

*“We’ve taken glyphosate for granted and we mustn’t do that any longer.”*

JOHN CUSSANS

# A chink in glyphosate’s armour

The first incidence of glyphosate-resistant Italian ryegrass in the UK has now been confirmed and although concerning, experts stress their continued confidence in the active’s efficacy. *CPM* reports.

By Janine Adamson

**T**he importance of glyphosate to UK farmers is so significant, that when the news of a resistant population of Italian ryegrass was announced last month by the Weed Resistance Action Group (WRAG), it was even reported by broadsheet newspapers.

Agricultural weeds and herbicide use rarely make national headlines for something so technical, rather the usual route being to question the credentials of modern crop production methods. However this time, the potential gravity of the situation appears to be more widely acknowledged.

But is this amplification really necessary? According to ADAS’ John Cussans, the arable sector is right to be concerned, but equally, there has to be some perspective. “It’s resistance in one weed species on one farm in Kent and not a widespread problem. For context, during 2018-2023 we collated data for samples of Italian ryegrass which were submitted for standard resistance tests.

“They were screened with glyphosate

and there’s not been a single resistant sample. This one case does, however, serve as a firm reminder of the importance of stewardship otherwise we’re likely to see more cases,” he says.

Although globally there are several instances of glyphosate resistance in annual ryegrass (*Lolium rigidum*) and Italian ryegrass (*Lolium multiflorum*), John’s keen to stress the case in Kent is the first confirmed in the UK. That said, three further suspect populations of Italian ryegrass are currently under investigation with results expected later this year.

In terms of other species, extensive blackgrass testing and a 2023 survey of 166 brome samples have found no populations of concern.

According to John this is unsurprising, because experience from around the world suggests ryegrass species are particularly high-risk with regard to glyphosate resistance. “But other weeds can develop resistance, so glyphosate stewardship concerns every farmer not just those managing Italian ryegrass.”

Work conducted by UK scientists also indicates the risky nature of the weed, he points out. “We’re seeing shifts in herbicide sensitivity. There’s a five-fold difference between the least and most glyphosate-sensitive populations of Italian ryegrass tested. In comparison, for blackgrass, this is around 1.7 times.”

Given official screening suggests an otherwise clear run for glyphosate, how was the resistant Kent population identified? John reveals it was through an agronomist who noted Italian ryegrass survivors post glyphosate application in



## Industry-wide effort

Glyphosate stewardship concerns every farmer not just those managing Italian ryegrass, stresses ADAS’ John Cussans.

preparation for spring crop establishment.

The plants in question were recovered, sent to NIAB, grown on in a glasshouse and tested, confirming a cause for concern. He says what makes this the first true field case of glyphosate resistance is that follow-up seed samples from the summer were also shown to be resistant to glyphosate.

“Neither a 540g (1.5 l/ha) or a 1440g (4.0 l/ha) of glyphosate were sufficient to control this population,” adds John.

A similar process will be undertaken for future suspect cases, with ADAS offering initial rapid resistance testing this spring to identify any other populations with cause for concern. Growers are asked to first instigate a discussion with their agronomist before completing a questionnaire regarding agronomic and farm practice.

Whole, live weeds are to then be dug up and sent to ADAS. “Early intervention is vital to minimise the risk of more cases of resistance, don’t just apply more glyphosate,” emphasises John.

“The vast majority of cases of sub-optimal control will have nothing to do with resistance. They could be due to the application rate, timing or conditions. Spring 2024 is a good case in point, many farmers suffered from poor control for one or more of these reasons.

“We’ve taken glyphosate for granted and we mustn’t do that any longer. Stewardship is hugely important,” he stresses.

Bayer’s Roger Bradbury agrees that although true field resistance to



#### Application timing

According to Bayer’s Roger Bradbury, it’s imperative to remember that glyphosate shouldn’t be applied to a weed during rapid stem extension.

## Reducing glyphosate resistance risk

Guidelines issued by WRAG promote four key points which all growers and agronomists should adhere to:

**1 Prevent survivors:** Repeat application to surviving plants presents the highest risk especially where those surviving repeat applications are allowed to set seed

**2 Maximise efficacy:** Use the right dose for the hardest target weed species and growth stage on actively growing plants; reduced rates increase risk of reduced efficacy

**3 Use alternatives:** Use cultivation or other non-chemical control when practical; use effective herbicides in the crop in sequence (or mixture only, if recommended)

**4 Monitor success:** Consult your agronomist or supplier; remove survivors to prevent spread; test seed samples of survivors



#### Stewardship guidelines

WRAG reminds of guidelines previously issued for the use of glyphosate.

#### WHAT’S WRAG?

The Weed Resistance Action Group (WRAG) is an independent and cross-industry body supported by AHDB. It involves CropLife UK member companies, representatives from the agrochemical industry (AIC), a range of independent organisations including public-sector research institutes and AICC, and the Chemicals Regulation Directorate (CRD).

glyphosate is quite rare and therefore should be manageable, growers must engage with guidelines for weed management at a field level, including those issued by WRAG.

“It’s not new information but requires greater awareness, so in many ways, this is a plea to growers and agronomists to engage with the stewardship guidelines to mitigate the risk of further resistance cases.”

Roger adds that in some instances this risk will be higher, depending on the farming system. “Those who operate no-till or within regenerative types of approaches and therefore rely heavily on the use of glyphosate, will require additional scrutiny and attention on a per-field basis.

“But the overall aim is to use integrated weed management techniques to drive down numbers and prevent survivors, this can include strategic use of cultivations and non-chemical methods as well as sequencing herbicide programmes with alternative modes of action.

“Then it’s about maximising the efficacy of glyphosate through correct dose rate and application timings,” he adds.

According to Roger, it’s imperative to

remember that glyphosate shouldn’t be applied during rapid stem extension. “From GS30 is when it becomes difficult for glyphosate to function properly as the active will be translocated to the weed’s growing tip rather than its root zone, risking potential regrowth.

“However, weeds should be actively growing and not under stress from environmental conditions such as waterlogging or drought.”

He also emphasises the importance of application quality – including correct water volume, nozzle choice, lowering the speed of the sprayer and considering the use of a water conditioner – to ensure the chemistry reaches its target.

“Don’t forget to monitor success, remove survivors and if appropriate, have the seed tested. A small number of weeds often survive a herbicide application but in all likelihood, this isn’t due to resistance but because of other external factors.”

Roger says WRAG is proactively working with other sectors beyond arable given the widespread reliance on glyphosate. “Perennial cropping for one as well as the applications within the amenity sector; there must be adherence to stewardship in those instances too,” he concludes.

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## Further reactions

### AICC annual technical conference discusses glyphosate challenges

Just days after the news of the first confirmed case of UK glyphosate resistance was shared, the Association of Independent Crop Consultants (AICC) dedicated a conference session to the future of the chemistry and how it might be protected.

The content was based on Rothamsted Research's impact assessment of life without glyphosate – conducted by Helen Metcalfe in 2024. The results were presented at the conference by the institute's ecologist, Dr David Comont.

The project modelled a simple cereal and oilseed rotation across ten growing seasons, estimating weed abundance, crop yields, total food production and profitability. The model included glyphosate pre-drilling as well as the pre- and post-emergence herbicides available in each crop.

Hundreds of simulations were then run with different weed communities and in different weather scenarios to achieve a 'business-as-usual' baseline, explained David.

He said the model was then re-run without glyphosate to quantify the impact of losing the active, and also with a range of cultural practices to evaluate their usefulness in mitigating its loss. These included increasing the frequency of grass leys and spring cropping in the rotation, delaying drilling of winter crops, and finally, substituting ploughing for glyphosate use.

David shared that the only scenario which achieved total weed control was where glyphosate was included and, in all scenarios where glyphosate was excluded, weed control suffered. However, the one practice which stood out in helping to reduce the overall weed burden in the absence of glyphosate was ploughing.

Furthermore, in some years, the simulations showed very large weed outbreaks threatening crop viability and aside from glyphosate use, the only scenarios that aided prevention were where the plough was used.

David commented that yields were



#### Impact assessment of life without glyphosate

Dr David Comont presented Rothamsted Research's modelling work at the recent AICC conference.

generally lower where glyphosate wasn't used although this varied considerably between crops, largely driven by availability of pre- and post-emergence herbicide options.

Equally, overall food production and profitability across the 10-year rotation without glyphosate decreased, but not by as much as expected. "We're still producing food and making a profit in these systems where we have a higher abundance of weeds, but quite clearly nothing is performing better than the 'business as usual' system," explained David.

The study also scrutinised the trade-offs of deploying alternative practices instead of glyphosate, with increased frequency of grass leys providing competition for weeds and with correct management, depleting seedbanks.

However, there was a dip in food production and profitability where a proportion of cash crops were taken out of the rotation, said David.

The effectiveness of delayed drilling fell without glyphosate to create a stale seedbed, and when combined with the increased risk of potential crop failures in a poor autumn, it becomes a less attractive weed control measure.

He highlighted that spring crops in the absence of glyphosate still helped to reduce the number of pernicious weeds while providing an environmental benefit by allowing over-winter stubbles or cover crops to provide food and habitat for farmland birds.

Finally, David noted ploughing was clearly beneficial for weed control in a glyphosate-free scenario, burying weed seeds, reducing their

viability over time and physically destroying weed seedlings.

"But of course, we know there are trade-offs with using these types of tillage practices which disrupt soil structure, soil biodiversity and change the greenhouse gas fluxes from the soil. All of these strategies can be important for weed control but there are a range of positive and negative consequences that should be kept in mind," he said.

David added that the modelling emphasises the urgent demand for a diverse range of strategies in a future with or without glyphosate, following the discovery in Kent. "Resistance management strategies are always most effective and financially viable when we start to impose them early before we see any issues in the field."

After 50 years of use, the case of resistance in Kent didn't come as a surprise to Lincolnshire agronomist Sean Sparling, who believes sub-optimal application is a key cause and urges users to sharpen up practices to protect its effective life.

He said the very low cost and almost bulletproof reliability of glyphosate has arguably fostered a blasé attitude, with sprays applied when conditions aren't right for other plant protection inputs.

"The simplest possible message I could give is to treat glyphosate like you would a flag leaf fungicide spray in winter wheat. It might not be costing you as much, but it probably gives you a greater benefit.

"If resistance evolves and glyphosate is lost because it's not treated with respect, you might not have a flag leaf to treat anyway," he warned. ●