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Pushing Performance

Tackling resistant ryegrass

With ryegrass becoming an increasing problem on arable farms, *CPM* learns how one farmer is using a multitude of tools to tackle resistant species.

By Charlotte Cunningham

Although blackgrass has dominated grassweed conversations during recent years, the tides are slowly turning and now it appears that for some growers, ryegrass is causing more of a stir.

Among those growers is William Hazell, who inherited a ryegrass problem when he took on a 360ha farm in Oxfordshire four years ago. “When we arrived on farm, there was an area which had been in a Countryside Stewardship agreement, but when I took it on the timings were wrong to put in an application to continue with it, so we decided to crop it instead.”

Following suit with what the previous tenant had done, William decided to top what was already there and direct drill a cereal crop – which is when the weed challenge was unveiled. “Every coulter where the drill had gone along just flushed with ryegrass.”

To tackle this, William went in heavy with contact herbicides. However, after minimal effect on the weeds, suspicions were raised that there could be a resistance issue at play – so he worked closely with his Agrii agronomist, Peter Carr, to get a better handle of the status on farm. “Having tried a few different herbicides and not seen any results, we came to the conclusion that it was likely to be resistant,” explains Peter. “Further testing confirmed that the ryegrass was indeed RRR resistant – the contact herbicides weren’t even yellowing the ryegrass.”

Protracted germination

While this can be incredibly challenging for the individual farm, Peter says it’s becoming more and more commonplace across the UK. “Ryegrass is probably more of a problem than blackgrass now in terms of its difficulty as a weed because it continues to flush. With blackgrass, with the right cultural control, once you’ve shut the door on that initial germination, it’s just bad luck to get subsequent flushes if you’ve stacked the herbicide correctly and crop competition takes over in the spring. But ryegrass quite prolifically keeps going; it’s also more competitive.”

This discovery led to an overhaul of the farm management, deploying every cultural control in the toolbox. “This included everything from stale seedbeds, very competitive varieties and delaying drilling right until the third week of October,” continues Peter. “Luckily, the medium-bodied soils on farm allow this.

“We’ve also looked at the rotation and have now introduced some forage maize, which hadn’t been grown on the farm before. The thinking behind this was that the crop would bring in a new active ingredient, as well as a later-drilled spring crop to allow more flushes prior to drilling.”

Agrii agronomist Peter Carr says ryegrass is probably more of a problem than blackgrass now in terms of its difficulty as a weed because it continues to flush.

Testing for resistance

The only way to get a handle on any potential resistance issues is to test and confirm exactly what is present on farm. But when is the best time to test?

According to ADAS, if there has been a gradual decline in weed control, this may indicate herbicide resistance. "You may also notice that one weed type seems increasingly hard to control while others remain well-controlled," explains ADAS' Katy Hebditch. "Herbicide resistant weeds tend to occur in species-specific patches, so healthy weed patches may be found beside dead weeds of the same species. A more uniform failure across the whole field, across multiple species, would tend to point more towards application issues. However, if herbicide failure becomes a recurring pattern, it's important to then test for resistance.

"Ideally, fields should be tested every three years to coincide with a typical three-year rotation. Understanding the resistance profile of the grass weed population in the field will help to optimise control measures."

There are, of course, certain risk factors which could increase the likelihood of a resistance issue, says Katy. These include; repetitive application of herbicides with the same mode of action, particularly high risk groups such as the ALS inhibitors (HRAC Group 2), multiple herbicide applications during the same growing season, a lack of non-chemical management, a lack of crop rotation and reduced or less effective dose rates of herbicide applied.

ADAS provides both standard and bespoke grassweed herbicide testing for blackgrass, ryegrass, wild oats and brome – with a standard test costing £240 and giving results to three herbicide actives. "Your results will come with a guidance document which will explain what tests were done and our interpretation of the results. For grass weeds, we will also calculate a resistance rating for your sample/s using the UK resistance-rating 'R' rating system.

"We know that ryegrass is becoming an increasing challenge on arable farms. In 2023 it was the first time we received as many ryegrass as blackgrass samples in our testing programme, so acting as soon as you have suspicions can really help nip any issues in the bud at a potentially much less severe stage."

Fields should be tested every three years to coincide with a typical rotation, says ADAS' Katy Hebditch.

Resistance ratings

- **RRR** – Resistance confirmed, highly likely to reduce herbicide performance
- **RR** – Resistance confirmed, probably reducing herbicide performance
- **R?** – Early indications that resistance may be developing, possibly reducing herbicide performance
- **S** – Susceptible

Cultivation-wise, while the plough has been used to 'hit the reset button', William sticks predominantly to minimum-tillage to avoid disturbing the soils. "We want to get to a point where we're completely direct drilling, but we require the ground to be in best shape first in order to make sure it's a success.

"We generally bale the straw behind the combine and the cultivator follows the last straw trailer out of the field. It's then left to flush for a minimum of six weeks."

In terms of chemistry, the approach has been based on big stacks of residual herbicides and mixing different modes of action, explains Peter. "We're using a mixture of cinmethylin, aclonifen, pendimethalin, diflufenican, metribuzin, picolinafen and flufenacet, and typically spread these across pre-emergence and peri-emergence applications, as well as a top up in the late winter – end of January/early February time – to control the spring flush."

To avoid further resistance issues, a traffic light system is in place, with a reduced programme applied to the 'green' cleaner fields. "The red fields get the full treatment as we're really trying to give them the best chance."

With so much riding on the residual programme, William says he has leant on the benefits of a specialist activator adjuvant to keep chemistry where it's required and further assist with the ryegrass battle.

Maximising coverage

Backrow Max by Interagro, is specifically designed to push the performance of residual herbicides, particularly under suboptimal weather conditions. "It does this in a number of ways," says Stuart Sutherland, technical manager at Interagro. "Firstly, it reduces drift to maximise coverage which is achieved by the product's ability to reduce the number of droplets to below 100 microns, as these are the ones prone to drift.

"It also reduces the number of very coarse droplets prone to bounce, creating a more optimal droplet size for pre-emergence application and even distribution across the soil target. This improvement in coverage maximises the number of weeds coming into contact with the herbicide at germination, leading to an increase in the number of weeds controlled."

As well as this, Backrow Max helps retain chemistry in that all-important kill zone, he continues. "Adding it to the mix enables herbicide and moisture retention

Ryegrass resistance stats

- An increasing threat throughout the UK
- Resistance first found in 1990
- More than 475 cases confirmed, across 33 counties
- Non-target site resistance most common
- Target site resistance to 'fops', 'dims' and 'dens' occurs, but less commonly than in blackgrass
- Target site resistance to ALS inhibitors (confirmed in 2012)
- 2019 survey of resistance status suggested resistance is continuing to increase
- 2021 survey found evidence of increasing control issues, with problematic hotspots widespread across the UK

Source: AHDB

By deploying a range of techniques, Oxfordshire farmer William Hazell has improved the ryegrass burden on farm.

in the top 5cm of the soil to be maximised. This can increase the longevity of weed control by up to eight weeks – boosting herbicide performance in a dry spell or when conditions turn wet. By retaining more of the herbicide in the top 5cm of the soil for longer, away from the root zone of the crop, Backrow Max also has benefits from a crop safety perspective too and helps to prevent the leaching of the herbicides and subsequent crop protection inputs to groundwater. All residual herbicides move in soil, the trick is to keep them concentrated in that weed germination zone for as long as possible to control weed flushes."

Peter says it's an integral part of the programme now. "I deploy a data-driven approach to agronomy, and everything in that programme – including the Backrow Max – has proven its place and value."

William adds: "I think it does an amazing job. The amount of time the chemistry seems to keep working when we've included it is phenomenal really – I'm talking about still seeing effects during Christmas time. I'm not a scientist, but it really seems to aid the longevity and effectiveness of our programme."

Retention data

Looking at just some of the wealth of data behind Backrow Max, Peter specifically points out a trial undertaken at the Institute of Soil Science and Plant Cultivation in Wroclaw, which proved that the retention of Luximo (cinmethylin) is enhanced in wet conditions when paired with Backrow Max.

Soil cores were taken from an arable field in Wroclaw and treated with Luximo alone and Luximo with Backrow Max, before simulating a heavy rain event and comparing the differences. The results (see table) showed that Luximo is retained well in the weed zone, but it can be further enhanced with Backrow Max, giving you more bang for your buck. "We know Luximo is one of the products which works on William's ryegrass, so by adding Backrow Max to the mix we're able to push that performance just a little bit further," says Peter.

Institute of Soil Science and Plant Cultivation study, 2023

Treatment	Herbicide residues (mg)		
	0-5cm soil layer	5-10cm soil layer	10-20cm soil layer
Luximo	0.103[a]	0.019[b]	0.003
Luximo+ Backrow Max	0.110[b]	0.015[a]	ND
$LSD_{0.05}$	0.0036	0.0021	-

ND – no residues detected (<0.001mg/kg)
a,b – values marked with the same letter don't differ statistically

The farm has a severe RRR-resistant ryegrass issue, illustrated here in a crop of wheat.

Looking forward, the duo's efforts and war on ryegrass have not been in vain, and now they're achieving some fairly good levels of control, he adds.

This year, William says they'll continue to experiment with all the controls available to improve both the control of ryegrass populations and fine-tune the best strategy possible. "We've made a significant improvement to control – we're not there yet, but we're definitely on the right track," he concludes. ■

Pushing Performance

At the heart of good crop production lies careful use of chemistry to protect the plant and maintain performance, right through the season.

But optimising the efficacy of plant protection products can be challenging, while increasingly restrictive regulations limit just how far you can go.

This series of articles explores the science behind the use of adjuvant and biostimulant tools to help power both chemistry and crop performance, as well as increase understanding of why they're needed and what they do.

We're setting out to empower growers and drive crops to reach their full potential. For more info on optimising pre-em efficacy visit: www.interagro.co.uk/how to get more from your pre-ems

CPM would like to thank Interagro for kindly sponsoring this article, and for providing privileged access to staff and material used to help put the article together.

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