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Can less be more?

AHDB

from theory to field

Improving productivity is all about using inputs more efficiently. At AHDB’s Strategic Cereal Farm in Suffolk Brian Barker is looking at just how low he can go by tailoring his inputs to crop, disease levels and the weather. *CPM* finds out more.

By Lucy de la Pasture

Looking across at his office wall, Brian Barker scans the pieces of paper pinned there to give him inspiration. He settles on the one carrying the quote, “That’s the way we’ve always done it, should we be doing it?” As a result of the trials being carried out on his farm, the pioneer in the AHDB’s Strategic Cereal Farm network, the answer is, more often than not, a ‘No’.

AHDB’s Teresa Meadows explains that the purpose of the Strategic Farms is to put research into practice and help growers find the line between inputs and outputs so net margin can be maximised within an IPM approach.

“They provide a platform for discussions and take farmers on a journey which encourages them to start to question things and look at how inputs can be matched to variety, disease and the season rather than simply taking a programmed approach,” she says.

Tailoring nitrogen according to potential began when the farm did its stint as an AHDB Monitor Farm, but its current Strategic Farm East status is taking the study of inputs to a whole new level.

“The question we’re trying to answer is whether we can apply less and still maintain crop output and to do this we’re looking at the farming system as a whole and not just a crop in isolation, lowering inputs is just a part of the equation,” explains Brian.

One of his mantras is ‘farming for potential not for hope’ and he religiously monitors every crop’s potential by monitoring biomass at key growth stages. It’s become an integral part of his farming practice and Brian believes he now has a pretty good handle on crop potential from his five years of intense assessments. Even so, he still gets a little twitchy about how low he can go with inputs. ▸

Using regular plant counts to assess biomass has been instrumental in determining crop potential on the farm.

▸ Brian feels he is 'scratching the surface' compared with some other farmers when it comes to cutting back on inputs. So in 2020 a field was dedicated to pushing the boundaries to the max in an effort to test just how little he could put on the crop and still maintain productivity.

"We chose an October-planted field of KWS Siskin and we held back on nitrogen, applying 150kgN/ha which in hindsight was probably still too high. It was then a case of monitoring the crop biomass, disease and the weather and using this information as a basis for making fungicide decisions," he says.

At T0 it was dry, with little disease, so the decision was made to apply copper, zinc and a PGR. At the T1 timing the crop received 0.5 l/ha tebuconazole but at T2 the consensus was no fungicide was necessary. Conditions changed at T3 and some yellow rust started to come in so another 0.5 l/ha tebuconazole went on.

There's no question that 2020 was a low-risk season for disease but a fungicide cost of just £12/ha involved some brave decision making. "The field was right behind my house, so each morning I'd twitch the curtains and look nervously out of the window. The crop actually yielded 9.43 t/ha, which was one of the highest yielding on the farm with one of the lowest costs of production (£67/t)," adds Brian.

Pushing the boundaries that hard isn't a risk he'd choose to take across the whole of the farm, but it has highlighted the potential for reducing inputs and reinforces that 'do we need to do it?' is the right question to ask, says Brian.

Brian Barker believes it's important for farmers to take ownership of their own destiny and be involved in agronomy decisions.

Take ownership

"I believe it's important for farmers to take ownership of their own destiny and have the confidence to question their agronomist and be a part of the decision-making process. Lowering inputs does mean higher risk but you have to question what's the bigger risk — losing tonnes or losing pride."

The farm is now entering its third year as a Strategic Cereal Farm, gradually building layers of information about where fungicide inputs can be reduced, adds Teresa. "In the first year (2018-2019) the trials looked at the relationship between varietal disease resistance and fungicide inputs. Five winter wheat varieties — Silverstone, Graham, KWS Siskin, Shabras and KWS Santiago — were treated with low, medium and high input fungicide programmes and taken to yield."

Results from the past two seasons have shown that in disease-resistant varieties there was a low response to increasing fungicide spend, says Teresa Meadows.

The results showed that in disease-resistant varieties there was a low response to increasing fungicide spend in what turned out to be a moderate disease-pressure season. "Although the highest yield was seen in the high input regime, the best net margin was obtained with Graham in a low input situation — highlighting the importance of varietal resistance as part of an IPM approach," she says.

In the next season (2019-2020), the trials were repeated in the same field with Siskin, Shabras, Graham, Santiago and KWS Crispin but refined further, with variable input levels for PGRs and biostimulants as well as the different fungicide input strategies.

Each of the varieties received four sets of fungicide and other inputs of varying

Focus on fungicide timings in 2021

This season the trials on Brian's farm will look at fungicide inputs in a slightly different way, adding yet another layer of information about how best to use fungicides to maximise profit. The aim is to prise out the influence of different timings on crop performance and is being led by NIAB's Will Smith.

The trial this year takes place in a single variety, in a field large enough to accommodate two replicates of the 150 x 30m plots. It was drilled on 04 October with Gleam and the treatments will investigate fungicide applied at T1, T2 and T3 and all their possible combinations while also incorporating an untreated control. Overlying the timings will be a high and low fungicide input regime, he explains.

The higher inputs will be based on the NIAB fungicide programme used at Morley, where similar work has been carried out looking at different levels of fungicide inputs. The exact approach is yet to be finalised but will include the most up-to-date chemistry and mixed modes of action. The low input system will be decided as the season progresses, explains Will.

"All treatments will be applied using the farm's sprayer and assessments of disease in the leaf layers will begin around the T0 timing and be repeated every two weeks through the season. The assessments will be made at the same point in each plot and at harvest the plot combine will also take a grain sample from these same points for quality assessment, which will feed into the margin analysis. The remainder of the plots will be harvested with Brian's combine which will map the yields," says Will.

Further work continuing at the AHDB Strategic Farm in 2021 includes monitoring beneficials and natural enemies in flowering margins and the surrounding crop. Brian is also looking at his use of marginal land as well as investigating how cover cropping holds and releases nutrients through the rotation in a split-field trial.

Will Smith explains that this year's trials will take place in a single variety and aim to prise out the influence of different timings on crop performance.

Yield rankings

Yield T/ha Rank by field location (Highest to Lowest)

	Silverstone	Graham	Siskin	Shabras	Santiago
Untreated	9.57	10.16	9.66	8.55	7.35
Low	10.71	11.59	11.45	11.34	9.52
Medium	11.47	11.83	11.62	11.52	11.22
High	11.68	12.13	12.28	11.03	11.03

Source: AHDB Strategic Cereal Farm East, 2019

Gross margin rankings

GM £/ha Rank by field location

	Silvestone	Graham	Siskin	Shabras	Santiago
Untreated	£ 898	£ 974	£ 909	£ 767	£ 611
Low	£ 1,002	£ 1,116	£ 1,097	£ 1,083	£ 849
Medium	£ 1,025	£ 1,071	£ 1,044	£ 1,032	£ 992
High	£ 981	£ 1,039	£ 1,058	£ 898	£ 898

Source: AHDB Strategic Cereal Farm East, 2019

Net margin rankings

NET Margin CoP £/T Rank by field location (Lowest to Highest)

	Silverstone	Graham	Siskin	Shabras	Santiago
Untreated	£ 61.06	£ 57.52	£ 60.49	£ 68.35	£ 79.54
Low	£ 60.37	£ 55.79	£ 56.47	£ 67.92	£ 67.93
Medium	£ 64.65	£ 62.69	£ 63.82	£ 64.37	£ 66.10
High	£ 69.54	£ 66.96	£ 66.14	£ 73.64	£ 73.64

Source: AHDB Strategic Cereal Farm East, 2019

Winners are prudent in Fungicide Margin Challenge

Last season, 36 farmers — all engaged in AHDB's Farm Excellence programme — took part in the ADAS Wheat Fungicide Margin Challenge with the support of AHDB, a contest to see who had the nerve to cut fungicide spend just enough to produce the best regional winter wheat gross margin.

Each entrant planned a fungicide strategy for their respective regions, which was put into action by ADAS and pitted against strategies devised by ADAS' experts. In each region, the strategies were applied to replicated plots across a single field of wheat and ADAS conducted regular disease assessments and gathered yield data with a plot combine.

Margins were based on the average grain price between 1 January and 1 August 2020, /fungicide-cost data and cost of £14/ha per application.

Across all of the entrants, the best margin over fungicide costs were achieved with low-to-moderate fungicide inputs, both by product and number of applications. It was a relatively low-disease year, and average spend on fungicides was less than in 2019 (a moderate disease-pressure year).

The winners and margins for each region were Mark Wood (West and Wales): £1,320/ha from 8.6t/ha, Andrew Bott (East Anglia): £1,753/ha from 11.4t/ha and Jonathan and Philip Dolbear (South West): £1,367/ha from 8.9t/ha.

intensity (high, medium, low and untreated), which was decided as the season progressed in response to disease assessments and the weather.

Once again, the lower-input regime gave the best margin in another low disease and relatively low-yielding season. Even the more disease-susceptible varieties only saw a small improvement in net margin between low and high input regimes, she says.

Farming for potential

For Brian, the 2020 season highlighted another of the quotes he has stuck on his office wall reminding him not to make his farming decisions based on last year. In hindsight he says he'd have cut back on the levels of PGR he'd used on the farm — another lesson in farming for potential, not hope.

"All the bigger biomass crops on the AHDB Recommended List are also the highest yielding and I think that in that season, the effect of the PGR was to reduce biomass when crops had lower than normal biomass anyway. That meant there just wasn't enough leaf to provide the photosynthetic capability to translate into yield."

The Strategic Farm work has confirmed in Brian's mind that disease-resistant varieties actually need more management time (rather than less) to fully realise their full potential and deliver a decent net margin through lower inputs.

When it comes to reducing fungicide inputs, T0 is one of the applications that may not pass the 'do we need to do it' hurdle unless disease pressure really warrants it, he says.

"If the plant population has low biomass in early spring then I have concerns about applying fungicide, some of which will hit bare soil and potentially could damage mycorrhizal associations. It has its place but probably not on the more robust cultivars — they've been chosen as the first step in an IPM strategy, so it doesn't make sense to then throw everything but the kitchen sink at them."

Farming more sustainably and profitably involves moving away from entirely chemical solutions to agronomy problems, believes Brian. "It's getting easier to make the no-spray decisions and having the confidence to go less will be more beneficial in the longer term. After all, it's net margin I'm chasing, not gross margin."

Understanding crop potential also means having the confidence to invest more in a crop when it's prudent to do so, he believes. "In 2021 many crops in the ground will have more yield potential than last season. With wheat prices also rising, there's also more margin potential so a higher level of investment in crops may prove worthwhile without sacrificing net margins."

Another of Brian's favourite sayings is 'the devil is in the detail' and that's precisely what's coming out of the Strategic Cereal Farm programme. "There are different ways to farm than applying a standard fungicide programme and 210kgN/ha. Farming isn't consistent enough to just continue ploughing the same furrow," he says.

Strategic thinking really does mean 'thinking outside of the box before looking in it.' We'll just have to wait and see which new quote Brian picks for his office wall based on his experiences in the coming season. ■

Research roundup

From Theory to Field is part of AHDB's delivery of knowledge exchange on grower-funded research projects. *CPM* would like to thank AHDB for its support and in providing privileged access to staff and others involved in helping put these articles together.

Further information about AHDB's Strategic Cereal Farm East can be found at *ahdb.org.uk/farm-excellence/strategic-cereal-farm-east*