Cropping out the weed challenge

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Technical
Cereal cropping

Spring cropping and barley are popular options for getting to grips with blackgrass populations. *CPM* talks to two growers who have very different opinions on what’s best.

By Lucy de la Pasture

Blackgrass control is a thorny problem for arable farmer, Ruth Stanley. In spite of the many avenues of research to find the answer, it’s becoming clear that there isn’t a magic bullet. The solution lies in adopting a whole range of practices, she believes.

The grassweed really just crept up on the Stanleys, who farm around 400ha at Harby in Leics. Predominantly heavy clay, there’d always been a smattering of blackgrass across the farm, but then suddenly it was everywhere, wall to wall, explains Ruth Stanley.

“Clearly we’d developed a problem without really realising it was happening. The blackgrass population was low enough to ignore because it wasn’t really a problem, but then about four years ago it just exploded.”

At about the same time, Ruth Stanley joined BASF as agronomy manager for the Eastern region. “Maybe it was a coincidence that BASF was struggling to find a blackgrass trial site just as I was beginning to wonder what our options were, but I jumped at the opportunity to have a trial site on my own land where I knew the chemistry would be under pressure. I hoped it would give me a pretty clear picture of what approaches would work and what wouldn’t,” she says.

True reflection

The trials are large scale to reflect commercial practice rather than small plots, which don’t necessarily give a true reflection of what would happen on farm, she reckons.

“Plots are 36m wide which is my sprayer boom width. If it’s too wet to travel then herbicide applications are delayed, which doesn’t happen in small plots sprayed with a knapsack.”

In the first year of trials, the focus was on chemistry and finding the best herbicide stack to tackle the ALS-resistant blackgrass on the farm. Blackgrass pressure was 494 heads/m^2 across the field in untreated plots and a matrix of 16 different herbicide treatments were evaluated.

“Best of the pre-emergence herbicides was Crystal (flufenacet+ pendimethalin) + DFF which gave 77% control. The best of the programmes was Crystal plus Lexus (flupyrsulfuron-methyl) plus Defy (prosulfocarb); followed by Stomp Aqua (pendimethalin) plus Auxilliary (clodinafop-propargyl+ prosulfocarb), which gave us 95% control, close to the target of 97% needed to prevent plant populations from increasing further.”

Barley has allowed Ruth Stanley to lengthen the rotation and provide her with more opportunity to use stale seedbed techniques.

But as far as Ruth Stanley was concerned, there were a number of problems — not least being the cost of the Rolls Royce treatment which still left too much blackgrass behind for her liking.

“25 heads/m^2 still results in a seed return of around 2500 seeds/m^2. A herbicide programme for blackgrass costing £130/ha and still not achieving the control we needed just couldn’t be justified with wheat at £110/t,” she says.

“At this point I began to really worry about how I was going to get our blackgrass problem under control and whether ultimately it was going to be sustainable to continue farming. We needed to do more than rely on herbicides so began to integrate cultural control methods in the trial — it was the only way I could see to clean up the farm moving forward.”

With that in mind, the trial looked at different cultivations and drilling dates in 2015, as well as the introduction of cover crops to one of the spring plots. Historically the rotation on the Stanley's farm has been biased towards first wheats, with either spring beans or winter oilseed rape as a break crop. The farm didn't possess a plough and not a clod had been turned in many years.

She believed there was plenty of scope to assess whether a change in cropping emphasis and cultivation technique could help a more modest chemical control programme to achieve target levels of blackgrass control.

The outcome of the second year of the trial pointed towards increasing spring cropping and later drilling in the autumn as the two measures that had the biggest effects on blackgrass populations. These are two changes that Ruth Stanley has integrated on a farm scale in 2016: a cropping change has seen an increase in the spring barley acreage and the introduction of winter barley, while there's also a policy not to drill in the autumn before mid Oct.

"The introduction of barley has allowed us to lengthen the rotation and provides us with more opportunity to use stale seedbed techniques to help us get on top of the blackgrass. We're now using ploughing on a rotational basis before our spring cropping."

Making sure ploughing is done properly, with full inversion of the furrow, is something that's crucial to make it work as a control method and it's something that really seems to be helping, she says.

And for Ruth Stanley, it's a practice that's a really obvious way of aiding blackgrass control when considering where the blackgrass seed germinates from within the soil profile.

When you look under the canopy of the Volume, the blackgrass is still there but it's hidden by the tall height of the crop.

Viable seed-bank

"Blackgrass seeds that are predominantly in the top 5cm of the soil will germinate, so if the soil is inverted fully and the seed in these surface layers buried, then it should reduce the viable seed-bank. But this will only work if seeds are left undisturbed for 3-4 years after ploughing, so you have to be careful not to bring them up with any subsequent cultivations and plough just once every four years or longer," she suggests.

On the farm this year, the worst blackgrass fields have been put into spring barley and ploughed before drilling. The trial site has evolved even further, looking at seed rates and nitrogen inputs in spring barley. Also under scrutiny is the blackgrass suppression in conventional ▸

Although good results were achieved in some herbicide trials, the cost was prohibitive and it still left too much blackgrass behind.

The level of blackgrass looks worst in the conventional barley (right), but plant counts show the Hyvido barley (left) actually has more than double the population.

▸ winter barley varieties, KWS Glacier and KWS Tower, compared with the Hyvido winter barley variety, Volume.

"The hybrids are widely touted as being the most competitive winter barley able to suppress blackgrass populations so we wanted to compare this ability alongside the conventionals," she explains, and the results on the Stanley's farm has rather put the cat among the pigeons and goes against the trend of information from many other trials across the country.

"The Volume established rapidly in the autumn and got away really well. Looking at the winter barley crops, the level of blackgrass looks worst in the Glacier and Tower at first glance. But when you actually look under the canopy of the Volume, the blackgrass is still there — It's just hidden by the tall height of the crop.

Blackgrass plant counts revealed the

Hybrid barley to replace first wheat

Blackgrass is prompting Cotswolds farm manager Richard Ward to drop first wheat from about two thirds of his arable land this autumn, replacing it with as many as two crops of hybrid barley in a three-year rotation with winter oilseed rape.

That follows two years of split-field comparisons of Hyvido hybrid barley against conventional two-row winter feed barley, which have convinced him that the hybrid's vigorous growth gives greater blackgrass suppression.

Managing a total of 340ha of arable land at The Barton Farms, Moreton-in-Marsh, split between the home farm and a neighbouring farm managed under a share-farming agreement, he also estimates that barley, when grown as a first cereal will usually deliver a higher gross margin than first wheat across the farms' variable soils.

"Some of the blackgrass on the farm is so bad that we've had to abandon growing wheat, even as a first cereal," Richard Ward explains. "We counted 82 tillers off one blackgrass plant in winter wheat."

Weed counts from this year's split-field comparison, taken in July, revealed only 28 blackgrass heads/m^2 in the Hyvido, versus 352/m^2 in the conventional. That was despite the Hyvido being drilled at around half the number of seeds. Any blackgrass survivors in the Hyvido hybrid were also less vigorous, he observed.

"The hybrid was drilled at 200 seeds/m^2, while the conventional was drilled at 400-450 seeds/m^2, and we still had blackgrass problems in the conventional. It was everywhere and abundant.

"There was a bit of blackgrass in the hybrid, but nothing like as much — not really much of a problem at all. The hybrid had outgrown it and was taller. So seed return is obviously going to be much less. We definitely know that taller varieties — including of winter wheat — help against blackgrass," he says.

For herbicide control, blackgrass has become resistant to sulfonylurea herbicides, so they're rarely relied on. Indeed, very little post-emergence herbicide is used in his wheat and barley. Instead, emphasis is placed on targeting blackgrass with pre- and peri-emergence residual herbicides, with the same programme used across both crops.

For the 2016 harvest, 80ha of hybrid barley was planted — a mixture of Hyvido Volume and the new hybrid Hyvido Bazooka. For 2017, the cropping area will be divided into equal thirds, with rotations chosen according to blackgrass severity. Conventional barley will still be grown, but only on land that's classed as medium for blackgrass, Richard Ward explains.

"Where blackgrass isn't too bad, our standard rotation of OSR followed by winter wheat followed by hybrid barley will continue to be grown. Where there's more blackgrass, the rotation will be OSR followed by a tall conventional winter barley variety followed by the hybrid.

"And where there's really bad blackgrass, it'll be OSR followed by two years of the hybrid. There's no doubt that even conventional winter barley is better than winter wheat against blackgrass, but not as good as the hybrid," he explains.

In the very worst fields, the standard Hyvido hybrid seed rate will also be increased slightly from 200 to 240 seeds/m^2, to further increase crop competition. "We don't have to increase the seed rates everywhere — only where we know we're going to have bad blackgrass problems, which is always on the poorer draining, heavier land. But we think it's worth it."

Yield-wise, Richard Ward saw hybrid barley deliver 11t/ha versus 9.8t/ha from conventional winter barley when grown side-by-side in the same field in 2015. This year, he says yields have been lower, but hybrid barley still has a place in the rotation. After the initial seed cost, he says both the hybrid and conventional have equal growing costs — and both offer savings over growing winter wheat.

"We only use two fungicide sprays in barley, compared with four in wheat, which saves over 40%, and we're getting nitrogen fertiliser savings of 10-20%. So even at a sale price for barley of £10/t less than wheat, it's still more profitable for us to grow barley than winter wheat in a first cereal situation.

"This autumn we'll be growing a lot more of the hybrid. We're going to switch to all Bazooka because it's higher yielding than Volume and also slightly taller, which will help against blackgrass. Whatever you can do to manage blackgrass, you have to do it," he says.

Even at a sale price for barley of £10/t less than wheat, it's still more profitable for Richard Ward in a first cereal situation.

Richard Ward has seen clear reductions in blackgrass populations in hybrid barley (right) compared with conventional winter barley (left) when grown in the same field.

Impact of soil moisture on blackgrass

At Ruth Stanley's farm, she's also looking at the effect mole ploughing has on blackgrass populations, as well as whether applications of gypsum or human digestate have any effect.

"Blackgrass is a marshy weed, so thrives in cool, damp conditions. Improving drainage by mole ploughing is one way of making conditions less favourable for it. Gypsum also has a drying effect on the soil and both of these techniques appear to have reduced blackgrass populations," she explains.

By contrast, the human digestate seems to encourage blackgrass, perhaps because of the moisture of the product and incorporation required after application, she mutes. "But this is an effect that could be used as a management tool if the digestate could be applied early enough to encourage the blackgrass to germinate, then it could be sprayed off with glyphosate."

The winter barley trial plots will be destroyed with glyphosate this year, even though there'd be a reasonable crop, as this level of seed return would be too high.

Volume has 302 blackgrass plants/m^2 which is more than double the blackgrass population in the conventional plots. "That's a potential seed return of 604,000 seeds/m^2," she says, though it's possible that the blackgrass heads are actually smaller in the crop of Volume because of the shading effect, which may reduce seed return per head.

"The winter barleys all definitely have a greater smothering effect than winter wheat but it still isn't the whole answer and the spring barley has done a significantly better job. If your land is really too heavy to consider planting spring barley, then linseed could be worth considering because it's later planted and gives you the same opportunity to get a couple of glyphosates on any blackgrass before planting the crop," she suggests.

"I'm going to destroy the winter barley trial plots with glyphosate this year even though there would be a reasonable crop, which is a decision some growers find hard to understand. But we've worked too hard to allow this level of seed return and by taking the hit this year, the field will be a lot cleaner for next year."

On the farm this year, the worst blackgrass fields have been put into spring barley and ploughed before drilling.

And budgeting for the long haul is something Ruth Stanley believes farmers are very good at, as heart breaking as it is to destroy a crop after all the time, money and effort that has gone into producing it.

"It's all about managing seed return with blackgrass, so that means there'll be a couple of rough years with reduced profits while we deal with the problem," she says philosophically. ■