

IN FIELD FOCUS

— AGRONOMY THAT DELIVERS —



HELPING HAND FOR SPRING BARLEY

With the prospect of a large spring barley harvest in 2020, how should the crop best be managed?

If you're growing spring barley, manage it to get the best from it, agree ProCam's head of crop production, Mike Thornton (pictured), and regional technical manager for Scotland, Alistair Gordon. (continued overleaf)

IN THIS ISSUE:

Winning with wheat | Storing seed | Sustainable system

Helping hand for spring barley

Spring barley can yield up to 9 or 10 t/ha in some situations, and has the potential for a malting premium with the right variety and grain quality. Compared with a winter crop, it can also help reduce blackgrass, Mike Thornton points out.

So what are some of the key steps to get right?

End market

Start by having a clear vision of the end market you're growing for, stresses Alistair Gordon. Globally, Scotch whisky consumption has been booming, though you need to be in a location that can access this market, and be sure you can attain the low 1.4-1.6% grain nitrogen needed, before aiming solely for this outlet, he notes.

Otherwise, end uses that allow yield to be pushed harder with more nitrogen fertiliser may give more leeway, he adds. Brewing markets typically want 1.6-1.8% grain nitrogen or sometimes higher, he says, and there are dual-purpose distilling and brewing varieties available.

"Barley with higher grain protein can also be beneficial in livestock diets if home-feeding," says Alistair. "If you're growing spring barley on heavy land or after oilseed rape, soil nitrogen levels may be elevated. Soil

Continued from page 1

nutrient testing may be time well spent this season, so that you know your starting point for nitrogen and trace elements."

Establishment

Spring barley's sensitivity to stress and short growing season mean creating the best seedbed conditions to get the crop up and out of the ground quickly is crucial, says Mike Thornton.

"It wants to go into the ground in nice conditions," says Mike. "If you're planting spring barley on heavy land, soil may need working to allow it to dry out. Feed it with a proportion of its total nitrogen dose for the season in the seedbed, increasing this proportion if drilling later. That way, if it turns dry, at least some will have been taken up."

Typical drilling windows if conditions allow are mid-February to early April in England, says Mike, while Alistair says in Scotland the drilling window starts at the end of February and closes a month later than in England.

"Seed rates need adjusting to sowing date and local conditions, and to variety to account for tillering ability," adds Alistair.



Sowing spring barley early increases yield potential but also increases disease risk, says Alistair Gordon

"Concerto, for example, might produce three tillers, while Laureate might produce four.

"Sowing too thick can also produce low specific weights, high screenings and increased lodging. Sowing early increases yield potential but also increases disease risk because the crop is in the ground for longer.

"Over the last few seasons I've also avoided rolling at the time of sowing on light land to prevent capping, but if applying pre-emergence herbicides then rolling beforehand may be necessary to break down clods."

Nutrition

As well as choosing the correct nitrogen dose and timings, avoid trace element deficiency, says Alistair. Common requirements



are for copper and zinc which are crucial for flowering and grain set, but it's no good waiting for deficiency symptoms to appear before treating. Nutrients need to be available from the outset, he notes.

"Manganese is another common requirement," adds Alistair. "It can be locked up on soils with a high organic matter content, as can manganese and copper on soils with a high pH.

"With spring barley's sensitivity to stress, there's also a clear role for bio-stimulants. We've done a lot of research testing early applications of micronutrients and bio-stimulants, with the aim of giving the crop a rapid start, and have good evidence that the right treatment promotes early root mass and shoot growth.

"Good rooting is important because dry conditions can severely hinder spring barley. I tend to apply these treatments around the three leaf stage. It's also important to choose the right formulations of these treatments for compatibility, as they're often applied within tank mixes."

Weed control

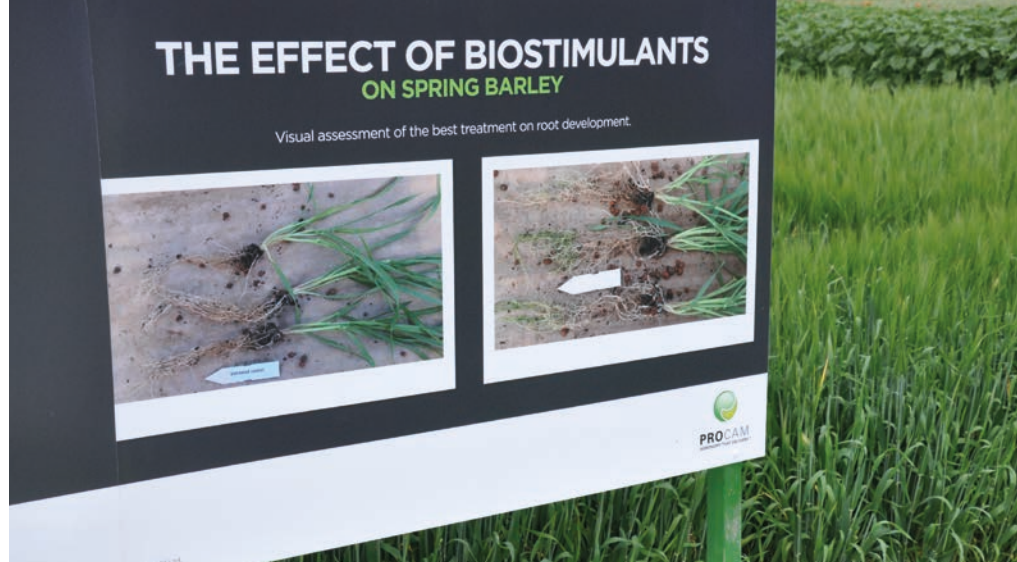
Effective grassweed and broadleaved weed removal are important to minimise competition against spring barley, says Mike Thornton.

Although pre-emergence herbicide options are limited in the crop, and good seedbed quality is important to get the best from them, they provide a good foundation, especially if later foliar herbicide applications are delayed, he points out.

"Pre-ems are also useful against poppies, mayweed and chickweed if you have sulfonylurea resistance. Also, watch certain spray intervals if using a sequence of a sulfonylurea and a foliar grassweed killer," he adds.

Managing disease

As with wheat, spring barley disease control is best carried out preventatively, agree Mike and Alistair, with fungicides giving about three weeks' protection, depending on dose. Two sprays are usually applied in England, though sometimes three are necessary in



ProCam research into early applications of micronutrients and bio-stimulants has produced good evidence that the right treatment promotes early root and shoot growth

Scotland due to the longer season.

"Maintaining good green leaf area to drive grain-filling and specific weight could be vital for grain marketability this season if there's a lot of spring barley on the market come harvest. Late season fungicides also help to reduce brackling," Mike notes.

"Key diseases to guard against include Rhynchosporium, net blotch and mildew, and increasingly Ramularia, which is expected to become a bigger issue when chlorothalonil can no longer be applied."

In readiness, ProCam has been evaluating alternative fungicides against Ramularia. While some have shown activity, this hasn't been at the level of chlorothalonil. Accordingly, other ProCam work, to underpin fungicides, has focused on improving crop resilience with mid-season bio-stimulant and micronutrient applications.

The reasoning behind this is that Ramularia lies dormant in plants after infection, says Alistair, but is triggered to cause leaf damage by the arrival of stress factors, such as adverse weather.

By proactively creating healthier

canopies with bio-stimulants and micronutrients, the aim is to improve resilience to stress factors. Trial results have shown clear benefits – with a halving of Ramularia symptoms (see panel).

"As well as factors such as correcting soil pH to reduce stress, and avoiding tank mixtures with excessive adjuvants, I would look to apply bio-stimulants and micronutrients around stem extension," he adds.

Growth regulation

Don't dismiss the need for growth regulation in spring barley, says Mike. Some modern varieties need more help with a PGR to reduce lodging or brackling, especially if pushing harder for yield with nitrogen fertiliser.

But while certain PGRs can improve rooting as well as straw strength, it is important not to over-shorten the crop to avoid harvesting difficulties, he adds.

"Correct PGR spray timings are crucial. Because spring barley goes through its growth stages quickly, it's easy to get caught out."

Ramularia reduction

A BASIS project by ProCam agronomist George Young in Scotland in 2019 showed late-season (GS72) Ramularia leaf damage was halved from 30% to 16% after applying a two-spray programme of a bio-stimulant plus micronutrient to clean spring barley at GS30/31 and GS45/49 compared with the untreated.

By comparison, plots receiving chlorothalonil at the same spray timings remained free of Ramularia damage at GS72.

Winning ways with 2020 winter wheat

Backward crops, yellow rust concerns, and the loss of chlorothalonil fungicide. Those are some of the challenges to this season's winter wheat potential.

Resurrecting limited growth and protecting green leaf area are set to be key strategies needed to boost this season's weather-hit winter wheat plantings.

Findings from ProCam 4Cast, the annual big data analysis of thousands of hectares of cropping, have shown that late-established crops can still produce decent yields. The key is attention to detail.

"The big issue this season is that we've had drilling dates all over the place because of the washout autumn and winter," says ProCam northern region technical manager, Nigel Scott.

"These ranged from early-drilled crops planted in non-blackgrass situations when it was dry in September, to very late crops that went in whenever it was possible to get on the land. However, there's a common

problem facing crops at both ends of this spectrum – poor rooting.

"Even though early crops established well, the fact that they've sat in waterlogged soils means their roots haven't had to extend deep into the soil. Late-established crops, as well as having limited root structures, have also had less time for tillering. Because of excess winter rainfall, some leaching of soil nutrients has also been inevitable. Otherwise, these nutrients would have helped."

Root mass

In response, Nigel says improving root mass should be a prime focus this spring, along with improving tiller production where necessary to attain the optimum number of ears per square metre. A bigger root mass helps to fulfil tiller potential, he notes.

So what can be done? Initially, crop rejuvenation will require a balance of effective plant growth regulation and targeted 'feeding' of plants, Nigel believes.

"An early application of plant growth regulator can help in multiple ways," he continues. "As well as helping to improve root mass, by reducing apical dominance, it also stimulates tillering, which helps to offset low plant populations or loss of tillers due to winter kill. Optimising tillering also increases the number of crown roots in backward crops, which reduces root lodging, and can improve thousand grain weight.

"With this in mind, I will be looking to apply an appropriate plant growth regulator as soon as possible this spring within label restrictions. However, hand-in-hand with growth regulation goes good crop nutrition.

"The macronutrients of P and K are important, as too is N, which feeds tillering. Plus, certain bio-stimulants definitely have an effect on root mass. We have seen this repeatedly in independent research that we have commissioned and in our trials.

"This season is a prime year to consider applying a combined bio-stimulant and micronutrient treatment – beginning while crops are still tillering in February –



By co-applying bio-stimulants and micronutrients with fungicides you are taking steps to protect crops against different weather scenarios, says Nigel Scott

although it is important to choose the correct one.

“From past experience, I’m also a fan of maintaining this type of treatment little and often through the spring. This isn’t expensive and, by co-applying a bio-stimulant and micronutrient with a fungicide programme, you are taking steps to protect crops against different future weather scenarios.”

In line with this, Nigel says if the season turns dry, and root mass has been improved, plants are better able to scavenge for soil moisture and nutrients. “We saw in the dry summer of 2018 that we had excellent yield responses from a bio-stimulant and micronutrient programme on top of fungicides,” he explains.

Alternatively, if it turns into a wet season and disease pressure is high, he says the fungicide elements protect yield.

“Remember, you don’t know at application how the weather will turn out. In autumn 2018 roots grew deep. This season, we haven’t had that luxury. It is going to be so important to build root mass early, especially if we have a dry summer. There’s a relationship in wheat that says the longer the roots at flowering the higher the yield.”

Disease risks

ProCam regional technical manager in the south, Paul Gruber, agrees and says it will be important to avoid crops being in any state of lack. Look at adjusting early nitrogen applications to aid tillering, he urges, for example considering 60-80 kg/ha at the start of spring growth, compared to a more typical 30-40 kg/ha.

Paul says: “It is also easy to think that later-drilled wheat crops will be at lower risk of disease. That may be true in some cases, but an early attack of yellow rust or mildew can be devastating to backward crops, because plants



Early attacks of diseases such as yellow rust or mildew can be devastating to backward crops, because plants don’t have much green leaf area to begin with

don’t have that much green leaf area to begin with. Also, a lot of varieties don’t have juvenile plant resistance to yellow rust.

“There’s been a lot of discussion online recently about whether to trim back on T0 and T1 fungicides. But we’ve had a couple of dry springs that curtailed early disease. In less kind seasons these early fungicide timings can prove vital. Yellow rust can escalate quickly and unpredictably if you don’t keep on top of it. Including a



There isn’t a one size fits all answer to cereal disease control, says Paul Gruber, especially in a season like this

fungicide at T0 doesn’t require an extra spray pass if you’re applying other treatments anyway, and it isn’t a massive cost.”

Additionally, Paul says we have seen over recent years how variety resistance ratings can crash in the space of a season due to new yellow rust races appearing. Several varieties were struck with unexpectedly high levels of yellow rust during 2019.

Specific assessment across ProCam trials from Devon to Durham last season confirmed this, says trials manager, Jodie Littleford, with resistance ratings seeming to have little influence over whether or not the disease appeared. She says it was found in varieties with ratings of 8, 7 and 4.

Similarly, although ProCam trial plots have shown that later drilling generally does tend to reduce disease pressure, this isn’t linear across all varieties. A variety can show no reduction in disease with later drilling, Jodie explains.

“The take-home message for disease control in 2020 is there isn’t a one-size-fits-all answer,” says Paul Gruber. “You can’t just look at variety, drilling date and current disease pressure. We are going to have to take into account much more besides.”

Coping without chlorothalonil

There’s little doubt that managing *Septoria tritici* will become more of a challenge when chlorothalonil can no longer be used.

The move to growing wheat varieties with greater *Septoria tritici* resistance provides a foundation against the disease. However, correct fungicide choices and programmes will continue to play a vital role. We have been evaluating alternative solutions in readiness for the loss of chlorothalonil. Contact your ProCam agronomist to find out more.



ProCam has been evaluating alternative solutions to the loss of chlorothalonil

Top tips when ‘over-yearing’ winter seed

Cereal growers having to carry over unused winter cereal seed from this season’s washout winter into next season must take adequate steps to protect its viability.

If not, then losses could occur during storage, says ProCam seed manager, Lee Harker, and its germination in autumn 2020 could suffer, leading to potential yield reductions come harvest 2021.

“Clearly, it is impossible to predict how well every batch of cereal seed originally purchased for planting in autumn or winter 2019 will perform if drilled in autumn 2020,” says Mr Harker. “What we can say, however, is that if it isn’t stored correctly and managed properly prior to planting, it will suffer losses.

“One possible positive aspect of over-yeared seed from 2019 is that many people are comparing the current situation with the difficult 2012 to 2013 over-yearing experience. However, harvest 2012 was wetter, so seed quality often wasn’t as good to begin with, even before it was over-yeared.”

Nevertheless, Mr Harker says there are important precautions when over-yearing seed:

Storage: Seed should be kept in original unopened bags if

possible, says Mr Harker, and stored in cool, dry conditions to minimise the chance of premature germination, and protected from frost. “Ensure also that labels remain intact for easy identification of the variety and any seed treatments used,” he says, “and seal any ripped bags against moisture such as humidity or dew. Ideally, raise bags off the floor on a pallet to allow airflow and to protect against damage.”


Vermin control: Keep vermin out of storage areas to prevent them chewing through bags and causing seed losses, says Mr Harker, either through direct feeding or more likely through seed leaking out, which then attracts more vermin. Importantly, regular checks on vermin control should be carried out through the entire storage period, he stresses.

Germination testing: Percentage seed germination will almost certainly decline to some degree during storage, says Mr Harker,

so it is essential that over-yeared seed is tested for germination before planting, and seed rates adjusted accordingly. Vigour can also be affected during storage, he says, which can’t easily be tested for. However, where seed was of good quality, with a decent thousand grain weight, he says the plump grains normally provide good food reserves to give it the strength to get away.

Seed treatment: With the majority of seed likely to have been treated with a seed treatment, growers may have questions about the effect of this on over-yeared seed, Mr Harker acknowledges. Again, germination should be checked and seed rates adjusted accordingly, he says, since seed treatment labels often say words to the effect that seed should be planted in the season of treatment.

Drilling order: Where winter cereal seed is carried over until next autumn, it may be worth drilling this first to take advantage of kinder establishment conditions, suggests Mr Harker, such as warmer soils.



Where winter cereal seed is over-yeared until next autumn, consider drilling this first, suggests ProCam seed manager, Lee Harker, to take advantage of kinder establishment conditions, such as warmer soils



Francis Dunne says Field Options' grass trials programme shows the value of expertly formulated mixtures and also highlights the benefits of including specific legumes

Ryegrass blends offer cost effective bare soils solution

Sowing a high performance ryegrass catch crop this spring could offer a flexible low risk solution for farmers with bare ground following aborted autumn drilling.

Specialist catch crop mixtures tested in Field Options' trials programme at Harper Adams University (HAU) have the potential to produce more than 10tDM/ha in the season immediately following spring sowing.

Following early April sowing, Hurricane III, a mixture based on unusually persistent and hardy Westerwold ryegrass and Italian ryegrass, has recorded up to 14tDM/ha in a full season in the HAU programme with an average ME of 11.5MJ/kg DM across five cuts. According to Field Options' director Francis Dunne, this kind of short term grass catch crop could be a better option than spring cereals for farmers still considering what to do with undrilled acres.

"For those with the opportunity to either feed or sell a high value forage crop then a short term

ryegrass catch crop should be a consideration," he says.

"With a mixture like Hurricane III, which has been carefully compiled with a blend of new high performance Westerwold and Italian ryegrasses, and tested in our trials programme, there will be high dry matter yields as well as sustained

quality through the first season.

"A first cut would be taken a full month ahead of when a wholecrop cereal would be harvested, and there is added flexibility, as the mixture is designed to last for up to 18 months, so can perform throughout a second season.

"Though the species in the mixture are more suited to cutting, it can also be grazed successfully if the appropriate controlled grazing techniques are employed."

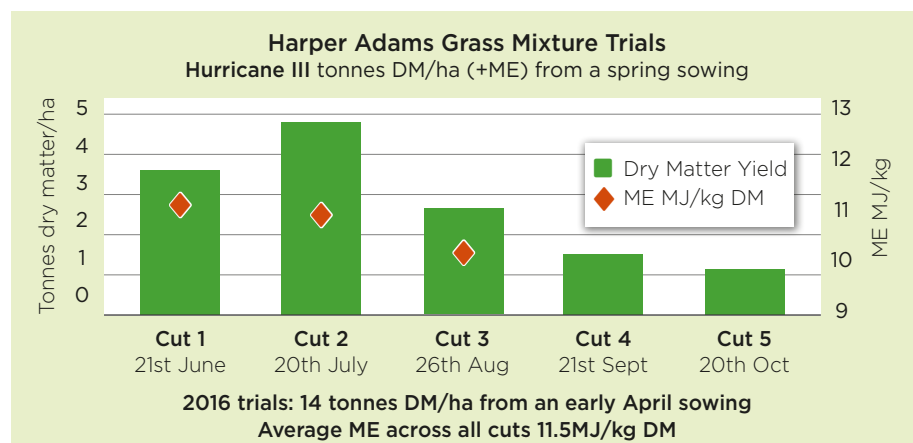
The addition of various legume species that complement these vigorous grasses adds value for anyone seeking a fertility building solution, additional yield or drought tolerance.

"Hurricane III Pro-Nitro includes a range of legume options, including common vetch, berseem, crimson and red clover," adds Francis Dunne. "The precise formulation depends on the month of sowing, but the addition of the right legumes will give higher yield potential, particularly in a dry season, and will improve the protein content of the silage by about 3%.

"At a cost of around £25/ha to add the clovers, following the catch crop with wheat is a sound investment for the significant benefits of improved soil structure and fertility.

"Higher protein content in the sward will also increase the value of aftermath grazing."

Ryegrass catch crop mixtures are also an option for sowing later in the season, from July to early October. In Field Options trials, autumn sown Hurricane III and Hurricane III Pro-Nitro out-yielded a straight Italian ryegrass after the first two cuts in the following year by 2.3t/ha and 5.7t/ha of 30% dry matter silage respectively.



Sustainable cropping underpins green energy production

For Devon farmer Stuart Cole, growing feedstock for a green energy anaerobic digester needs to be part of an integrated and sustainable rotational cropping system, just as any other progressive farming operation.

Of the 406 hectares farmed at Menchine Farm, near Tiverton, around half is used to grow a combination of maize, wholecrop oats, Italian ryegrass and beet for the 1.3 megawatt AD plant, with these used alongside poultry litter from two free range broiler units.

Digestate from the plant is spread on the Italian ryegrass leys and is also a primary source of nutrition for the maize. It is also sold off the farm, often in a favourable trading arrangement with neighbours that are growing additional feedstock for the unit.

"Some of the energy produced goes into the poultry units but the vast majority is exported to the grid," says Stuart. "We're a

renewable energy producer and it is important to us to be doing this as sustainably as possible. Maize is the most digestible feedstock, and we could run the plant on that alone, but we don't want to be reliant on one crop. We also want a cropping rotation that is looking after soil health and is environmentally responsible."

The plant has been operational since 2015 and the search for the optimum balance of feedstocks is on-going, including trials on the best way to grow maize. Currently, of the 80ha allocated for maize, around 30ha is grown under film.

"We've grown maize previously for local dairy farmers," adds Stuart, "so it's a crop we're

reasonably confident with, but some of our land is marginal and it's essential that we have the yields we need to create continuity of supply for the AD plant.

"We've grown a proportion of our maize under film using the Samco system in recent years, with the aim of increasing yields and also achieving an earlier harvest to allow us to establish a winter cereal successfully."

The 2019 harvest at Menchine Farm provided a stark comparison, with maize grown under film on north facing marginal land up to 195 metres being harvested a full six weeks earlier than maize grown on more favourable land in the open. This has allowed a good proportion of the winter oats to be drilled after maize grown under film, whereas the crops grown in the open were not harvested until the end of October.

"With the conditions we had this autumn, we would not have been able to harvest around 25% of the land if all maize had been grown in the open, as it would have been too wet to travel. We'd also have trashed a lot of the land with late harvesting.



Stuart Cole needs a reliable source of feedstocks for his AD plant and growing maize under film provides part of the solution

"I am very glad we used film where we did this year. I will be continuing with maize under film but will also still grow some in the open so we can continue to evaluate it over a number of seasons."

In the final analysis, maize grown on marginal land under film at Menchine Farm averaged 41 tonnes/ha freshweight, over 10 tonnes/ha more than was achieved from crops grown in the open, which will more than cover the extra cost of the system, according to ProCam's Emma Dennis, one of the farm's agronomists.

"There is additional cost in growing maize under film, but with Samco maize – which is a full system approach – the return on investment is significant," she says.

"We have a ten point plan for anyone wanting to grow maize under film, which includes everything from correct soil management and site selection through to working with fully trained operatives. It's a tailored approach, with key decisions such as the type of oxo-biodegradable film and variety selection depending on the farm's situation and desired outcome.

"Variety choice is particularly important, and we've found through an extensive programme of trials over many years that only certain varieties are suited to the conditions created by film. We make recommendations based on our trials and the particular conditions and requirements of each individual farm."

Emma points to areas such as nutrient use efficiency as additional benefits of growing maize under film, which add to the extra yield and earlier harvest that are the initial attractions.



ProCam's Emma Dennis recommends a ten-point plan as part of a holistic approach to growing maize under film using the Samco system

"The warmer soils created by the film make phosphates more available, removing the need for DAP down the spout, for example, and farmers will see more efficient use of slurry and digestate. With more focus on the environmental consequences of different farming systems, maize grown under film will have advantages in terms of nutrient use efficiency and soil health, with earlier harvests more likely to allow the establishment of a following crop, thereby reducing soil erosion during the winter months."

In addition to the field scale comparisons between maize grown under film or in the open, Menchine Farm is also hosting a series of strip trials with plant breeder Pioneer.

Simon Preece, who manages the south west PACT trials, agrees that some hybrids are better able to cope with the environment under film and that variety choice is therefore a crucial part of

achieving success with the system.

"We've grown a number of our hybrids under the Samco system to see which perform best," he reports, "and some have been grown both under film and in the open. One direct comparison involved the early maturing hybrid P7326, which is one we would consider to be suited to growing under film. In the 2019 trials, we saw a 28% increase in both dry matter yield and predicted methane yield per hectare when the variety was grown under film."

"This clearly shows the advantage of the system in a year when seasonal temperatures were fairly close to the long term averages."

Simon Preece adds that whilst the extra yield from the current maize crop is important, the wider impact of more timely autumn drilling and better soil health should also be a major consideration.

That's certainly a factor for Stuart Cole, who first and foremost wants a reliable feedstock, but is also focussed on the long term sustainability of his system.



Pioneer Accurate Crop Testing System (PACTS) strip trials at Menchine Farm, showing maize hybrid P7326 grown under film (left) and in the open on 24th June 2019

Feedstock breakdown (Menchine Farm)

Maize	-25%
Wholecrop	-25%
Zero-grazed grass or beet	-25%
Poultry litter	-25%

Bumper beet yields underpin low cost beef system

Out-wintering cattle on fodder beet has for Powys livestock farmer Marc Jones been a game-changer in his quest for a beef rearing and finishing system that virtually eliminates the need for bought in feeds and keeps overall costs to a minimum.

With crops yielding up to 25 tonnes of dry matter per hectare, just 22ha are required to support 350 Angus x Holstein Friesian growing cattle from November through to the end of March.

Cattle are supplemented during this period with nothing more than high quality round bale grass silage, at around 2kg of dry matter per head per day, yet even during this current excessively wet winter growth rates of 0.75 – 0.8kg/head/day have been maintained.

“We’ve been out-wintering cattle for a number of years, using various brassica fodder crops, but there is nothing to compare with fodder beet in terms of its output,” says Marc. “We’re using around half the acreage that would be required if we were growing kale, for example.

“It costs around £1,200/ha to grow, but with the dry matter yields that we’re achieving it is without doubt the cheapest winter feed available.

“With all aspects taken into account, I estimate a saving of around £150/head from out-wintering on this system when compared with housing cattle.”

Marc farms just over 200ha with his father David at Trefnant Hall, near Welshpool, running 800 Romney X Lleyen ewes as well as the beef finishing enterprise on land rising to over 335 metres (1,100ft). Routine reseeding ensures high levels of productivity during the spring and summer, with rotationally grazed cattle on quality mixed species leys achieving growth rates of 1.3kg/head/day in their finishing period.



Marc Jones found that fodder beet grown from primed seed produced an additional one tonne per hectare of dry matter compared with the same variety un-primed

Fodder beet integrates well with the grassland reseeding programme, with the root crops typically being grazed through to the end of March then creating the opening for spring establishment, though in some cases Marc will grow a second crop of beet.

“When following grass, we ensure we spray out perennial weeds in the preceding year,” he says, “and then we spray off with glyphosate in the spring before ploughing. Fodder beet is a hungry



Angus and Hereford cross cattle have averaged 0.75 – 0.8kg DLWG when out-wintered on fodder beet at Trefnant Hall Farm

crop, so we'll usually apply plenty of broiler manure before ploughing, and up to 400kg/ha of agricultural salt is also important."

The fodder beet variety Geronimo is grown at Trefnant Hall Farm, this being very high yielding and suited to grazing due to its medium dry matter and relatively high proportion of root sitting out of the ground.

Drilling into a fine seedbed in April, when soil temperatures are at or above 7 degrees C for three consecutive days, Marc further enhances establishment by using primed seed, which has been

through a controlled process of pre-germination before being dried and pelleted.

"In the past we've compared primed and un-primed fodder beet seed," says Marc. "There is additional cost with the primed seed, but this is justified as it accelerates the establishment process and reduces the risks of disease in the early stages. We have seen an additional tonne of dry matter per hectare as a result of using primed seed."

Marc also uses 370kg/ha of 16:16:16 fertiliser in the seedbed and will apply additional nitrogen two

or three times (125kg/ha at each pass) as late as mid-September.

"We're aiming to maintain the green leaf for as long as possible, to protect the bulb, so it is important to keep feeding the crop. We'll also apply pre and post emergence herbicides, a fungicide usually in August, and – now that the seed treatment options have been removed – we'll spray against flea beetle and aphids. It's worth investing in the crop, however, because the potential is there for 25 tonne/ha of dry matter."

To maximise the value of this crop, the transition from grazing to out-wintering is critically important. Cattle coming off their first grazing season, when they will have maintained growth rates of 0.8kg/head day, are introduced gradually to fodder beet over a two week period.

"We give them a taste of fodder beet whilst they are still at grass, just by sprinkling some smashed roots onto the ground in the week or so leading up to out-wintering.

"Then, for the first few days on the fodder beet, we allocate 1kgDM/head/day, keeping them shut on the crop until it is gone before letting them back onto grass," explains Marc. "We then increase the allocation over a period of days, up to 7 or 8kg initially and eventually up to 10kgDM/head/day. This is supplemented with good quality grass silage bales that have been placed in the crop during the summer.

"We allow one metre per animal along the fence line, to avoid cattle being bullied, and having portable water supplies is important. When conditions do become very wet, as we've seen this winter, it's good to have the flexibility of moving them to a fresh area or even getting them onto hard tracks for a few days. Having a three or four metre buffer zone around the fields is also helpful."

Although the system at Trefnant Hall has previously involved buying in calves pre-weaning, the plan in future will be to buy weanlings in the spring at around 150kg liveweight, with these going straight out onto rotational grazing. They'll then have the winter on fodder beet and a second grazing season, being finished over their second summer to produce a target 300kg O+ and 3 or 4L beef carcase on a supermarket contract.

Quality leys

High performance mixed species leys supplied by Field Options are rotationally grazed at Trefnant Hall Farm, with cattle achieving growth rates of 1.3kg/head/day in their second grazing season. Using mixtures based on the best available perennial ryegrasses, with additional species selected for specific conditions, is allowing maximum performance off forage.

Using the Endurance II mixture, which combines high performing perennial ryegrasses, more drought-tolerant timothy and modern cocksfoot, this adds an estimated 2.5 to 3 tonnes of dry matter production in a dry season. White clover and trefoils are another important inclusion

in this mixture, increasing summer yield and palatability as well as growth rates in the cattle whilst reducing the farm's need for bought in nitrogen. On some of the most drought-prone slopes, Marc uses Endurance Herbal, which includes recently introduced Boston plantain and Puna II chicory, whilst on his better ground he opts for Preference Pro-Nitro, a version of the successful long term mixture with additional red clover to optimise yield, finish more lambs and improve soil fertility.

By maintaining quality grassland for rotational grazing and out-wintering on fodder beet, the farm is meeting its target of producing one tonne of liveweight per hectare with minimal bought-in feeds.



Including alternative species such as plantain, perennial chicory and clovers in grazing leys, alongside the best available perennial ryegrasses, ensures the best cattle growth rates, even in drought-prone conditions

The nature of nutrition

Once a poor relation to crop protection inputs, micronutrients and bio-stimulants are now increasingly in the limelight for boosting crop health.

Forward-thinking farmers have been using programmes of bio-stimulants and micronutrients for a number of years.

Now, the practice is filtering down to become much more mainstream, believes experienced crop nutrition expert, Tricia Roffe, who has recently joined ProCam to further develop this area.

"Certainly, they are more widely accepted," says Tricia. "There's more knowledge about these types of treatments, together with a lot more research. The whole area has been uplifted.

"Essentially, the more robust and healthy a plant is in terms of its root mass, green leaf area and size, the greater its ability to withstand stress. If a fungicide is late being applied, a healthy plant is better

able to cope. Anything weak is more susceptible to disease. With the loss of crop protection active ingredients, we need other ways to help the plant."

Tricia believes that although there are bio-stimulant treatments where results have been less conclusive, there are others that now deliver more consistent results.

She says: "The more work that's done, the more we find out which have a consistent effect.

"There's no doubt that a proactive approach to assisting the plant to be strong and resilient is beneficial, rather than waiting for signs of deficiency. A plant can have a manganese deficiency, for example, well before it shows any symptoms."

As a proactive approach, Tricia

advocates starting with a soil test before the autumn. Use of nutrition in the autumn will help rooting to see the plant through the winter, she says, prior to little-and-often micronutrient and bio-stimulant applications at T0, T1, T2 and T3. Good quality treatments are compatible with fungicides and herbicides and they can be applied as part of a comprehensive tank mix, she notes.

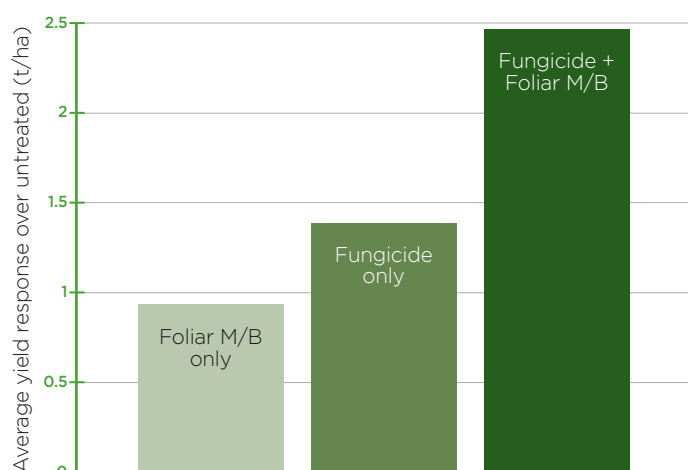
"Tissue tests have traditionally been carried out after a deficiency has appeared, when ideally they should be done as part of the growing cycle to ensure the necessary nutrients are available.

"In future I genuinely believe growers will have to look at this whole area. When we consider what a crop is capable of and where we are currently with average yields, there's still scope for improvement.

"The other important thing to consider is that these types of treatment don't have to be hugely expensive," she concludes.

Yield responses to fungicides and micronutrients/bio-stimulants

M/B - micronutrients/bio-stimulants



Source: ProCam trials, 2015, Santiago second wheat



There's no doubt that a proactive approach to assisting the plant to be strong and resilient is beneficial, says Tricia Roffe



PROCAM
AGRONOMY THAT DELIVERS*

ProCam UK Limited

2020 Cambourne Business Park, Cambourne, Cambridge, CB23 6DW

Tel: 01954 712150

www.procam.co.uk



@ProCAMUK

The ProCam orb and 'Agronomy that Delivers' are trademarks of ProCam Europe Ltd.