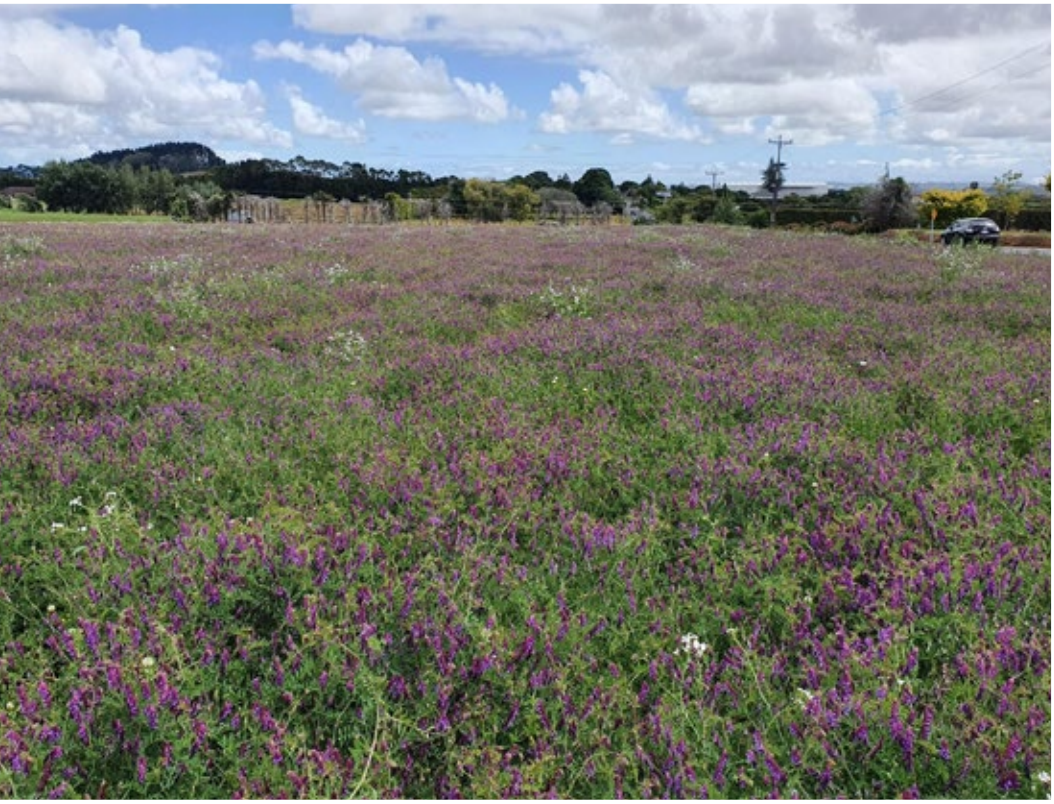
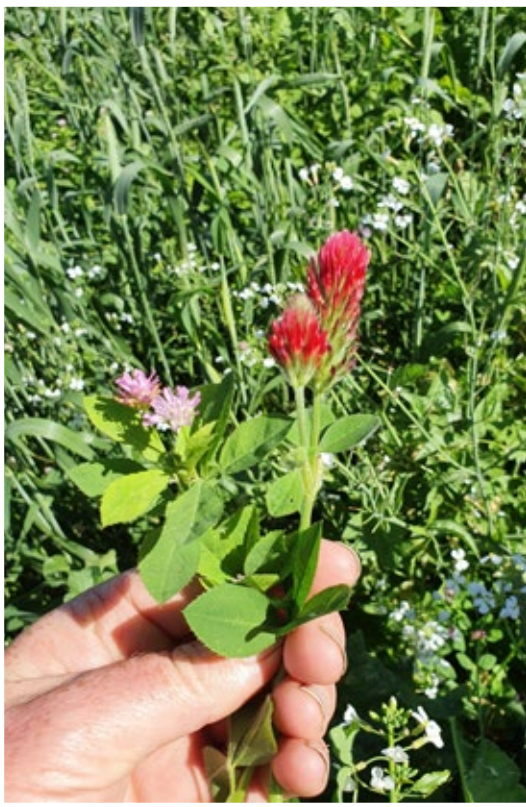
Inta-Ag Mag

JUNE 2021





FREE BEANIE WITH TERRACIN
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Biostart Terracin for Restoring Soil Biological Balance

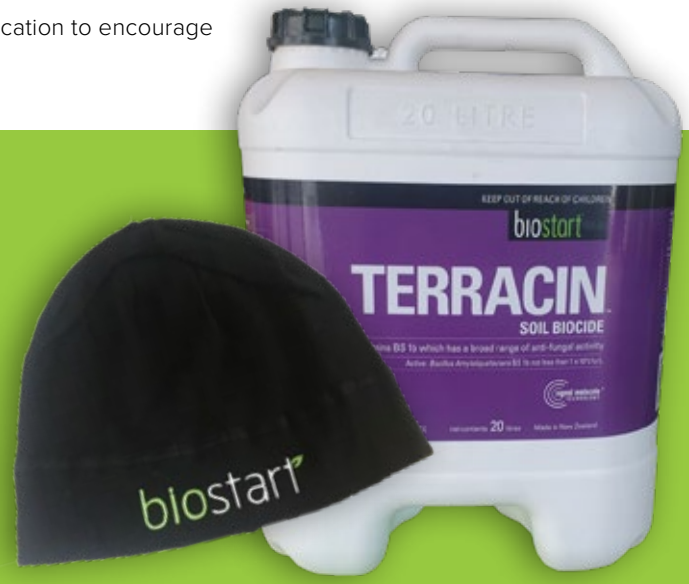
An imbalance in soil microbiology can lead to problems with soil health. In healthy soils, disease-causing fungi and bacteria are suppressed by other more beneficial soil microbes.

Terracin contains compounds that rebalances the existing soil biology.

Terracin has two modes of action:

- The bacterium *Bacillus amyloliquefaciens* BS 1b which produces a wide range of antimicrobial compounds.
- Fermentation extracts and other bioactive nutrients that help reset the soil microbiology into a more balanced state.

For potato crops apply Terracin by liquid injection at planting. For other crops, treat the soil three weeks prior to planting to reset the soil microbial balance. Further benefits can be gained by applying Mycorrcin three weeks after the Terracin application to encourage beneficial microbes to rebuild their numbers after the reset.



Receive a FREE merino beanie with every purchase of BioStart Terracin.

While stocks last.

Farm Mapping Workshop

Inta—Ag welcomes you to a breakfast mapping workshop, designed to get you on the right track and answer any questions that you may have.

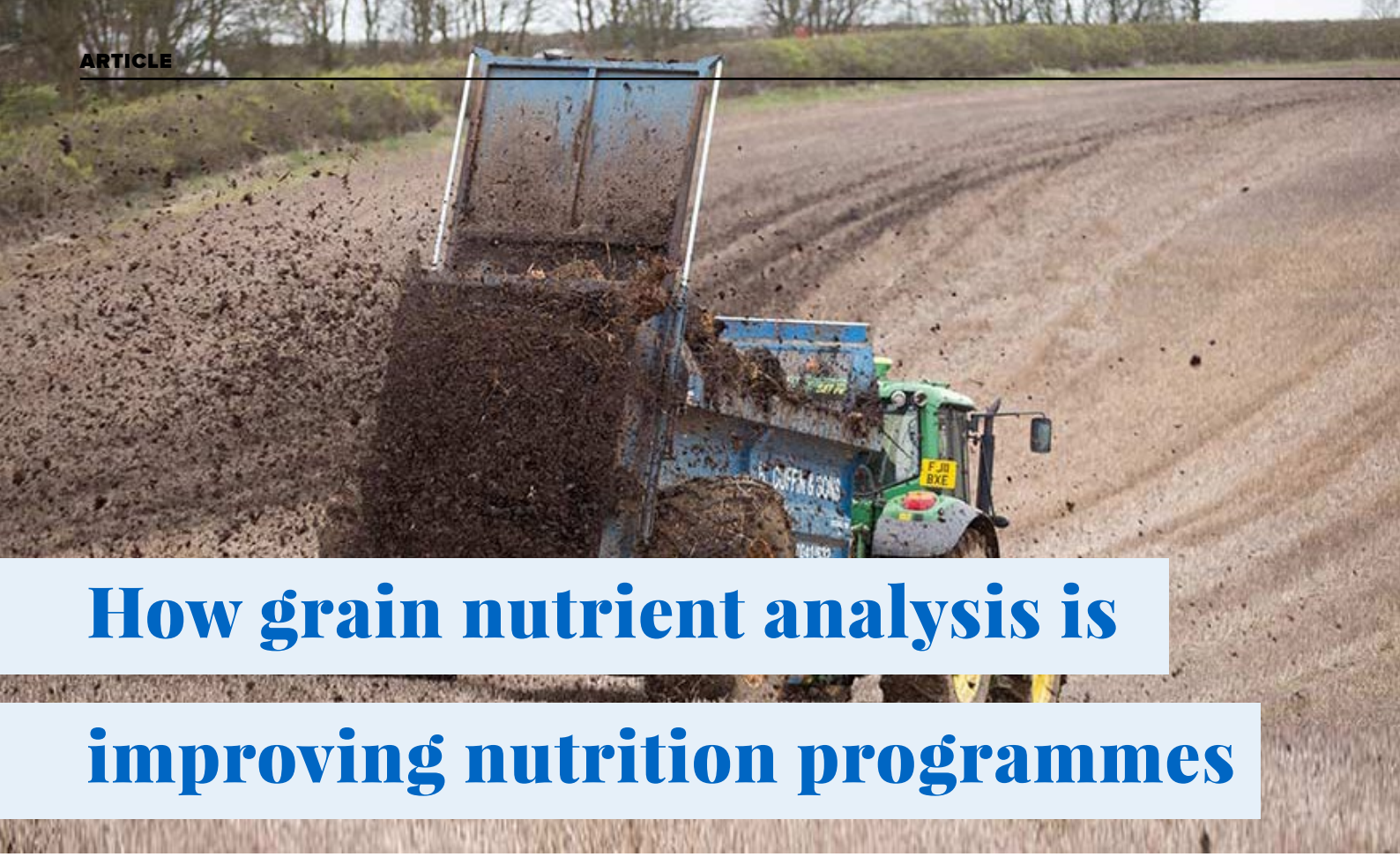
Every one is welcome, just bring your laptop and maps that you currently have.

June– Date to be advised
7:30am—8:30am
8:30am—9:30am
9:30am—10:30am

Inta-Ag

Mothers Day. Thank you!

Alison and Lyn enjoyed hosting a few lovely mums this month to a morning of cake decorating followed by a decadent high tea. Much laughter was had and great conversation. Thank you again to everyone who attended and made this morning so special.



How grain nutrient analysis is improving nutrition programmes

FARMERS WEEKLY UK | MARCH 2021

The first year of comprehensive grain nutrient analyses from farms taking part in the YEN Nutrition initiative suggests there is a substantial "farm factor" difference between participants, alongside high numbers of grain samples below the phosphorus level thought to be required for yield not to be limited.

The results also seem to suggest regional clusters of nutrient deficiencies of some key macronutrients (see panel).

YEN Nutrition involved about 150 farms providing grain samples, usually from six fields, of any crop for grain nutrient analysis, explains Roger Sylvester-Bradley, head of crop performance at Adas, who leads the Yield Enhancement Network (YEN).

Grain nutrient analysis, he believes, can be an important and accurate measure of crop nutrient capture and offtake, helping growers judge the success of applications and ultimately help refine nutrient management.

"Very few assess the success of their nutritional programmes, yet nutrition costs growers more than any other input, and has big uncertainties," Prof Sylvester-Bradley says.

Since 2020, the AHDB Nutrient Management Guide (RB209) has suggested using grain analysis for phosphorus as a useful measure of assessing capture and offtake.

Adding analysis of 11 other key nutrients costs little extra on top and, having successfully launched the concept of post-mortems of the previous season with YEN, benchmarking and sharing of data for nutritional programmes through grain analysis are parts of the YEN Nutrition project, Prof Sylvester-Bradley says.

Results from around two-thirds of the 900 grain fields signed up for the project have been analysed, with most being wheat and barley crops.

FARM FACTOR

One of the first things that has jumped out of the analysis is the "farm factor", says Prof Sylvester-Bradley. "We knew from analysing data from YEN there is a farm factor for yield, but we now know there's also one for nutrition."

The farm factor means that if a farm has high nitrogen in its grain for wheat, it is also likely to have high nitrogen for barley and other crops, he explains. "But what we don't know yet is if the farm factor for nutrition is causing the farm factor for yield."

While further analysis of the YEN data has suggested some associations between high-yielding farms and things they do, Prof Sylvester-Bradley believes the differences might be more to do with growers' attitudes and motivations, and how that influences their management practices.

"We've come to the conclusion that it could be useful to ask growers to do psychometric tests to help understand this better."

Just as in YEN where the use of organic manures appears to be associated with higher yields, a similar conclusion is being drawn from the first year of YEN Nutrition. Growers who used organic manures in this study tended to have higher yields, and Prof Sylvester-Bradley points out that organic manures contain multiple nutrients.

"But it was difficult to determine with the data set we have whether that was also associated with fewer deficiencies in grain nutrients," he says.

Deficiencies were generally in the macronutrients, with the most common deficiency in grain being phosphorus. Of the 504 cereal samples, 65% were below 0.32%, which is the level in grain that RB209 suggests doesn't cause any yield loss, he says.

"From the data we can start to work out yield loss from a level of deficiency. So for phosphorus when you get down to 0.25% you're losing around 1t/ha in yield."

YIELD LOSS

Using this across all 504 cereal crops, the mean yield loss was 0.6t/ha, while the median value is 0.2t/ha – so 50% of the samples were losing less than 0.2t/ha, and 50% more, he explains.

The data gets more complicated when looking at the relationship between soil analyses for P and grain, he adds. "There's not a good association with soil P. There are lots of farms which are reasonable for soil P and low in grain P, while there are a few with low soil P and high grain P."

That points to a problem with crops taking up P, which is not very mobile in the soil, rather than the soils being deficient, he suggests.

"What you're looking for is a well-aerated, moist topsoil with lots of roots and mycorrhizae. Unfortunately, we're not very good at maintaining our topsoil in a fit state for that to be the case."

Understanding how take-up of P could be improved is likely to need experimentation, he suggests. "What we desperately need is growers to do some testing."

That could involve, for example, growers with fields where grain is low in P applying a huge quantity of P to small patches, to contrast with the rest of the field to see if they are truly deficient, he suggests.

The formation of nutrition clubs he hopes will pave the way for this and other experimentation. ◆

ARE THERE REGIONAL DIFFERENCES?

Analysis of the data across the country for the 57 farms where both wheat and barley crops were submitted suggests that there could be differences between regions in macronutrient values in those crops (see chart).

"There appear to be regional clusters where macronutrient levels in grain are lower or higher than average," Adas's Roger Sylvester-Bradley says.

They are not quite the same for all macronutrients and he says it's not clear why that is, although it could be associated with livestock and manure use, and perhaps more diverse rotations.

Overall, the data for 2020 are also showing that there was a tendency to over-apply nitrogen across the country, however, he adds.

From the grain analysis, 60% were applying more than optimal last year.

While that might have been partly due to the lower yields and over-optimistic applications before the extent of the spring drought became apparent, there is a farm factor involved, he says.

"The evidence suggests whole farms need to look at their farm strategies. Generally we are finding that if they are generous with nitrogen on their wheat, they are too with their barley."

Micronutrient deficiencies have been harder to pick up through grain analysis, he notes. The exception was manganese where 14% of wheat crops were deficient, which increased to 87% of barley crops.

Manganese in barley clearly works differently to manganese in wheat, in that there is less in the grain typically. "It's not clear at the moment if that means it is deficient or whether barley is more efficient."

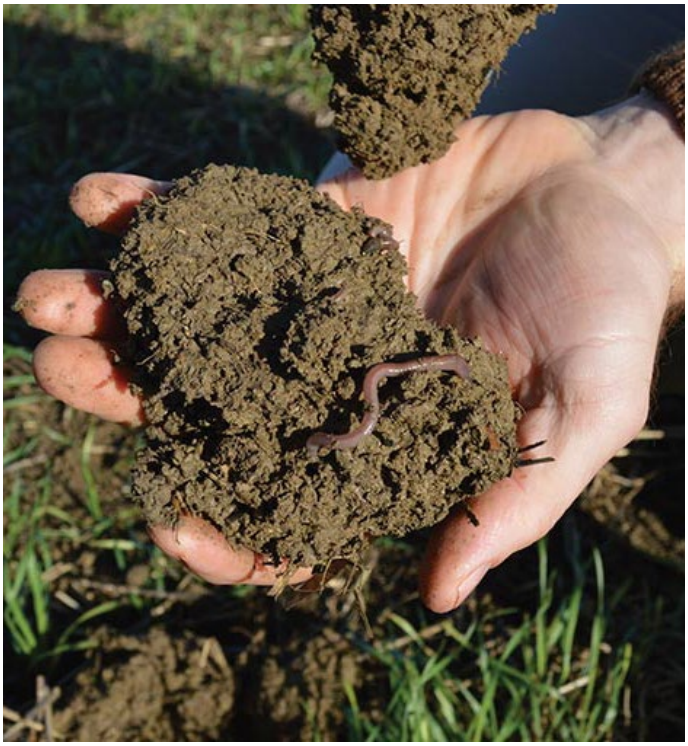
WHAT ARE THE 12 ESSENTIAL CROP NUTRIENTS?

Nutrient	Important in wheat crops for:	Critical threshold for grain dry matter in winter wheat	Level of certainty about threshold	Deficiency occurrence in wheat grain samples from 2020
Nitrogen*	Growth	1.9%	Reliable	12%
Phosphorus*	Energy for growth	0.32%	Reliable	75%
Sulphur*	Yield and quality	0.12%	Reliable	12%
Manganese**	Photosynthesis	20ppm	Reliable	14%
Magnesium*	Green leaf duration	0.08%	Uncertain	18%
Potassium*	Water regulation	0.38%	Uncertain	5%
Copper**	Pollination	2ppm	Uncertain	1%
Zinc**	Enzyme reactions, N metabolism and protein synthesis	15ppm	Uncertain	1%
Calcium*	Cell wall structure	-	Unknown	-
Iron**	Photosynthesis	-	Unknown	-
Boron**	Pollen viability	-	Unknown	-
Molybdenum**	Enzymes in N metabolism	-	Unknown	-

Barley-pea mix gives farm healthy benefits

FARMERS WEEKLY UK | MARCH 2021

A spring barley and pea mix, along with grass leys, is helping David Marsh improve soil health and cut the carbon footprint on his mixed Cotswold farm.



The barley-pea combination is used for whole-crop silage or crimped grain to help feed his cattle, as well as giving his arable crops a boost by making his soils more workable and cutting herbicide costs.

The mixed crop and the grass leys are proving very useful break crops for his arable land, increasing soil health and helping to finish 150 cattle a year for Waitrose using nearly all farm-grown feed and fodder.

“These break crops work brilliantly for the livestock and also brilliantly for the arable side,” he tells Farmers Weekly.

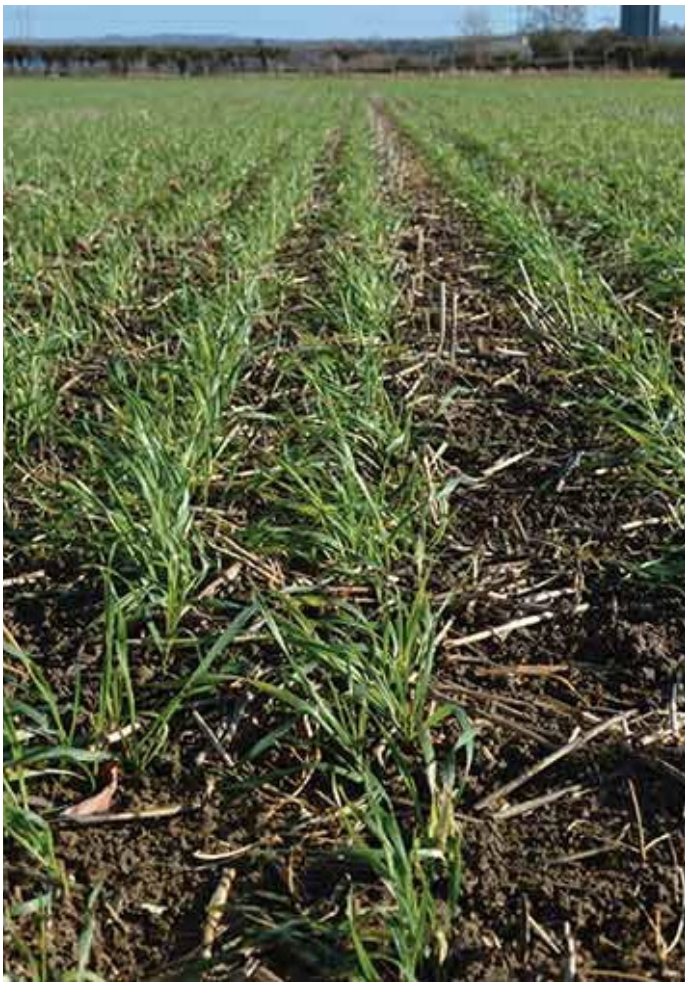
TWO BLOCKS

Mr Marsh’s heavy land had been run largely in two blocks – one of permanent grass on the Cotswold escarpment and then arable land on lower land – but integrating the two has given clear benefits.

His two main aims on the 190ha Pardon Hill Farm in Gotherington, six miles north of Cheltenham, are to feed his suckler herd and followers on 100% farm-grown food and grow 500t of milling wheat on a Warburtons bread-making contract – and integrating arable and stock is key to achieving this.

Cattle are finishing earlier and at better weights and grades, his blackgrass herbicide bill has halved and he is better able to travel on his well-structured arable soils.

Integral to improving soil health was his move towards more direct drillings and use of cover crops on a route to a more sustainable farming model.



BARLEY-PEA MIX

Mr Marsh started growing his barley-pea mixture 12 years ago, and after advice from his agronomist, John Vickery, he has now brought direct drilling to most of his arable land.

“Integrating low-disturbance drilling and forage crops has helped to reduce the blackgrass burden,” says Mr Vickery, who works for agronomy group Agrii.

Some 70ha of steep permanent grass banks are grazed by 110 suckler cows and followers, and 120ha of arable land grows wheat, oilseed rape, the barley-pea mix, maize, Tiffany spring beans and grass leys.

The barley-pea mix is drilled a little later than traditional spring barley. This gives Mr Marsh more time to control blackgrass in the spring and harvest it early enough for the blackgrass seed not to have set and shed and cause future problems.

CLIMBING FRAME

Mr Marsh is growing the spring barley variety Irina plus a marrowfat pea, as these leafy peas can use the barley as a climbing frame – using the two together gives good standing power and they mature at the same time.

In early April, some 15ha of the mixed crop is drilled into the previous crop's stubble, with his Weaving DG disc coulter direct drill, after a spray of glyphosate herbicide to give a clean weed-free start.

The crop needs no nitrogen fertiliser, as the peas – being a legume – fix their own nitrogen. Very little herbicide is required, so it is virtually gown as an organic crop.

This mix can be cut for whole crop silage in early July to produce a yield of 25t/ha for the silage clamp, or left another 10 days and cut with a combine to give 10t/ha of crimped grain plus good barley-pea haulm straw.

The 30% moisture grain to be crimped is first rolled, preservative added, and put in a separate silage clamp to supply the cattle with a feed of about 15% protein content.

WARBURTONS WHEAT

Half the arable land on the farm is down to wheat, growing winter varieties Skyfall, Crusoe or spring variety Lennox for Warburtons, which have a good clean weed-free entry following the break crops.

"We can drill early because the break crops have helped us achieve near zero blackgrass," he says.

The wheat is drilled in late September and yields typically 9t/ha, with the aim for 10t/ha of a premium bread-making sample.

Mr Marsh can establish his wheat by spraying glyphosate to control weeds and direct drilling using 6-7 litres/ha of diesel/ha, compared with 30-plus litres using his former, more traditional method of ploughing and power harrow-drill combination.

"The soil structure is hugely improved and the crop establishment better, with a small amount of crumb giving good seed to soil contact," he says.

SKYFALL WHEAT

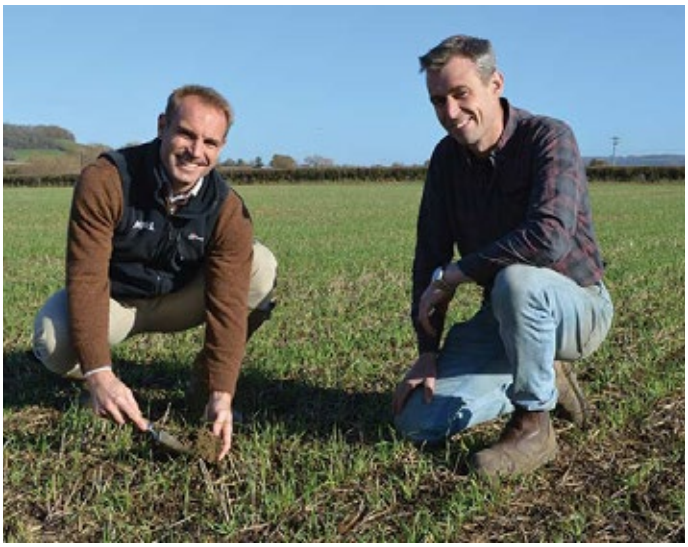
Looking at a field of a second wheat, Skyfall, in November, there was a clear spring in the ground showing a sign of good soil structure down below. The soil had also benefited from generous amounts of farmyard manure.

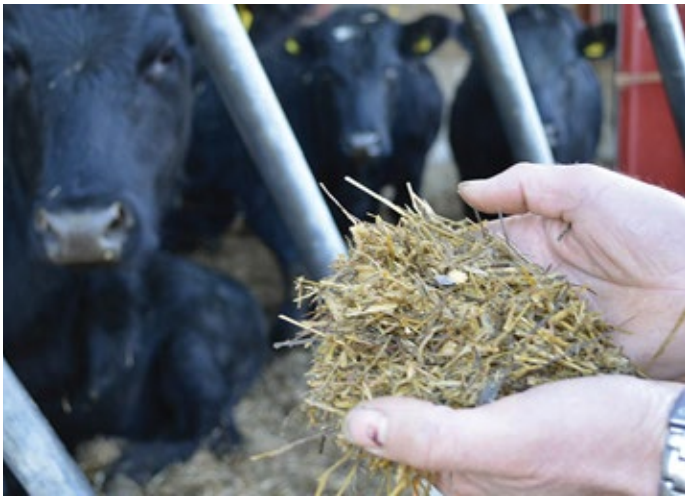
This low-cultivation approach is releasing less carbon than ploughing and intensive cultivation, while the permanent grass banks are a huge carbon sink.

"We are farming more sustainably by integrating our arable and livestock operations, and along with the direct drilling, our carbon footprint is much reduced," he says.

Mr Marsh is reluctant to say that the approach has improved his wheat yields, but cultivation costs have come tumbling down, and blackgrass herbicide costs have fallen from more than £100/ha to well below £50/ha, and use of cover crops have also helped soil structure.

"We are less reliant on chemicals and less susceptible to weed-resistance problems, while direct drilling and the cover crops have cut water run off from fields," he says.





FARM FACTS

- **190 ha Pardon Hill Farm**
- **70ha permanent pasture**
- **60ha winter wheat**
- **15ha oilseed rape**
- **15ha spring barley-pea mix**
- **5ha maize**
- **15ha Tiffany spring beans**
- **10ha grass leys**

NON-CEREAL SPECIES

Cover crops using a mix of non-cereal species such as buckwheat, linseed, vetch and phacelia are used where possible, which help to improve the soil structure and, therefore, keep it relatively free drained throughout the winter.

The break crops also help give a more varied diet for his suckler cows as he aims to finish all his progeny from his herd, which include Hereford, British Blue and Simmental cows all crossed with an Angus bull.

Mr Marsh buys in a few store cattle and aims to finish 150 cattle a year, which head for Waitrose via Dovecote Park and earn him an Angus price premium. Currently, he is using 80-90% home-grown feed for the cattle with the aim of reaching 100%.

The cattle are thriving on a mix of silage made from his ryegrass-red clover-vetch grass leys, whole-crop silage and crimped grain from the barley-pea mix, and maize – high-protein and easily digestible Tiffany spring bean can also be added. ◆

Early blight spread warning

POTATO REVIEW | MARCH/APRIL 2021

The steady increase of Alternaria spp was a key focus at the 2021 Bayer Potato Conference, along with a three-point nematode plan.

CROSS Europe growers are being encouraged to give greater thought to how they protect crops against early blight (Alternaria spp.) following the detection of isolates showing reduced sensitivity to fungicides belonging to the Quinone outside Inhibitor (QoI) mode of action group.

Speaking at the Bayer Potato Conference via video link from his o ffi ce in the Netherlands, Bert Evenhuis of Wageningen University & Research, reported that a novel genotype of Alternaria solani has shown itself to be more aggressive than wild relatives and less well controlled by products containing pyraclostrobin, azoxystrobin and famoxadone.

Bert said the rising threat of early blight has increased steadily since the turn of the century as a changing climate has created conditions more favourable for the disease.

Efforts to protect crops has led to increased use of fungicides and in some cases, this has resulted in reduced sensitivity to certain modes of action. Th is has been hastened by a lack of breeding focus for Alternaria resistance in new varieties.

Isolates with reduced sensitivity to QoI fungicides were fi rst detected in Germany by researchers at the Technical University of Munich and more recently in the Netherlands and other European countries. Most recently, research in Europe has identifi ed reduced sensitivity to some SDHI active substances, namely boscalid.

The challenge facing growers in seeking to protect crops is dealing with the two distinct species that make up the Alternaria complex.

"Early blight is caused by Alternaria solani, the principal pathogen threat. Brown spot, usually also called early blight, is caused by Alternaria alternata, a secondary threat that enters the plant via earlier damage. Both species can be found wherever early blight is detected," said Bert.

DATA SPARCE, BUT PRESENCE FREQUENT

Data on the prevalence of Alternaria spp. in the UK is sparse, but as many of those involved will attest, it is present in most seasons.

"The two species are virtually indistinguishable in the fi eld, but A. solani is the more damaging as it produces bigger lesions and can infect crops without fi rst needing an entry point caused by an unrelated event. Most varieties have good tolerance to A. solani, but Markies, Ramos, Lady Christl and Aveka have been found to suff er problems, other varieties might be affected too."

As with programmes for late blight (Phytophthora infestans), interventions should be timed before the disease pressure begins to build. Achieving this in practice is often di ffi cult as predicting the onset of disease is notoriously hard.

"Developing more accurate decision support systems will be essential to promoting protection against both early and late blight. The early systems lack the capacity to consider crop development, crop stress, and the presence of other diseases which can hinder protection practices, so further work is needed," said Bert.

Production practices, especially nutrient availability, have been found to have an impact on disease development, but more work is needed to fully understand this relationship.

"We have seen that crop health is a factor in disease onset, especially where nitrogen availability is restricted. Th is can be through low application rate or low soil reserves. Th is is another reason to favour split applications to keep promote canopy growth and delay senescence, but beware that too much, too late can impair tuber quality," he said.

Developing more accurate decision support systems will be essential to promoting protection against both early and late blight.

Bert Evenhuis, Wageningen University & Research.

The rising threat of early blight has increased steadilysince the turn of the century