

“The prospect of resistance fills me with horror.”

# The risk of reliance

**Technical  
Forward-thinking  
farmers**

**Glyphosate may be vital in the battle against blackgrass, but it's under threat, both from resistance and public perception. CPM visits Andrew Ward to find out how he's reducing dependence on herbicides and to join an industry roundtable to discuss the latest research.**

**By Tom Allen-Stevens**

**There's the smell of fresh paint as you enter Andrew Ward's workshop. There in the centre, finished and gleaming in army green, is what looks like a troop logistics vehicle.**

"It's the welfare trailer for the roguing team," Andrew explains. "They're due to arrive next week. I've found that if you look after the team, they'll do a good job on the blackgrass."

The trailer's drawbar has been extended to accommodate a Portaloo. Inside are 16 comfy seats acquired from a coach, and there's even a boot brush attached to the steps at the back. Andrew lifts a flap to reveal a 20-litre water container with its dispenser. "It's in an insulated compartment — you need that when it gets hot," he says.

The trailer's military livery is probably

appropriate — since 2012, Andrew has waged a zero-tolerance war on blackgrass across the 650ha of heavy clay and lighter heathland soils he farms near Sleaford in Lincs. Each year and every battle is a progressive success, with the population dwindling gradually, according to figures he keeps with meticulous detail.

## Roguable levels

"We stopped using Atlantis (iodosulfuron+mesosulfuron) as resistance to it grew and started removing every blackgrass plant that survived the pre-emergence herbicide to prevent it seeding. In the first year, we cut 40ha of wheat for an anaerobic digester and sprayed out another 38ha with glyphosate. That figure has gradually reduced as we've kept populations down to roguable levels. For the past two years, we haven't had to spray out any standing crop."

He pulls out a map that shows the hours the roguing team spent in each field last year. "We have the cost down to £30-35/ha on average now, but it varies considerably from field to field — as high as £226/ha and as low as £14/ha. The trick is to use the rotation as an extra tool to outmanoeuvre the blackgrass and also to never let it seed."

Taking a tour around the farm, Andrew points to the spring cereals, now in ear that currently make up the largest share of the rotation. "We've gone from 60% winter wheat to less than 20%, although that's rising again to around 35% as we're getting on top of blackgrass. We're taking a break from

oilseed rape mainly because it was the worst crop for blackgrass. We generally don't drill before 20 October and sow at high seed rates."

He parks up on the margin of what he believes is his worst wheat field. To the untrained eye it looks clean, but Andrew levels his gaze over the top of the crop and points out the tell-tale freckled haze you can just make out against the dark green of the hedge at the field edge. "The roguing team may have to make two or even three passes through this field," he says.

Pre-emergence herbicides are still used, although Andrew is beginning to experiment with unsprayed patches to gauge where he may be able to drop his dependence on them. "Of 12 plots we left unsprayed, three had no blackgrass, five were roguable and four had to be sprayed out with glyphosate," he notes.

"We haven't allowed any seed to drop on these fields for at least seven years,



*The well equipped welfare trailer helps ensure the roguing team do a good job on the blackgrass.*

yet still the blackgrass keeps coming. I'm determined to defeat it, but the very last thing we want to rely on is something out of a can."

There is one herbicide, however, on which he admits he's still very dependent — glyphosate. "The prospect of resistance fills me with horror. We're following all the guidelines, and have put in place as many cultural controls as we can. But I know we rely on glyphosate and that the blackgrass would quickly get out of control without it."

Returning to the farm office, Andrew grabs his tablet to join a Glyphosate Stewardship Roundtable organised by Bayer. It's a Zoom meeting to discuss the findings of the latest research, led by Lynn Tatnell at ADAS. These are presented by her colleague James Clarke, who chairs the Weed Resistance Action Group (WRAG). Also on the call are Bayer's Roger Bradbury, farmer and independent agronomist in Leics Chris Tolley, and Essex grower David Lord.

"There are no known cases of resistance in grassweeds in the UK to glyphosate, but there are populations that are more tolerant," says James. "There are very few alternatives that offer such effective control over a broad spectrum of weeds. So growers should be doing everything they can to keep weed numbers down, to lower the risk of resistance developing."

James notes that WRAG proactively issued guidelines in 2015, and reiterates the four key points:

- **Prevent survivors** – repeat applications present the highest risk.
- **Maximise efficacy** – the right dose for the target weed on actively growing plants.
- **Use alternatives** – cultivation and non-chemical control methods as well as other herbicides in sequence.
- **Monitor success** – remove survivors and test samples.

Research has refined the guidelines, particularly around dose and application timing (see panel right). "540g/ha of active ingredient should be seen as an absolute minimum, but if the blackgrass is tillering, this should be stepped up to 720g/ha. Control is very unreliable at low temperatures, and a cultivation between glyphosate applications is key to maximise grassweed kill before drilling."

That's a concern for David, with 600ha of arable land, most of which haven't been cultivated since 2014. "We use a lot of cover crops which we spray off two days before drilling, and then apply glyphosate with the pre-em, aiming for a total of around 1000g/ha."

Those who direct drill should pay greater

attention to good application and other measures, says James. "Every time you take away a cultural control option, everything else you do becomes more important, and if you have high levels of resistance to other herbicides, you're high risk. With cover crops and high weed burdens, shading can also be a problem as weeds could receive a sub-optimal dose and go on to produce seed that season."

Roger notes that application technique, including slower forward speeds, a careful nozzle choice and appropriate water volumes can help here.

## Regenerative Agriculture

David highlights radish that can be a problem to take out with glyphosate, although the pre-em herbicide usually takes care of it. A farmer who follows regenerative agriculture practices, he aims to minimise bare land and has a high proportion of spring crops in the rotation, which he points out both help enormously towards reducing blackgrass numbers.

"There's also later drilling, although there's a balance to be struck between reducing blackgrass and getting a good establishment," he says.

Andrew is adopting a more flexible approach to later drilling on lighter land and on fields where he feels the blackgrass is under control. "I still wouldn't drill before 10 Oct, however, and our policy not to drill before 20 Oct has had a huge effect on reducing blackgrass."

For him, spring crops form the cornerstone of his battle against the grassweed. "They're low input and need less herbicides overall. With yields averaging



*You can just make out the tell-tale freckled haze against the dark green of the hedge at the field edge.*

8.5t/ha, these have been as high as 9-9.5t/ha, so the margin is comparable with winter wheat.

Chris agrees that attention to detail with spring cropping brings rewards. "Those who drill too early often have problems. It's a question of drilling when soil conditions are right. Going back to basics and getting the fundamentals right help enormously towards reducing dependence on herbicides."

When it comes to dose rate, he remarks that none of his recommendations for glyphosate are below 720g/ha. "Fields contain mixed populations of weeds, and some broadleaf weeds, such as cranesbill, will require higher rates for control."

While most of the research has focused on blackgrass and Italian ryegrass, James notes that bromes are causing real concern. "We're finding populations showing lower levels of control. Again, it's not resistance but tolerance. But it's different to blackgrass — plant for plant, brome is more difficult to control, although blackgrass survivors produce more seed. We'd like to see product labels offering more guidance for these weeds that are tougher to control."

Roger says manufacturers already provide additional guidance beyond what is ▶

## WRAG guidelines – Revisions for 2021

- **Application timing** – for blackgrass and Italian ryegrass, GS12-13 is the optimum weed growth stage.
- **Rate** – don't go below an application rate of 540g/ha of glyphosate, which for most formulations is 1.5 l/ha.
- **Weed size** – Tillering plants (>GS21-22) require a higher glyphosate rate (at least 720g/ha).
- **Temperature** – Control can be very unreliable at low temperatures.
- **Cultivation** – A shallow pass is best to disturb survivors. Direct drillers should watch for shading – it's even more important every other aspect of weed control is correct.
- **Stale seedbed** – Don't apply more than two glyphosate applications between crops, preferably with a well-timed cultivation



*A shallow pass is best to disturb survivors while direct drillers should watch for shading.*

between them.

For the full project report and updated guidelines, go to [ahdb.org.uk/wrag](http://ahdb.org.uk/wrag)



*The Glyphosate Stewardship Roundtable was a meeting to discuss the findings of the latest research.*

▶ available on the label. “We’re aware brome can prove more difficult to control, although existing label rates are still achieving a good result. The quality of application is also an important component of effective weed control.”

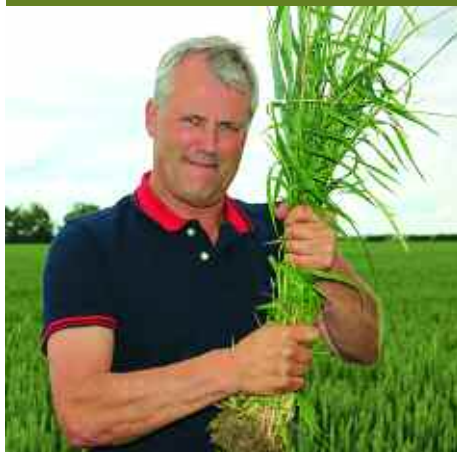
He also has guidance on adjuvants and water conditioners. “There is concern that growers feel they can drop rates if they use them. This is not the case and no amount of additional adjuvant can replace an effective dose of glyphosate. Roundup branded products contain all the adjuvants and water conditioners you need, including for hard water.”

David notes that he applies fulvic and humic acid to improve soil health, which he believes help to break down glyphosate residues. But Roger raises concerns here: “We are not aware of any reliable scientific evidence supporting these claimed benefits. From an efficacy and resistance management perspective, we don’t support their use with Roundup, and there may be antagonism.”

So what about the view that levels of glyphosate are building in soils as a result of repeated use? “It’s been comprehensively demonstrated that glyphosate does not accumulate, but readily breaks down in the soil through microbial activity. A good functional soil biology is important for any farming system.”

The focus shifts to pre-harvest glyphosate and concern over residues in food. Roger stresses that maximum residue levels are set at the limit of detection and will not be exceeded where label recommendations are followed. “Even where residues are found there’s no science that backs up allegations there’s a danger to human health. That doesn’t mean there isn’t negative press, however, so pre-harvest glyphosate should only be used when needed to aid harvest and where the end market allows it,” he states.

## How to get the best out of a rogue



*Trace the plant down to the ground and pull out the whole clump, says Andrew Ward.*

Andrew Ward has employed a roguing team to help blackgrass control for the past seven years. The total cost last year was £26,500, but there’s a downward trend every year, he says, and this is considerably less than he used to spend on contact graminicides.

James adds that pre-harvest use has not been found to contribute to increased tolerance of glyphosate. Andrew notes that in wheat where residues have been found, you’d have to eat 250 loaves in one day to come close to exceeding the acute reference dose.

David has concerns, though. “I get pulled in two directions. Although the science supports pre-harvest use as being safe we do need to address consumer concerns over its use in this way and always apply due diligence — it’s rare that here in the South East pre-harvest glyphosate is really needed.”

Chris agrees. “Pre-harvest use is an important tool, especially for growers in the North and Scotland. But it shouldn’t be seen as a pre-requisite of wheat production and

Andrew has a few top tips to get the best out of the practice:

1. **Look after the team** – It can be gruelling work, especially when it’s hot, so it can be a good idea to provide a rest area with a toilet and plenty to drink.
2. **Make sure they stay in line** – Have no more than 4m between each team member, working up a tramline at a time.
3. **Look behind as well forward** – black grass tends to be easier to spot in one direction than the other.
4. **Check the tramlines** – it’s very easy to miss plants that are often below the height of the surrounding crop.
5. **Pull from the root** – trace the plant down to the ground and pull out the whole clump.
6. **Carry a bag** – don’t leave pulled black grass in the field. Take it to a heap that’s marked on a map, or better still, the bucket of a telehandler at the field edge. Then clear all traces to green waste that won’t come back into your fields.



*Bromes are causing real concern with populations found showing lower levels of control.*

only used when needed.”

Andrew only ever uses glyphosate pre-harvest for secondary growth. “For me pre-drilling is the most important use of glyphosate, and if it was banned it would be a catastrophe. Glyphosate is vital.” ■

## Forward-thinking farmers

With robotics, gene mapping and molecular markers, digital technology and bio-chemistry it is a dynamic time for anyone involved in agriculture.

Challenges lie ahead for UK agriculture, such as improving productivity while minimising its environmental footprint. But farmers have always had to deal with change, and adopt new ideas and technology.

Bayer is at the core of these agricultural advances, working with farmers throughout the UK and further afield to trial and develop new

diagnostic tools and evaluate different farming strategies, coupled with exciting plant breeding and product development programmes. It will help us develop innovative solutions and services to assist farmers achieve profitable and sustainable agronomic practices.

Despite the challenges facing UK agriculture there is much to look forward to. This series of articles focuses on how innovation and partnership between farmer and industry will help us face the future together.

