred to the surrounding crop." The residual nitrogen left in the soil helps the follow-on crop thrive.

"YOU NEED ABOUT 30% CLOVER IN THE SWARD TO FIX AROUND 150-250KG N/HA PER YEAR"

But clover also provides much more than nitrogen. It is a homegrown protein, it improves feed quality, increases soil fertility and enhances soil structure, attracts pollinators and is drought tolerant. Adam explains, "Clover is often disregarded as a valuable source of energy, but research proves it has a bigger role to play. If we look at red clover, for example, it can reach high DM percentages, with high ME content and crude protein when compared with average grass silage."


White clover's strong creeping stolons spread across the ground making it tolerant of grazing.

"RED CLOVER IS ROCKET FUEL FOR LIVESTOCK"

Red clover versus white clover

"Red clover is rocket fuel for livestock," Adam says. "It improves milk yields, liveweight gain and ewe condition." However, you must also manage red clover correctly as it can be vulnerable to grazing damage. Grazing over winter isn't recommended as exposing and damaging the crown of the plant can reduce its persistency.

"Older varieties of red clover only offer two to three seasons, but Germinal's red clover breeding programme has produced varieties which give four to five seasons, and we have further developments in the pipeline."

The animal performance benefits from red clover can't be ignored. Germinal Horizon found red clover shortened lamb finishing times by nine days, which has economic and environmental wins, plus increased carcass weight.


Red clover grows a long taproot - making it tolerate drought well

Grazed red clover and ryegrass lamb performance

	Red clover	Ryegrass
Growth rate (g/day)	229	182
Days to finish	40	49
Eye muscle depth	27.1	25.9
Subcutaneous fat depth	4.1	3.9
Cold carcass weight	18.8	17.7
Killing out %	51	48

Source: IBERS

Red clover's long taproots grow down deeply, whereas white clover's stolons spread across the ground, with roots anchoring the plant. Adam explains, "White clover offers different leaf sizes, and we generally say match the leaf size to your system. Small leaf varieties provide long-term leys for continuous sheep grazing, a medium leaf variety is ideal for rotational grazing and cutting with the larger leaf varieties working well for cutting and cattle grazing systems."

White clover generally has good persistence and can last years with good management. However, as warm temperatures are needed for both red and white clover, it can suffer from poor spring growth. This is where a tactical early nitrogen application encourages grasses to start moving and provide sufficient forage before the clover springs into action.

Establishing clover in your swards

Typically, a full reseed is best for establishing clover. Concentrate first on your soil, as you need pH >6.3 and P&K index >2 for clover and soil temperatures of 8˚C or above.

"Spray off your old sward and create a firm, fine seedbed. Don't drill too deep, 10mm at most, and roll before and after sowing," says Adam. "Sow from the end of April to mid-August, so the crop is well established before the winter."

With improved animal performance, and environmental and economic gains for farmers, it is fair to say clover deserves the title of superhero and lives up to the hype!

To find out more about clover, and other legumes, visit the Germinal knowledge hub for webinars, videos and how-to-guides. germinal.co.uk/knowledge-hub/

TOP TIPS FOR OVERSEEDING WITH CLOVER

While a full reseed is ideal, sometimes it's not possible. Adam shares his top tips for overseeding with clover.

- **Timing is everything**. March, April, July and August are best for providing the warmer temperatures clover needs. May and June should be avoided, as grass growth is at its most vigorous and will compete with the clover
- You need an **open sward**, where you can see the soil
- Use **3.7kg/ha** for white clover and up to **7.4kg/ha** for red clover
- **Avoid** drilling too deep, it's a small seed so you only need to scratch the surface
- Make sure you have good **seed-to-soil** contact – roll it after drilling
- **Don't** apply nitrogen fertiliser – it will cause the grass to outcompete the clover

Germinal's Helen Mathieu

CAPTURING THE FULL POWER OF PERENNIAL RYEGRASS

Perennial ryegrass (Lolium perenne) is the foundation of forage-based systems and the UK's go-to grass species. Helen Mathieu explains why and unwraps the importance of understanding its full potential.


Perennial ryegrass and its distinctive reddish-pink at the base of each culm

Decades of research in one seed

"To appreciate the potential of perennial ryegrass, you need to understand its history," says Helen Mathieu, Germinal grass and forage production specialist. In the early 20th century, the grasslands of Britain, except for the so-called 'fattening pastures', provided only for animal maintenance; production requirements were met by other crops such as swede, mangold, red clover and rolled oats. Keen to capture and cultivate the value of those fattening pastures, research scientists at the then newly established Welsh Plant Breeding Station in Aberystwyth studied the dominant grass species.

"Perennial ryegrass now has decades of breeding improvements behind it making it a powerful tool in modern agriculture," explains Helen. "It is optimised for persistence, nutrition and quality, and it's this legacy of research which makes perennial ryegrass so valuable to farmers."

The work in Aberystwyth continues today at what is now part of Germinal Horizon, the research and innovation team of specialist plant breeder, Germinal. Their work has led to the development of the Aber High Sugar Grass (Aber HSG) range, ryegrass varieties with higher levels of water-soluble carbohydrates (sugars). "You'll recognise them by the 'Aber' prefix. They feature prominently in the Recommended Grass and Clover Lists year after year as new and improved varieties continue to be produced."

Powerful production

One reason to maintain a high percentage of perennial ryegrass in your swards is its nitrogen use efficiency – whether from the bag, slurry or legumes. "When compared to other indigenous species, like Yorkshire fog or rough stalk meadow grasses, perennial ryegrass has two or three times as much yield response to nitrogen," says Helen.

This is particularly useful for farmers struggling with this year's high input costs and trying to reduce use of applied nitrogen.

Perennial ryegrass grows easily in temperate climates which suits the northern hemisphere - especially the UK. Ryegrasses in general are particularly aggressive in establishment, so can be reseeded almost anywhere in the country. "It's easy to manage, versatile and is pretty hardy to rough treatment from grazing or being trampled on," says Helen. "And of course, it is a high-quality grass, by which I mean D-value. D-value rules livestock production, whether in liveweight gain or milk yield."

How do you select the right mixture?

"You need to really think, in granular detail, about how and when you're using your grass," advises Helen. "If you're using it purely for silage, pick a multi-cut mix with more tetraploids to take advantage of their excellent conservation characteristics. But a high percentage of tetraploids leaves the ley open at the bottom so with silage ground often seeing a lot of traffic and slurry, it's susceptible to weed ingress and capping." She also suggests thinking about winter management of the ley. If grazing, or cleaning up, with sheep over winter ground cover is important. "Germinal's multi-cut mixtures contain a balanced mix of diploids and tetraploids with a narrow heading date range to cover all these requirements," she says. For grazing leys, Helen recommends farmers consider what they'll need just after turnout, looking for mixtures with good spring growth.

"A blend of perennial ryegrass varieties within a grass seed mixture is best for giving an even growth curve. Different varieties offer solutions for a multitude of challenges."

Gaining the most from perennial ryegrass

"For grazing swards, I cannot emphasise enough the importance of measuring your grass. Walk your swards once, even twice, a week and measure. This way you will know your supply, can change your stocking rate and be on top of fertiliser or weed control planning." There are plenty of reliable ways to measure grass availability in kg DM/ha, and estimates can be cross-checked by cutting and weighing grass from a known area.

The approach is slightly different for silage, Helen explains. Being fast growing, ryegrass is quick to mature but can lose some quality if not used or cut soon enough. "Set your swards up, clean them out after grazing and be tactical and timely with your fertiliser applications. Then monitor to mow at the optimum stage of ear emergence. There can be a compromise between yield and quality once grass reaches ear emergence as the D-value starts to decline, potentially losing 3% per week." Multi-cut systems capitalise on the virulent regrowth and extra energy of high-performing perennial ryegrass varieties before quality declines. Helen adds: "Of course there are extra costs associated with additional cuts but these are balanced by the savings made through the extra energy in the clamp reducing the requirement for bought-in feed."

Example figures for multi-cut versus a traditional silage system

MULTI-CUT (four cut)				
1st cut (early May)*	**2nd cut** (3rd week of June)	**3rd cut** (mid-July)	**4th cut** (end of August)	**Total**
4,000kgs @ 12.16 ME = **48,640**	3,500kgs @ 12.16 ME = **42,560**	3,000kgs @ 12 ME = **36,000**	2,500kgs @ 12 ME = **30,000**	**13.0t DM 157,200 MJ ME/ha**

TRADITIONAL (three cut)			
1st cut (end of May)	**2nd cut** (mid/late July)	**3rd cut** (end of August/ early September)	**Total**
5,500 kgs @ 11 ME = **60,500**	4,500 @ 10.7 ME = **48,150**	3,000 @ 10.5 ME = **31,500**	**13.0t DM 140,150 MJ ME/ha**

*Dates vary to suit system, climate and start dates

RECOMMENDED GRASS AND CLOVER LISTS (RGCL)

Varieties on the RGCL are independently tried and tested across the UK over a four-year period, guaranteeing they perform well in UK conditions. Only 1 in 20 varieties make it to the final selection. Using RGCL-listed varieties means you are accessing the latest plant genetics to maximise the productivity of your grassland. The new list is published annually in May by AHDB.

WHAT DOES SUSTAINABILITY REALLY MEAN?

Sustainability has become something of a buzzword, but what does it really mean for agriculture, how does it relate to productivity and where do regenerative principles come into it? Clemmie Gleeson asks three industry experts.

"Sustainability covers everything - profitability, the environment and people too," says Germinal's managing director, Paul Billings. "In agriculture it is the balance of production versus the environment. We need to produce enough food, but with as light a footprint as possible."

The definition varies across the supply chain, suggests Sarah Haire, head of agriculture for Dawn Meats/Dunbia. "We have tried to define sustainability alongside the European Roundtable for Beef Sustainability." They decided it has four elements – environment, animal health and welfare, animal medicines and economics, she explains. "They are all non-negotiable because they are intertwined. It's all about minimising the unintended consequences of our actions."

Meanwhile, First Milk's sustainability director, Mark Brooking, puts regenerative principles centre stage: "For me, sustainable agriculture is regenerative and by regenerative it has to put back more than it is taking out." The five pillars of regenerative farming are, therefore, all fixed aspects of sustainability. However, it is not just about what is happening on the farm – Mark takes it a step further to include impacts elsewhere in the supply chain or even in the world.

Sustainability vs productivity

When it comes to the age-old debate of productivity or sustainability, it seems there is some consensus. "The two definitely go hand in hand and shouldn't be seen as opposing challenges," says Sarah. "Better productivity will hopefully make you more sustainable in the long run too."

With the global population estimated to reach 10 billion by 2050 we can't afford to let either productivity or sustainability slip, adds Paul. "We have to maintain productivity but reduce the impact of farming on the environment."

Unlike other industries, agriculture has the added potential of carbon sequestration in the land, he says. "It's a real trump card if used properly.

"However, if farmers are involved in carbon trading, they must remember they can only count that carbon once, which means they can't then use it to balance their own systems."

Mark argues adopting regenerative principles should deliver both sustainable and productive agriculture. "A regenerative approach by its very nature will improve productivity. It's all about producing more from less," he says. "In my mind the regenerative principles are the best way to ensure we have thriving soil health in order to grow crops and reduce inputs."

While not disagreeing, Paul believes the definition of regenerative farming is not clear enough. "It needs a comprehensive definition, as the term has been used to mean different things. If you have an area of unproductive land then rewilding could be a great solution, but if it is your most productive land rewilding is difficult to justify.

He believes government policy is heading in the right direction, though. "Farmers know their land and where best to have environmental projects and make them work, rather than being paid subsidy to have five metre strips around every field."

Regenerative principles are about going back to basics, adds Sarah. "I grew up in Norfolk learning about the four-course rotation, which is all about leaving the soil fit for the next crop. We moved away from that with monocropping and pushing the soil as far as we can, but regenerative principles are putting the focus back on improving soil health.

"That means better conditions for plants and, by definition, improved productivity. However, the danger with a label like regenerative agriculture is you risk creating factions within the industry, when in reality everyone needs to think about soil health."

Priorities at farm level

Soil health should be the priority, agrees Mark. "It is central to everything – it is the engine room of your business. Anything that improves soil health will improve productivity in the long run."

By default, cattle and sheep farmers have several regenerative principles covered including maintaining living roots and livestock. "Something we could do more of is plant diversity, achieved by looking at multi-species leys. These have increased capacity to capture sunlight, while also putting nutrients into the soil at different depths."

Efficiency is a priority, suggests Paul. "If you are efficient, you are in a better place and will reduce your environmental footprint. Over the last 50 years of grassland management, it has been easy to spread cheap nitrogen. Now it's so expensive you need to target its use to where you'll gain the best return. That makes financial sense as well as being more environmentally friendly."

Fertiliser and feed prices are a real problem, agrees Sarah. "But have farmers done as much as possible to control the things they can? Have they accurately evaluated the amount of fertiliser they need through soil analysis? Have they looked at different grassland species? How can they achieve the same end goal with a different approach?"

Sustainability is really about being able to continue to produce food without depleting nature or having a detrimental impact on the climate or wider society. While there is consensus in some areas, there is probably no 'one size fits all' solution.

"There are lots of things farmers can do, but mindset change is perhaps the biggest challenge," Sarah concludes. "We will all need to adapt to the changing pressures on the agricultural industry, so probably the most important factor in sustainability is having a positive attitude to change."

SARAH HAIRE is head of agriculture for Dawn Meats/ Dunbia and Chair of UK Cattle Sustainability Platform. She's spent 20 years in the meat industry with Assured British Meats, Hilton Meats Retail and now Dawn Meats since 2011.

PAUL BILLINGS has been Managing Director of Germinal GB since 2012 and oversees the research and innovation division, Germinal Horizon. In the seed industry for 30 years, he is passionate about new technologies allowing farmers to grow sustainable grassland.

MARK BROOKING is Sustainability Director of First Milk. With over 30 years' experience in agriculture, he has a particular interest in socially responsible food production. He has also had a diversified farming enterprise in Devon for 22 years.

Five pillars of regenerative farming

Diagram courtesy of First Milk

ALTERNATIVE FORAGES CAN HELP FILL FEED GAPS

Livestock farmers are turning to alternative homegrown forages as they work to fill predicted feed gaps resulting from high fertiliser and purchased feed prices. James Marshall examines the benefits of growing clover and brassica crops.

Livestock farmers know this year is going to be particularly challenging. With fertiliser and feed prices at record highs, farmers are understandably nervous about how they will feed livestock economically. Many are also facing the possibility of substantial forage deficits, with reduced expenditure on inputs negatively impacting grass growth.

As a result, there is more interest in growing alternative forages on farms. Brassicas, for example, can provide a nutritious source of quick-growing feed, for under 10p per kilo DM. The choice of available forages is wide, so it's important farmers select the crop that best suits their specific forage requirements.

Red and white clovers

The nitrogen fixing properties of red and white clover make it a popular choice in light of current fertiliser prices. But clover's high feed value can also help alleviate pressure on forage stocks and provide a useful source of homegrown protein.

"We shouldn't overlook clover's feed value," says Adam Simper, Germinal grass and forage production specialist. White clover is an excellent source of protein, with a high mineral content and high DM value. It's very palatable and passes through the rumen more quickly than grass, resulting in high intake potential."

Trials on sheep rearing systems have shown a mixed grass-clover ley with an application of 90kg nitrogen/ha produced 300kg more dry matter and reduced lamb finishing time by 14 days, compared to a pure ryegrass ley receiving 145kg nitrogen/ha.

Adam Simper, Germinal grass and forage production specialist

"As well as reduced input costs, the quicker finishing times meant stocking rates could be increased or leftover forage given to other livestock once finished lambs were moved off," continues Adam. "Both options result in better utilisation of the homegrown forage with improved productivity."

WHITE CLOVER ESTABLISHMENT

- Aim for 30% white clover in a grass-clover ley
- Soil pH 6.3 or above, with P & K index of 2
- Drill from end of April to August, when soil temperatures are 8°C and rising
- For a full reseed, sow at 13-14kg grass seed/ha and 1-1.5kg of clover

GERMINAL RED CLOVERS

Traditionally red clovers only last two to three years in cutting leys. New generation red clovers, including AberClaret, bred at Germinal Horizon Aberystwyth, last at least four years under cutting and are significantly more tolerant of grazing. Scientists are now working on the development of varieties resistant to common disease challenges.

All red clovers fix nitrogen at a rate of around 150kg N/ha reducing the need for fertiliser applications.

Red clover is also a high-quality, cost-effective feed giving yields of 10-15 tonnes DM/ha and a consistent, high protein content. With new varieties lasting four to five years and with options to sow as part of a mixed sward or as a monoculture, red clover provides another excellent alternative forage option.

"Average red clover silage consistently produces 15-19% crude protein, roughly 3-5% above average grass silage," continues Adam. "Livestock also benefit from the polyphenol oxidase [PPO] enzyme found in the plant. The PPO protects the protein as it travels through the rumen until it reaches the abomasum. Once in the abomasum, bacteria can break down the protein more efficiently in the highly acidic conditions, resulting in better animal performance."

Finishing lambs on stubble turnips

Benefits of brassicas

Brassicas incorporate a wide range of main and catch crops, providing fast-growing feed with good nutritional value. If managed correctly, livestock can also be overwintered on brassica crops, alleviating the costs and labour associated with winter housing.

"If farmers foresee forage gaps later in the season, I urge them to sow brassicas," explains Paul Morgan, Germinal grass and forage production specialist. "Brassicas can deliver a kilo of DM for just 4-6 pence, with some catch crops ready to graze two months after sowing. They provide a quick, cost-effective way to plug forage shortfalls in late summer or autumn.

"They are also versatile with stubble turnips a good example of this versatility. Stubble turnips can be sown in May and grazed just eight weeks later; providing DM yields of 5-7.5 tonnes/ha, with 10-13 ME and crude protein at 16-17%. They are great for topping up later season grazing during the summer months."

Other popular brassica crops include Maris Kestrel kale, a very winter hardy crop suitable for overwintering and with DM yields of 10-14 tonnes/ha. Triumph swedes are often used to support lamb and ewe condition over winter. Their high DM yield and ME value of 12-14 means they support high stocking rates on small areas of land.

"Hybrid brassicas such as Swift or Redstart grow rapidly and mature 100 days after sowing," continues Paul. "They represent another source of winter grazing and farmers can multigraze the crop when effective back fencing is in place. Managed well, the crop should achieve 50% regrowth after an initial graze."

Brassicas are best strip grazed using long, narrow breaks to maximise utilisation, with livestock moved on to fresh growth every day. It is also important to supplement livestock with high-quality fibre and mineral supplements.

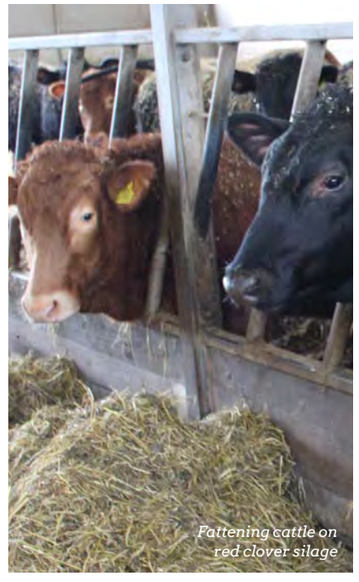
Most main crops of brassicas need to be sown by the end of June at the latest if farmers want to graze them over the autumn and winter period. For a quick catch crop, farmers should look to establish brassicas between May and the end of August.

"Now is a good time for farmers to work out when they will need extra forage on their farm, working backwards to plan establishment dates," concludes Paul. "They need to factor in what land is required and how much is available at different times of the year. By taking these steps now, farmers can hope to alleviate some of the feed-related pressures they know are coming later in the season."

"BRASSICAS CAN DELIVER A KILO OF DM FOR JUST 4-6 PENCE, WITH SOME CATCH CROPS READY TO GRAZE TWO MONTHS AFTER SOWING."

PAUL MORGAN, GERMINAL GRASS AND FORAGE PRODUCTION SPECIALIST

Paul Morgan



Fattening cattle on red clover silage

FORAGER IS CHANGING

THIS SUMMER ISSUE IS THE LAST EDITION OF FORAGER AS YOU KNOW IT.

THE MAGAZINE IS MOVING ONLINE AND WE'RE TAKING THE OPPORTUNITY TO DEVELOP IT INTO SOMETHING NEW.

Underpinning our commitment to sustainable communications, we encourage you to sign up to our mailing list to receive Forager in its new format together with all the free news and updates from Germinal. Send your contact details to **forager@reverberate-pr.co.uk**, go to **germinal.co.uk/subscribe** or use the **QR code**.

RESEARCH UPDATE

Continuing demands for climate-sensitive production and inflationary costs making farmers review every nitrogen application carefully mean the emerging benefits of combining grasses, legumes and herbs are well timed. Germinal Horizon's long-term trial studying multi-species swards is generating results just when farmers need them most. Backed up by their latest results, the specialist plant breeding team's scientifically robust recommendations is advice farmers can trust.

TRIAL DESIGN

Germinal Horizon Wiltshire's multi-species trial plots were drilled in spring 2020. A multi-species mixture usually includes at least one type of grass, legume and herb. This trial was no different with replicated plots of six mixtures ranging from a control of perennial ryegrass alone to a mix of 16 different species, comprising five grasses, five legumes and six herbs. Seasonal growth performance, dry matter (DM) yield, persistency, metabolic energy (ME) and protein were measured from multiple cuts across the season. The impact of two levels of applied nitrogen was also assessed.

QUANTIFYING THE BENEFITS

Nitrogen fixation, drought tolerance and a greater nutritional value are some of the advantages already being seen by farmers using multi-species leys. Environmental and production gains are brought about by the distinct characteristics of each species within the sward. What this trial adds to the understanding of these benefits is the detail – how the species interact, the role of the smaller species and how different conditions affect yield. By using scientific methodology to study these elements, farmers can overcome the unpredictability of taking a 'suck it and see' approach.

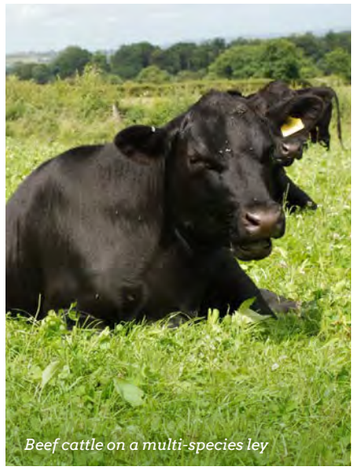
YIELD PROFILE

Good DM yields were seen from all the trial plots. The perennial ryegrass yielded well at 14.8tDM/ha and adding species to it drove yields even higher. Around 19tDM/ha was produced by the multi-species mixtures except for the most diverse mix of 16 species. This diverse sward would be of more use where the focus is on biodiversity, whereas the others all offer high-quality grazing.

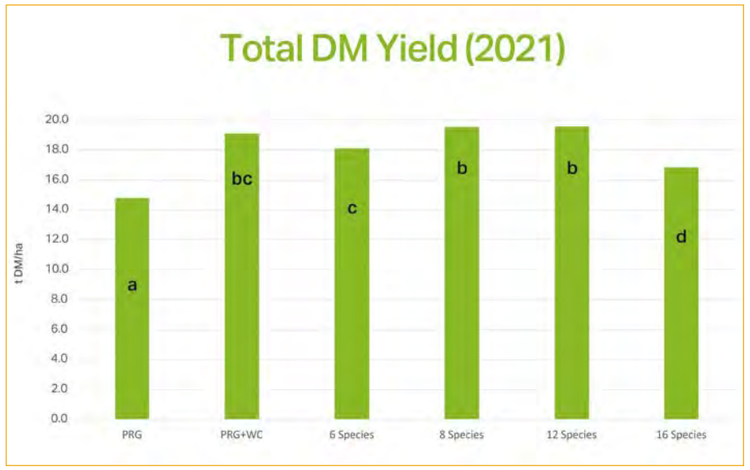
When tracked across the season, yields reflected the growing cycle of each species. Perennial ryegrass was critical to sward establishment at the beginning of the season, its spring growth also playing a valuable role in suppressing weed growth. Adding species to perennial ryegrass stabilised supply across the season, particularly during parts of the summer when grass growth is known to fall.

SWARD QUALITY

In those mixtures containing a variety of grass species, perennial ryegrass showed a significantly higher metabolisable energy (ME) content, but the other species offered useful levels of crude protein. The fescues, better able to withstand dry conditions, appeared to use soil nitrogen more effectively in the drier summer period.



Beef cattle on a multi-species ley




Grace Welling studying the trial plots at Germinal Horizon Wiltshire

The common forage herbs, chicory and plantain, dominated the multi-species mixtures initially and made a significant contribution to sward performance and quality in the first year. They didn't have the persistency of the legumes, however, with the proportion of chicory and plantain in some swards halving in year two. The secondary herbs of sheeps parsley, yarrow and burnet made little impression in either growing season and were all but lost in the second year.

The slower establishment pattern of clover was seen clearly in the first year of this trial, but its overall contribution was indisputable. Both red and white clovers showed high energy density, with white clover highest early in the season, and their superior protein levels were particularly significant. The average protein content across the season exceeded 20%, building to a high of 26-27%; both clovers always contributing more protein than the herbal elements.

IMPACT OF FERTILISER

Positive interactions with fertiliser were closely aligned to the proportion of perennial ryegrass in the mixture. This is most likely due to the ability of perennial ryegrass to use nitrogen during its period of highest growth potential.

In contrast to its effect on perennial ryegrass, higher levels of applied nitrogen suppressed clover growth significantly, thereby reducing crude protein levels in those plots. As well as lowering protein, when clover is inhibited one of its greatest benefits is lost – its ability to fix atmospheric nitrogen. This underlines the need for using artificial nitrogen carefully. While it can help grass growth early in the season, further use is unnecessary and detrimental where clover is included.

SOWING TIME

The trial established spring as the best time for sowing multi-species mixtures. This benefits the herbs and legumes, providing the warmer temperatures they need to germinate and grow.

FURTHER WORK

The trial continues with further exploration of how ley composition is influenced by inputs, climatic conditions and soil types.

TAKE-HOME MESSAGES

- **Spring establishment** is recommended over sowing in the autumn
- **Legumes**, such as red and white clover, are critical for sward quality and reducing the requirement for applied nitrogen, and proliferate over time
- **White clover, chicory and plantain** increase sward performance and influence quality, stabilising yield mid-season but the herbs show low persistency
- **Secondary herbs** and legumes may be useful for biodiversity rather than grazing performance. They are potentially more site specific and may be of benefit in certain circumstances
- **Diverse swards** containing a lower proportion of perennial ryegrass are open and more vulnerable to weed ingress

SUMMER FOCUS

HAVE YOU CONSIDERED UNDERSOWING MAIZE?

Much has been made of the environmental and soil erosion risks associated with leaving agricultural land bare over winter. This has prompted many UK farmers to explore the environmental and soil health benefits of undersowing maize with clover ground covers. James Marshall finds out more.

Undersowing maize with grass is already common practice in many European nations, but it hasn't been widely adopted here in the UK. Concerns regarding plant competition and subsequent impact on maize yields have traditionally deterred livestock farmers from implementing the technique.

However, interest in undersowing is growing within the domestic livestock industry. It's becoming clear that with effective management in place, maize can flourish alongside undersown ground covers and achieve multiple soil health benefits. As well as improving soil retention over the winter period (especially on sloping ground) and reducing nutrient leaching, undersowing maize helps improve soil health and structure.

"Vigorous growing grasses, such as Italian ryegrass, will create a thick ground cover but are more likely to negatively impact maize yields due to competition between plants," explains Helen Mathieu, Germinal grass and forage production specialist. "However, we've been carrying out trials at Harper Adams University and they've highlighted maize crops can be successfully undersown with perennial ryegrass and white clover, without negatively impacting maize yields.

"But it's important the right management and establishment practices are in place to ensure undersowing is a success."

ENVIRONMENTAL AND SOIL HEALTH BENEFITS

Leaving soil bare over winter represents a significant soil erosion and nutrient run off risk. Travel anywhere in the UK over winter and the sight of maize stubble fields with eroded channels through the soil is a worryingly common sight.

"Soil and nutrients are the building blocks on which successful crop growth is achieved, so anything to help retain these two things is really important," explains Helen. "Undersowing does add extra work for a farmer, but the result is a cover crop already established when maize is harvested. This represents an instant, large-scale ground cover and system of root structures immediately providing soil protection."


Helen Mathieu, Germinal grass and forage production specialist

Undersowing with perennial ryegrass and clover won't negatively impact maize yield

The foliage of the cover crop lessens the impact of rainfall on the soil. The network of established root structures also creates underground channels and air pockets to aid effective water infiltration. This, coupled with the structural integrity provided by root systems, can be a significant factor in reducing soil and nutrient run off during wet, winter weather.

When compared to leaving a field bare over winter, this approach brings soil biology benefits too. The live root structures provided by a cover crop help increase levels of soil organic matter. This increased organic matter fuels higher levels of soil microbial activity encouraging more beneficial organisms, such as earthworms, that return additional organic matter to the soil.

"Undersowing while maize is still growing also avoids the risks associated with establishment of post-harvest cover crops," says Helen. "After maize is harvested, poor autumn weather conditions can sometimes delay or prevent the sowing of cover crops and limit the successful growth of anything planted."

TIMINGS, CROP VARIETIES AND ESTABLISHMENT TECHNIQUES

Maize does not perform well with competition from other plants and this often deters farmers from implementing an undersowing policy. However, by using a slow-growing cover crop like clover, selecting early varieties of maize and sowing at the optimum time, maize performance shouldn't be negatively affected.

"For anyone looking to establish maize in late April, the best time to undersow a maize crop with clover is the end of June or early July," continues Helen. "In terms of optimum maize height, farmers should aim for the bulk of the crop to be between the top of a Wellington boot and their knee, and at the eight-leaf growth stage.

"The advantage of clover is it isn't as aggressive or competitive as Italian ryegrass and shouldn't pose a significant competition threat if managed correctly. The vital point is to establish the clover before the maize grows too high and overshadows the rows between the maize plants. But you also don't want the maize too short, as the clover will compete more effectively with the main crop."

While clover can be broadcast, drilling has been shown to be the most successful approach. Undersown clover should be drilled using an inter row weaving drill, at a rate of around 2.5kg/acre, and medium to smaller-leaf clover blends such as AberSheep usually work well in combination with maize.

And just as farmers need to carefully consider weed management when establishing a traditional clover-based ley, the situation is the same when undersowing.

"Maize can throw up quite a lot of weeds, so it's important to consider this when timing an undersown clover crop," says Helen. "In May, farmers should provide their maize with two treatments of post emergence weed control. This allows plenty of time for chemicals to work out of the soil, and not affect the clover later in the summer."

While the numbers of UK farmers undersowing maize crops is relatively low compared to countries such as Denmark and Germany, many are optimistic about its role in the industry.

"There is still a lot of research and refinement to be done," concludes Helen. "But the potential benefits of undersowing maize are significant and I think it is something we shall see an increasing number of farmers implementing in the future."

TOP TIPS FOR UNDERSOWING SUCCESS

- Avoid use of **fast growing**, competitive grasses
- Opt for **early varieties** of maize and establish in late April
- Treat maize with **two rounds** of post-emergence weed control
- Undersow with clover when maize at **eight-leaf stage** - usually end of June or early July
- Drill clover at **2.5kg/acre** using an inter row drill
- **AberSheep** is a successful, small-leaf clover blend to use for undersowing

Undersowing maize helps improve soil biology and structure

Over the Farm Gate regulars Brian Hogan and Tony Ball bring us up to date with what was happening on their dairy units during the spring.

TIMING OF RESEEDS CRITICAL TO SUCCESS

Brian Hogan

FARM FACTS

- **99ha** (244 acres). Includes 53ha (131 acres) grazing platform
- **160** cow spring calving, Holstein/ Friesian herd with some Jersey crossbred
- Calve from **29** January to **5** April
- **7,000 litres** a cow a year at 4.43% fat and 3.66% protein
- **550kg** of milk solids per cow per year

Brian Hogan, Horse & Jockey, County Tipperary, Ireland

Spring has been good for Brian and Pat Hogan in County Tipperary. The father and son team had a closing cover of 874kgDM/ha on 1st December, opening again at 1,128kgDM/ha on 1st February. It was a high cover but Brian wasn't concerned as he knew they were due a very compact calving in spring creating a high demand so it would all be needed.

Conditions for grazing were good throughout most of the spring, starting on 28th January and finishing the first round on 2nd April at 700kg. But a cold April slowed grass growth, seeing the Hogans having to feed 4kg silage and 4kg nuts.

The autumn reseeds including AberGain grew very well over winter and were grazed during the third week of March before being closed for silage.

Fertiliser spreading was delayed in February due to the weather conditions and high prices. Looking back, Brian feels this was a mistake. "We should have spread a few paddocks at the end of January. Other farmers in my discussion group did and have seen better growth in February," Brian reflects.

Responding to the scarcity and high prices of fertiliser, the Hogans cut back 15 units up to 1st April, replacing it by spreading far more slurry than usual on their grazing platform. They find using a contractor to spread slurry by trailing shoe works well for them.

A multi-species sward was sown in April in a field which had cows grazing Redstart last winter; a run of a disc and power harrow being enough to prepare the seedbed. They also oversowed white clover on more of the milking platform paddocks in April, having left it too late last year. "We were too late sowing last year," Brian explains. "It suffered in the drought last summer, so we hope April works better this year."

Calving ended on 5th April with 155 calved, before breeding started on 26th April.

Tony Ball

MULTI-SPECIES ON THE CARDS

Tony and Michael Ball, Vernon's Oak Farm, Sudbury, Derbyshire

Spring saw some slow grass growth with frosts in April preventing soil from warming up as they'd have liked, but this brought an advantage for the Ball brothers. "It stopped the zero-grazing platform getting away, meaning the high-yielding groups received grass in perfect condition," said Tony Ball. "In a warm spring, growth can accelerate away faster than the acreage is being mown, leading to grass being too strong when cut." Fresh grass analysis in April showed good nutritional value, similar to the 2021 figures, with ME at 12.4MJ/kg and 20.7% protein.

Zero grazing for the high yielders started in the third week of March, at the same time as turnout for the late lactation cows. Some of the youngstock had gone out earlier in the month but most were in until early April, being held back for a routine herd TB test. "It just made sense for practical reasons," commented Tony.

Tony and his brother Michael have been trying to keep fertiliser applications down over the past two or three years, and particularly so this year. This is a balancing act though, as it is vital to ensure there is sufficient high value silage in the clamps to see them through the winter. They are anticipating a strong milk price and quality forage will be needed to underpin production. "We are trying to use slurry as efficiently as possible on the grassland and plan to use contractors to help us cover more ground with slurry after first cut," explained Tony. Their fertiliser plan is on a field-by-field basis, prioritising the newer swards with the better growth potential and relying on clover to provide a significant contribution.

Tony has less ground coming back into grass this year, giving him an opportunity to reseed some of the older leys in the autumn. Two long-term leys were sown with an arable silage mixture in spring and undersown with a new grass ley.

Thinking ahead, Tony has been looking into multi-species swards and feels they may well fit into their system and offer some value. "We may earmark some acreage to try it for next season," he suggested. "It could work well in a zero grazing situation. I'm also interested in the benefits for soil structure and health, and the anthelmintic properties could benefit fields allocated for youngstock grazing."

FARM FACTS

- **300ha** (750 acres). Includes 162ha (400 acres) grass leys, 67ha (165 acres) maize, 40ha (100 acres) wheat, 8ha (20 acres) barley/pea/vetch wholecrop and 24ha (60 acres) miscanthus as an energy crop
- **500** all-year-round calving Holsteins milked through robots
- **10,000 litres** a cow a year at 3.9% fat and 3.3% protein. 3,000-3,500 litres a cow from forage
- Cows fed **zero** grazed grass, grass and maize silage and wholecrop silage
- Separate **200** cow, autumn block calving system on an additional 134ha (330 acres)

QUALITY FORAGE INCREASING IN VALUE

Is the saying 'less is more' right for milk and forage production in a year of high costs? Forager finds out from Kingshay's Senior Farm Services Manager, Kathryn Rowland.

With inflationary pressure on inputs across the board, contractor fees going up and availability of fertiliser patchy in some areas, there is a temptation to make less forage. But Kathryn Rowland from Kingshay says, quality forage production continues to drive herd profitability, with the figures clearly showing that maintaining or even growing milk from forage is cost effective.

"In recent months we've seen milk yields drop nearly a litre per cow per day," says Kathryn Rowland. "While this drop may reflect reduced feed levels in an attempt to save on expenditure, does it really make sense for your business? Reduced production means fewer litres across which to spread fixed costs. Finance and labour expenses don't reduce proportionally with each litre and still need to be serviced.

"With bought-in and homegrown feed costs rising for all herds, quality forage lies at the heart of producing milk profitably and efficiently, making your homegrown forage an even more valuable asset," she says.

Table 1 illustrates how driving profitable production of milk from forage makes economic sense. The table, analysing data from herds using Kingshay Dairy Manager, shows the top 10% of herds are producing nearly half their yield from forage. Total purchased feed costs per litre are 3.6 ppl lower than the bottom 25% of producers. For a typical 200-cow herd yielding 8,000 litres per cow, this equates to savings on bought-in feeds costs of over £58,000.

Milk from Forage — **Rolling results February 2022**

Holstein/Friesian, Conventional Herds		Top 10%	Top 25%	Average	Bottom 25%	Top 25% - last year	Average - last year
Cows in herd		182	198	209	236	183	203
Stocking rate	cows/ha	2.08	2.15	2.31	2.41	2.16	2.33
Milk Production							
Yield per cow	**litres**	**8,938**	**8,590**	**8,457**	**8,675**	**8,437**	**8,455**
Yield from all forage per cow	**litres**	**4,398**	**4,009**	**2,806**	**1,480**	**4,058**	**2,822**
% of total yield from forage		49%	47%	33%	17%	48%	33%
Milk Price	**pence**	**31.65**	**31.71**	**31.34**	**31.09**	**28.82**	**28.63**
Feed							
Concentrate use per cow	**kg**	**2,265**	**2,291**	**2,678**	**3,181**	**2,178**	**2,655**
Concentrate use per litre	kg	0.25	0.27	0.32	0.37	0.26	0.31
Concentrate price per tonne	£	276	274	271	269	247	245
Other purchased feed cost per cow	£	41	36	59	107	34	54
Total purchased feed cost per cow	£	666	664	786	961	573	704
Total purchased feed cost per litre	**pence**	**7.45**	**7.73**	**9.29**	**11.08**	**6.79**	**8.33**
All P.Feed @ 86% DM equiv. per cow	kg	2,374	2,391	2,896	3,626	2,267	2,862
Margins							
MOPF per cow	£	2,162	2,060	1,865	1,736	1,859	1,716
MOPF per litre	**pence**	**24.19**	**23.98**	**22.05**	**20.01**	**22.03**	**20.30**

Kathryn Rowland, Kingshay

"What we see is those herds with the lowest cost of production have higher forage costs, with investment still being made in soil sampling, fertiliser and reseeding," says Kathryn. "But this extra amount pays off when it comes to margins. These herds are also likely to have a lower carbon footprint due to efficiencies in other areas.

"The approach needs to be twofold. Produce the highest quality forage you can, whether grazed or ensiled, harvest it in the most efficient way and make sure you have the healthiest, most efficient cows possible to use it.

"Be on top of your grazing so cows are using the highest quality grass without wastage. Measure and allocate grass well and make sure your grazing infrastructure allows easy access to pasture and reduces poaching. The timing of silaging and ensiling techniques need to be spot on. Use a sheer grab for feeding out and keep the clamp face as small and sharp as possible to reduce wastage. Make the best of the forage you have invested in producing," Kathryn stresses.

"The temptation is to give purchased feed to late lactation cows to try and keep yields up, but analysis may show chasing those extra litres is not cost effective.

"It's the attention to detail in everything you do that helps make the best possible use of your increasingly valuable forage and drive performance across the herd," she concludes.

SUCCESS IN THE SECOND HALF

High fertiliser and feed costs strengthen the argument for making the most of homegrown forage, given decent milk prices. So how do you gain the best from silage crops in the second half of the year?

The middle of the year is pivotal for assessing where you are with silage, says Volac forage expert, Peter Smith.

Will you have enough? How is quality looking? And how might you need to manage remaining cuts? All are key questions, he says.

"There are two reasons to conserve silage well," says Mr Smith. "Firstly, because better silage puts you in a stronger position to reduce purchased feed requirements. But secondly, you have already invested in growing silage crops, so don't let their feed value slip away."

To help, Mr Smith outlines techniques for capturing maximum quality and quantity from silage crops over the rest of the season.

You have already invested in growing silage crops, says Peter Smith, so it's important not to let their feed value slip away

Grass silage

Grass has done most of its growing by mid-year, says Mr Smith, so if you need extra bulk from later cuts to offset earlier shortfalls, there's a diminishing opportunity and less margin for error.

"Second or third-cut grass is sometimes regarded as less important than first-cut. But there's a lot of potential in these cuts. Autumn grass may be more difficult to wilt, but it can be high in energy and protein. Also, don't overlook the value of having decent silage for dry cows or youngstock.

"If short on silage, don't cut grass too low as this will delay regrowth, which reduces later yields, and risks introducing undesirable microbes, which cause losses in dry matter (DM)."

Key with summer cuts, says Mr Smith, is to remember they head quickly. After heading, digestibility falls by about 0.5%/day and a 3.6 D-unit reduction requires 1.5kg/day more concentrate for a dairy cow, he says, so timing of mowing is key.

"Also, be careful not to over-wilt. Over-wilting increases in-field sugar and protein losses, and dry silage is difficult to consolidate, which increases risks of aerobic spoilage (heating). Wilt to 28-32% DM in the shortest possible time."

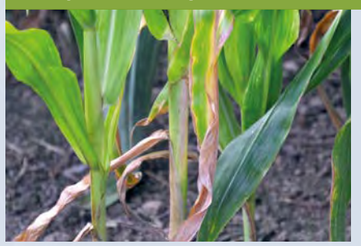
To conserve DM and nutrients, Mr Smith says an efficient fermentation is key. Undesirable microbes in silage feed mostly on sugars and proteins, he says, and some compounds produced by bad bacteria make silage less palatable.

"Cutting at the optimum time, rapid wilting and effective consolidation will help, but dominating the fermentation with beneficial bacteria from a proven additive remains important.

"Ecosyl, for example, delivers one million beneficial Lactobacillus plantarum MTD/1 bacteria per gramme of forage treated and results in rapid production of lactic acid, which quickly inhibits undesirable bacteria.

The DM level of wholecrop cereals at harvest can be adjusted according to your needs

Undesirable microbes can breed in dying leaves and decaying material posing a challenge to maize preservation, says Peter Smith



"In research, Ecosyl has halved DM losses in grass silage, with the resulting silage also more digestible, which means more energy for milk production. Across a range of forages, cows fed silage conserved with Ecosyl yielded on average 1.2litres more milk/cow/day."

Wholecrop cereals

A big benefit of wholecrop cereals, says Mr Smith, is you can adjust the DM level they are harvested at according to your needs.

"Most farmers preserve wholecrop by fermentation as a straightforward and cost-effective method. Fermented wholecrop can be made between 30-60% DM. However, you are more likely to need a dual-acting additive, such as Ecocool or DA Ecocorn, with wholecrop – to both aid the fermentation and keep it aerobically stable and cool."

1) Harvesting at 30-40% DM

If you need to make up for low grass yields, harvesting wholecrop at 30-40% DM offers the maximum amount of fresh weight, says Mr Smith, although not DM yield. "Wholecrop in this %DM range is lower in starch and often fed to dry cows and youngstock. At these %DMs it can be harvested without specialist equipment – using a wholecrop header, or by mowing before harvest without the conditioner turned on."

2) Harvesting at 40-50% DM

A more common %DM range, this offers a similar fresh weight yield, says Mr Smith, but more starch, making it useful for reducing starch-based concentrates and for animal performance.

"Harvesting in this % DM range offers a nice balance between starch content versus sugars and moisture for fermentation. However, because the crop is drier, it becomes more difficult to keep cool and stable, so a dual-acting additive is particularly important. Placing 2-3ft of consolidated fresh grass on top in the clamp can also help.

"At harvest, a wholecrop header is required and a grain cracker may also be needed above 45% DM to prevent intact grains passing through the cow, unless the crop is undersown, which can increase moisture enough to soften the grain."

3) Harvesting at 50-60% DM

Harvesting at 50-60% DM will increase starch levels further and increase "scratch factor" as the crop becomes more fibrous, says Mr Smith, making it useful for higher production animals, especially if other forages are low in fibre.

"Because the crop is now even drier, it becomes more difficult to consolidate. Clamps should always be filled in layers no more than 10-15cm deep, but at this %DM this is critical. Again, consolidated grass over the top is good practice, and an additive against heating is vital, as is a grain cracker on the harvester."

Forage maize

Maize crops should be well-established by now, but forward planning for harvest will help to ensure maximum feed value, says Mr Smith.

"The issue with maize is that there are plenty of 'bad bugs' waiting to feast on its DM, sugars and starches in the clamp.

"Dying leaves at harvest and decaying material trapped in leaf joints are breeding grounds for undesirable microbes, which pose a challenge to the fermentation. Meanwhile, fungal contamination can make maize silage less palatable and can cause mycotoxins. To reduce bad bugs, minimise the number going into the clamp in the first place, then inhibit any that do."

As well as scrupulously removing old, infected silage from clamps, Mr Smith says maize must be harvested at the correct stage.

"Modern maize varieties tend to reach the optimum 30-33% harvest DM while still green. Late harvesting risks dead foliage and mould growth. Also, higher %DM crops are difficult to consolidate, leaving them prone to heating losses from yeasts and moulds growing in the presence of air."

As with wholecrop, Mr Smith says there is a strong argument for the dual-acting Ecocool additive with maize silage. Other steps for reducing heating include chopping to the correct length to aid consolidation, typically 1.5-2cm, and keeping clamps airtight using side sheets and an oxygen barrier film beneath the top sheet.

"Maize should be consolidated to at least 0.7 tonnes of fresh weight per cubic metre. As well as weighting the clamp, protect it against birds pecking through the sheets and letting in air."

Second-cut tends to be drier and lighter than first-cut, so be careful not to over-wilt it or it will be more difficult to consolidate, says Peter Smith

2021 AWARDS FINALISTS

Richard Rogers and Harry Johnston were both finalists in national grassland competitions last year. Francesca Harding spoke to them about their approach to grassland management.

FARMERS WEEKLY GRASSLAND MANAGER OF THE YEAR FINALIST - RICHARD ROGERS

Richard Rogers farms with his mother Margaret in Anglesey
Photo courtesy of Farmers Weekly; credit: Richard Stanton

"IT'S NOT ENOUGH TO JUST PRODUCE LOTS OF FORAGE, WE NEED TO MAKE SURE WE'RE USING IT EFFECTIVELY."

Ten years ago, Richard Rogers transitioned his farm from a suckler beef and sheep operation relying heavily on concentrates to a dairy system. The three units he runs in partnership with his mother Margaret are now milking successfully, with over two-thirds of their annual average milk yield coming from forage.

Overhauling his grassland management was central to the transformation with Richard keen to make better use of their grassland. An early change was to introduce a rotational grazing system.

"Creating the rotational grazing system completely changed my mindset on grassland farming," says Richard. "It brings in much more structure and introduced us to regularly measuring performance and benchmarking our results. It has unlocked a new aspect of grassland management based on data and quantification."

Grass growth is measured weekly using a plate meter during the grazing season, normally running from mid-February until mid-November. To maximise utilisation and minimise waste, Richard uses a stocking rate of 4 livestock units/ha on the grazing platform.

"Utilisation is very important," explains Richard. "It's not enough to just produce lots of forage, we need to make sure we're using it effectively. This is why we run at a relatively high stocking rate."

Richard aims to reseed 10-15% each year to ensure his grassland performs consistently. He takes out the poorest performing fields first and sows with a mixture of Germinal's Aber high sugar grasses. In the future he plans to introduce more species into the leys, including clover to reduce reliance on bought-in nitrogen.

"It's important to adapt and react to the current situation," explains Richard. "With high fertiliser prices a challenge, we are thinking about how else we can achieve the results we're after. It gives us an incentive to explore options less reliant on bought-in nitrogen."

Having the right team is also part of Richard's success. Across the three units he employs six members of staff and puts a focus on creating opportunities for employees to develop.

"Each farm manager has an equity share in the business they run," says Richard. "It reflects the commitment they put in and means we share in the wins and losses. Having the right people is central to our business, so we want to ensure their role is recognised.

"The knowledge and skills we have across the business have really helped us make the most of our grassland," concludes Richard.

FARM FACTS

- **Bodrida Farm,** Anglesey
- **Farms in partnership** with his mother, Margaret
- **900** cows across three spring-calving dairy units
- **231ha** (570 acres)
- Average yield **8,100** litres (5,349 litres from forage)
- **Supplies** Yew Tree Dairy and South Caernarfon Creameries

BRITISH GRASSLAND SOCIETY GRASSLAND FARMER OF THE YEAR FINALIST - HARRY JOHNSTON

Harry Johnston milks 276 autumn and winter calving Holsteins

Creating a profitable and sustainable business centred on grazing has always been Harry Johnston's aim. But when two of his sons returned to the farm from New Zealand, he decided to take a fresh look at his grassland management.

"We're lucky to have a farm which is good for growing grass, and we've always tried to make the most of it," says Harry. "With Jack and Mark spending time in New Zealand, they gained first-hand experience of systems producing large quantities of milk from grazed grass. When they returned home, we decided to take this knowledge and see how much more we could make of our grassland."

Mark takes responsibility for grass measurement and allocation to the milking herd, while Jack looks after the soil analysis and nutrient requirements. They moved the start of calving from August to mid-September, making better use of grass during the peak of its growing season in June and July. This pushes milk yields later into lactation, as well as making the most of their processor's winter bonus.

Grass across the 53ha (130 acres) grazing platform is measured weekly by plate meter, with the data fed into AgriNet to calculate stocking density.

"The plate meter is the most important bit of kit on our farm," says Harry. "Good grassland management always starts with measuring and understanding what you have available. Once you have a handle on grass growth you can think about utilisation and how to tweak your system to make the most of what's available."

Cows graze from the beginning of April until they are dried off in late summer.

"Once the cows are out, it's really important they stay out and make the most of the grass available to them," explains Harry. "We have good grazing infrastructure, which makes it easier to move the cows to the right paddocks and means we only have to bring the cows in if the weather becomes really bad."

Central to Harry's grassland management is ensuring there is always quality grass in front of the cows. He achieves this by reseeding regularly with mixtures formulated to provide high quality, energy and palatability. The current mix is 50% AberChoice, 25% AberGain, and 25% Astonenergy. Paddocks are also pre-mown prior to grazing to maximise utilisation and promote high-quality regrowth.

Their approach is certainly working; litres from forage currently sit at 3,000 but the aim to achieve 3,500.

"Grass is the cheapest feed available on every dairy farm so it's really important we do all we can to make the most of it," concludes Harry.

"THE PLATE METER IS THE MOST IMPORTANT BIT OF KIT ON OUR FARM."

FARM FACTS

- **Ballybollan Farm,** Ahoghill, County Antrim
- **Farms alongside** wife Helen and sons Jack and Mark
- **276** autumn and winter calving Holsteins
- **164ha** (405 acres) with 53ha (130 acres) grazing platform
- Annual average milk yield of **8,500** litres (3,000 litres from forage)
- **Supplies** Dale Farm

2022 Nuffield Scholar Rob Havard is using holistic management on his family's Worcestershire farm

CHEWING THE CUD

For ten years, Rob Havard has adopted principles of holistic management and used holistic planned grazing to make the most of his farm's diverse pastures, restoring acres of native, species-rich land. He tells Laurence Brown about why he chose these techniques.

Rob Havard runs his family farm in Worcestershire with his father while also working as an ecologist. The farm has 130 Aberdeen Angus cows grazing over 1000 acres of extensive pasture, their main operation being the production of pedigree, grass-fed breeding cattle.

What is holistic management?

In a nutshell, it involves looking at the tools available to you and using them to determine the direction of the farm. Goals are set by which decisions can be tested against social, financial and environmental criteria. It is underpinned by flexibility. For example, we have fields being grazed six or seven times a year and grow back fine while others only manage two grazes. It's a case of matching your management to your land. Sometimes pinning your colours to the mast of one grazing system may not be the best approach.

To give this some context, with our grazing rotations we initially started moving our herd every two days and eventually settled on twice a week. The key principle for us was not to graze the grass as it was regrowing giving it chance to re-establish itself. When this goal is met, we can be flexible with the grazing system we choose.

Within our social criteria, consideration is given to quality of life for everybody involved and we are keen to avoid overworking staff unnecessarily. This approach gives us the freedom to respond to questions such as "What benefit is there in staff moving cattle every day compared to every other day?" and "Could staff be spending that time more productively elsewhere, adding more value to the business?" Using the holistic management framework, decisions are made based on several aspects of the operation.

What are you looking to develop further?

Ultimately, we would like to achieve the maximum stocking rate possible while still improving and regenerating the land ecologically. We are already working on the cow genetics, but plant genetics are equally important. We are developing swards with tall fescue and cocksfoot, mixed with native species such as meadow foxtail. This is very important in spring when we are trying to grow as much grass as possible. Its proving beneficial for us with the current high cost of fertiliser. At a time when costs are soaring, we are yet to see an increase in marginal costs.

How quickly did you see the benefits of holistic planned grazing?

It really depends on your land. Some permanent pasture we took on has plenty of deep-rooted grasses already. The sooner we allowed bunch grasses such as tall fescue and cocksfoot to reach their potential, the sooner we reaped the benefits. Some of those root structures are up to two metres deep, which in our clay soils made an enormous difference and allowed us to outwinter our cattle within 2-3 years, saving housing costs. It may take 10-12 years to see the same results on land previously in arable.

Would you recommend adopting holistic management?

I wouldn't necessarily say people should or shouldn't do it. I would explain what we have done and what has worked for us and leave others to work out if it applies to their own situation. Currently, there is a lot of interest in high-density grazing methods, such as mob-grazing and tall grass grazing. These are very intensive but certainly can offer benefits in weed control and kick-starting production. A holistic management framework looks beyond the grazing system to encompass everything about your operation, including people, cattle and the environment. If the approach is compatible with other farm operations and is of interest or a passion, then, yes, I would recommend it.

Lastly, can you elaborate on your genetics focus?

The most important trait we breed for is fertility, with additional focus on traits such as longevity, excellent forage conversion, good structure, udders and feet. We have found selecting for these traits has resulted in a typical size of 500-550kg. Our herd is a slightly line bred population which is closely related and will have some inbreeding depression. When our bulls are used over unrelated commercial cows, the resulting cow is smaller, but she has hybrid vigour making her very fertile and robust. If bred with an unrelated, easy calving terminal sire, the cow produces a calf almost as big as herself and I believe this demonstrates where our genetics blend well with the terminal, production-focused genetics. We recently sold some bulls to the owners of an 800-strong suckler herd, who needed to reduce their herd frame size as it was costing them a lot to feed. Our bulls introduced genetics that reduced maintenance requirements and costs.

"A HOLISTIC MANAGEMENT FRAMEWORK LOOKS BEYOND THE GRAZING SYSTEM TO ENCOMPASS EVERYTHING ABOUT YOUR OPERATION, INCLUDING PEOPLE, CATTLE AND THE ENVIRONMENT."

Rob believes plant genetics are as important as livestock genetics to the success of his holistic approach

FARM FACTS

- **20ha** (50 acres) Phepson Farm
- **77ha** (190 acres) rented
- **73ha** (180 acres) National Trust tenancy
- **24ha** (60 acres) rented meadows
- **222ha** (550 acres) at Kemerton Estate and Bredon Hill Nature Reserve
- **Diverse** native pastures
- **130** Aberdeen Angus cattle

NUFFIELD Farming Scholarships

NUFFIELD FARMING SCHOLARSHIPS

Rob is a current 2022 Nuffield Scholar studying the *'Evaluation of beef cattle selection methods for profitability in grass-fed production systems'* for his scholarship. He is investigating the effectiveness of different selection methods and how farmers can learn from them to improve the profitability of grass-fed cattle operations.

If there is an area of agriculture you are keen to explore to further your farming career, consider a Nuffield Farming Scholarship. A scholarship offers you the opportunity to travel, to develop knowledge and understanding of your chosen topic and to meet industry leaders around the world. Applications for 2023 Nuffield Farming Scholars are open; closing date 31 July 2022. To find out more: **nuffieldscholar.org**

IMPROVE FORAGE PRODUCTION THROUGH COST-EFFECTIVE WEED CONTROL

Escalating input prices are leading to tough decisions being made on how to control costs on farm. Forager explores why it's important to make sure your weed control strategy isn't scaled back to the detriment of your winter feed.

Cost-saving decisions can often be a trade-off; saving money in the short term can end up costing more further down the line. Weed control falls into this category and farmers are being urged to have a plan for it this year. Cutting back on weed control risks feed quality and quantity for next winter, at a time when homegrown forage will be more important than ever.

Docks in established grassland

Improving forage production

Keeping grass productive, extending the life of swards and providing quality nutrition for livestock is always a priority, but even more so in the current economic environment. Making the best use of grass through good grazing management and optimal cutting regimes is important, but so too is making sure the right plant species dominate without allowing weeds to take over.

It is vital to control docks, thistles, ragwort, buttercup and nettles as they offer little nutritional value, can cause animal health issues if there is nothing else to eat and are invasive perennial weeds. Left uncontrolled, they can quickly dominate a sward. Their management is essential to reduce competition for nutrients, light, water and space, allowing grass to reach its full potential as a valuable source of forage.

Even at low populations, weeds pose a threat to grassland productivity. For example, a 10% dock or thistle infestation can equate to a 10% reduction in grass dry matter leaving significantly less grass growing for feeding to livestock. With a low feed value, weeds in silage can cause nutritional shortfalls resulting in the need for supplements of more expensive, bought-in feed.

Managing weeds in a cost-effective way

To manage weeds cost-effectively and sustainably, consider the following:

- Select the right herbicide for the job. For example, if docks are the problem, select a high-performing dock control solution, such as Corteva's Doxstar® Pro. The Corteva decision tree (Figure 1) helps you decide on the best herbicide for your weed situation.
- Timing is critical. Apply herbicides to weeds when they show active growth and in a vegetative phase before moving into a reproductive or flowering state.
- Carry out as much weed control as possible in new sown leys. Controlling weeds when they are young is more effective and requires less herbicide than more established swards. It also encourages the new grass species to dominate, restricting the potential for further weeds. Corteva has two selective herbicides for use in new sown leys. Both Envy® and Leystar® kill weeds down to the roots. The best time to apply them is when weeds are small and actively growing – six to eight weeks after reseeding – and when there are three leaves on the grass.
- In multi-species leys, where valued species other than grass are present – typically white and red clover, chicory, vetch, birdsfoot trefoil, sainfoin or lucerne - weed control is more challenging. A more targeted approach is required, such as the use of clover-tolerant herbicides or precision applications using a knapsack and Grazon® Pro.
- Make applications as efficient as possible. Use a properly calibrated sprayer and apply the water volume as stipulated on the label to ensure good coverage. Use a nozzle, such as an air inclusion nozzle, to minimise drift.
- Topping or cutting may remove annual weeds such as fat hen and redshank but have minimal effect on perennial weeds such as docks, thistles and nettles. It is an expensive operation and a false economy if the weeds return.
- Plan your spray using the Corteva Forage App. Taking the time to plan a spray in your grassland is vital for success. A well-timed spray, using the right product can significantly reduce weed burden and encourage grass growth, as well as minimise the risk of a costly repeat spraying. Corteva's Forage App provides a decision support tool which helps you plan and execute an effective application.

Figure 1 – Using the Corteva decision tree helps determine which product is best for your situation

The free Corteva Forage App provides resources to help maximise production of homegrown forage.

DON'T FEED THE WEEDS

With the cost of applied nitrogen at an all-time high, another way to reduce costs is to make sure fertiliser is spread on grass not weeds. Control weeds to protect your forage quality and quantity and make a return from every kilo of fertiliser spread.

The economic conditions are tough at present and ensuring you gain the most from grazed grass and winter forage is imperative. Carefully planning your weed control for the summer months could save you money in the long run.

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Forefront® T is a high performance herbicide.

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Thistles


Buttercups


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