

Control the controllable

“In dry soils there’s less herbicide in the soil water.”

Technical Pushing performance

There are many aspects to blackgrass control that are in the hands of the weather gods, but a decade of trials has shown that the performance of residual herbicides can be reliably pushed using Backrow, regardless of the season.

CPM finds out how.

By Lucy de la Pasture

Last autumn was memorable for all the wrong reasons, with later drilled winter wheat either not going in at all or it was drilled so late — in soil conditions that weren’t always ideal — that it was pushing the boundaries of spring.

The legacy of the past season will be a backwards step in grassweed control for many farms, says Agrii regional technical advisor, David Felce.

“Spring crops were often very uneven this year and with open canopies. Brief periods of moisture after prolonged dry conditions led to very protracted growth of the crop and the blackgrass has reflected this pattern, leading to it seeding over a longer period than usual.

“That means getting on top of blackgrass this autumn is doubly important to keep populations in check, and to do this soil condition will be key. Any damage to the soil needs to be dealt with effectively to avoid rolling one bad year into another,” he adds.

Whether the monsoon experienced last autumn could repeat itself is a big unknown. For some growers delaying drilling until after mid-Oct may just be deemed too risky. David believes it’s sensible to stick to a recipe that’s been proven over a number of years rather than react to an exceptional season.

“If blackgrass populations are low then the highest yields will be achieved by drilling in the early window, but then there’s more of a risk from BYDV to add into the equation. Delaying drilling is the best cultural control for blackgrass when populations are high. This year the temptation will be to go early — it’s a case of balancing risk and reward.”

Increasingly difficult

The Holy Grail to prevent blackgrass from increasing on the farm is to achieve 97% control, but it’s a target that’s becoming increasingly difficult to achieve as levels of both target site and enhanced metabolic resistance increase. More than ever, blackgrass control needs a two-pronged attack using both cultural and chemical strategies, he says.

The resistance issues now widely present in the blackgrass population has put the emphasis on a stack of residual herbicides but getting them to perform well has its own set of challenges — even when resistance doesn’t come into the equation, explains Stuart Sutherland, technical manager at Interagro.

He lists good coverage, uptake and crop safety as the key ingredients for successful performance of residual stacks.

“Achieving even spray coverage across the soil surface will ensure residual herbicides make reliable contact with

germinating weeds. If soil conditions are cloddy or stony, this can cause ‘shadows’ which hide weed seed from spray droplets. In poor application conditions, spray droplets can drift off-course, leading to poor spray distribution.

But it’s not just these factors that can lead to poor herbicide performance. The condition of the soil it lands on also plays a major role. “Very wet and very dry soils both reduce herbicide activity and may impact crop safety.

“In dry conditions, herbicides with a medium-high adsorption tendency will bind tighter to soil organic matter (SOM). With excessive rainfall, herbicides that are even moderately mobile can be lost and their movement through the soil profile may also risk crop injury and movement into groundwater,” he explains.

To be successful, residual herbicides must be taken up by the roots and shoots of weeds. For this to happen, they need to be dissolved in the soil water and be in a position within the soil where they can be ▶



David Felce explains that improved deposition on the soil surface means more germinating weeds come into contact with residual herbicides at emergence.

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Stuart Sutherland says good coverage, uptake and crop safety are the key ingredients for the successful performance of residual stacks of herbicide.

► adsorbed, explains Stuart. “For most arable weeds, including blackgrass, that’s the top 5cm of the soil because this is the depth most weeds will germinate from. That means some rainfall is typically required to move the herbicide from the soil surface to the weed root and shoot zone for uptake to occur. “The amount of rainfall required to ‘activate’ a herbicide depends on soil moisture ahead of application and soil type. To be effective and safe to crops

and groundwater, herbicides must bind to soil colloids (clay, organic matter) with only a small amount remaining in solution. This avoids leaching from the weed germination zone down through the soil profile.”

The mobility/adsorption tendency of herbicides depends on the active ingredients within it. Herbicides with high mobility (such as metribuzin) are less dependent on rainfall for activation, he explains.

Excessive rainfall

“The downside is that with excessive rainfall, herbicides that are even moderately mobile (e.g. flufenacet, ethofumesate) can be lost, leading to poor weed control and threats to crop safety and groundwater. Herbicides with moderate to high mobility therefore need ‘help’ to be retained in the top 5cm of the soil profile.”

The level of herbicide in solution is directly related to soil moisture content — too much moisture can cause herbicide leaching but too little can be equally problematic, he adds. “Poor weed control typically occurs in dry soils as there’s less herbicide in the soil water. This is an issue particularly with active

Herbicide mobility and adsorption

Herbicide	Mobility	Adsorption
Aclonifen	Low	Very high
Diflufenican	Low	High
Ethofumesate	Moderate	Medium
Flufenacet	Moderate	Medium
Metribuzin	High	Low
Pendimethalin	Low	Very high
Picolinafen	Low	Very high
Prosulfocarb	Low	High

Source: University of Hertfordshire - pesticide properties database.

ingredients that have a high adsorption tendency — such as pendimethalin, prosulfocarb, aclonifen and picolinafen.” Backrow helps stabilise these variables by increasing the adsorption of the herbicide onto soil particles, which helps retain herbicide chemistry and soil moisture in the top 5cm of soil for a period of up to eight weeks, claims Stuart.

This extra moisture increases the availability of herbicides for uptake into weeds and is particularly beneficial with herbicides that have a high to very high adsorption tendency, which is one of the biggest factors influencing herbicide availability and efficacy, he adds.

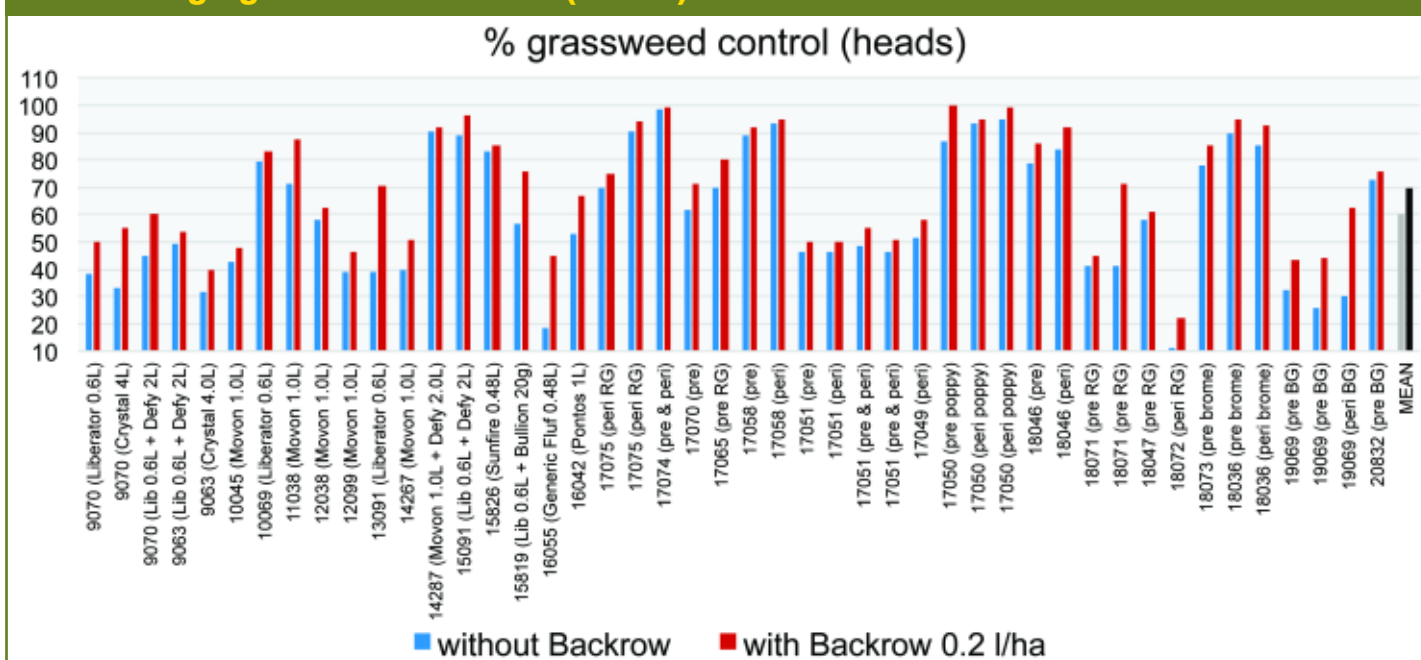
From this it’s clear to see

that some of the factors which influence the efficacy of autumn residuals are out of the control of the growers. But others are not and there are ways to help optimise the performance of pre and peri-emergence herbicides, including nozzle selection and the use of adjuvant technologies such as Backrow, explains David.

“In Agrii trials we’ve found the best spray distribution for residual herbicides has been achieved from a higher volume of application through flat fan nozzles. The difficulty is that almost all herbicide programmes now have a label requirement to use DRT LERAP 3*** nozzles,” he explains.

That includes any applications

Percentage grassweed control (heads)



The mean value across all Agrii trials over past decade from the addition of Backrow at 0.2l/ha equates to a 9.5% improvement in blackgrass control.

Factoring in dormancy

Innate or primary dormancy is a natural condition that develops as the seed matures. It prevents premature germination of the seed whilst it is still attached to the plant or just after shedding and allows for dispersal of the seed from the parent plant, explains Dr Sarah Cook, ADAS.

Blackgrass in spring wheat/late harvested crops has added an extra dimension to seed return this summer. "In some of these crops blackgrass has been making the most of the space. The late rains kept plants going and blackgrass is present at many growth stages — from tillering, flowering and shedding blackgrass seeds. Many are likely to have produced fertile seed.

"This season the dormancy status for blackgrass is high, with just 24% of blackgrass seeds germinating in tests. We've had a run of high dormancy seasons — last year was a similar picture, with 27% of seed germinating, as was 2016 and 2017," she says.

So what does this really mean to growers and does it impact blackgrass control? Sarah led an AHDB project looking at dormancy in grassweeds and it reported that the greatest proportion of blackgrass seed emerged during the first 30 days after sowing; this was greater with low dormancy seed (86%) than with high dormancy seed (75%). That situation was reversed beyond the first this period, with more high dormancy seed emerging than low dormancy seed up to 90 days after sowing. Spring emergence was also greater in high dormancy seed.

"In high dormancy years blackgrass emergence will be protracted, with 90% of seed emerging up to 60 days after drilling," she explains. "Because more blackgrass is likely to come up with the crop then it's important to try and get a competitive crop by planting in the right conditions, into the seedbed you've aimed for, at the right time rather than delaying drilling."

The advice to drill fields with high blackgrass



Sarah Cook says blackgrass dormancy is high this autumn which means more will come up in the crop.

populations last still stands and Sarah points out that where later-planted, less blackgrass will emerge in the crop and both pre and peri-em herbicides will work better under the cooler and moister conditions.

containing diflufenican (DFF), such as Cyclops (bromoxynil+ DFF), Tribal (chlorotoluron+ pendimethalin+ DFF), Liberator (flufenacet+ DFF) and Octavian Met (flufenacet+ DFF+ metribuzin), as well as Pontos (flufenacet+ picolinafen), Avadex Factor (triallate), and Proclus (aclonifen).

Agrii has been collaborating with Syngenta to study spray distribution through different nozzle types applied using simultaneous, field-time application. In the novel system, a fluorescent dye is added to the spray water and is applied using three booms feeding three different nozzle types at the same time, creating exactly the same application conditions as a farm sprayer. Trays of soil were placed under each boom, along with water sensitive paper. The soil trays are then taken up and examined under ultraviolet light to compare the spray distribution patterns obtained from the different nozzles.

"This initial work has given us a different insight into what we already know. In particular, the addition of Backrow improved the coverage from the DRT nozzles we looked at (the new Syngenta Defy 3D90 and Lechler IDTA) and this is why we recommend it for use with residual herbicides."

This autumn Agrii will be using the same system to assess herbicide applications and will record any differences in blackgrass control using different nozzle types, with and without a range of different adjuvants to get a fuller picture.

Backrow has become the datum point to

compare the performance of all other adjuvants in Agrii trials after consistently performing well in different trials over a 10-year period. "Over that time the inclusion of Backrow has delivered a 9% improvement in blackgrass control over all other programmes. The extra blackgrass control equates to 0.45t/ha yield in a 500 heads/m² blackgrass population, which equates to around £80/ha," he comments.

So how does the spray adjuvant contribute to better grassweed control from herbicides? Its addition to the spray tank influences both the delivery of the spray to the target, in this case the soil, and the subsequent movement of the herbicide in the soil.

"Adding Backrow to the spray water has the effect of increasing the number of

droplets in the mid-range, giving a more predictable and uniform spray distribution," says David.

The improved deposition on the soil surface means more germinating weeds come into contact with residual herbicides at emergence, which helps account for the increase in efficacy seen in trials

David highlights that Backrow will be particularly useful to help get the best out of the two Bayer actives which have new approvals for blackgrass control in cereals this autumn — aclonifen (in Proclus) and metribuzin (in Octavian Met).

Stuart adds Backrow is a vital addition at the pre- and peri-em timings where it helps mitigate the effects of very wet and very dry conditions that can lead to poor weed control and crop competition. ■

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.

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.

Backrow is fast becoming a vital performance adjuvant for pre- and peri-emergence herbicides to work at their best. The resulting improvements in herbicide coverage and uptake into weeds are crucial benefits for growers to protect crops and beat weeds for the best autumn start.

