



Bayer Crop Science **Mode of Action Survey 2023**

Summary of Results

Results

Here are **the results** for the **Bayer Mode of Action Survey 2023** which gathered responses in June and July 2023. We commissioned the survey to learn more about understanding and usage of different modes of action for weed control in cereal crops. The results will help inform the whole industry and allow us to provide better guidance to farmers about using herbicides.

243 farmers, agronomists and farm workers completed the survey from across the UK. Results show that there is a good cross section of farms included experiencing different weed problems and different levels of resistance.

The survey also shows that modes of action and resistance management are already part of many farmers thinking around weed control. But there is still potential to improve how we use herbicides, mainly by refining what we already do rather than radical changes.

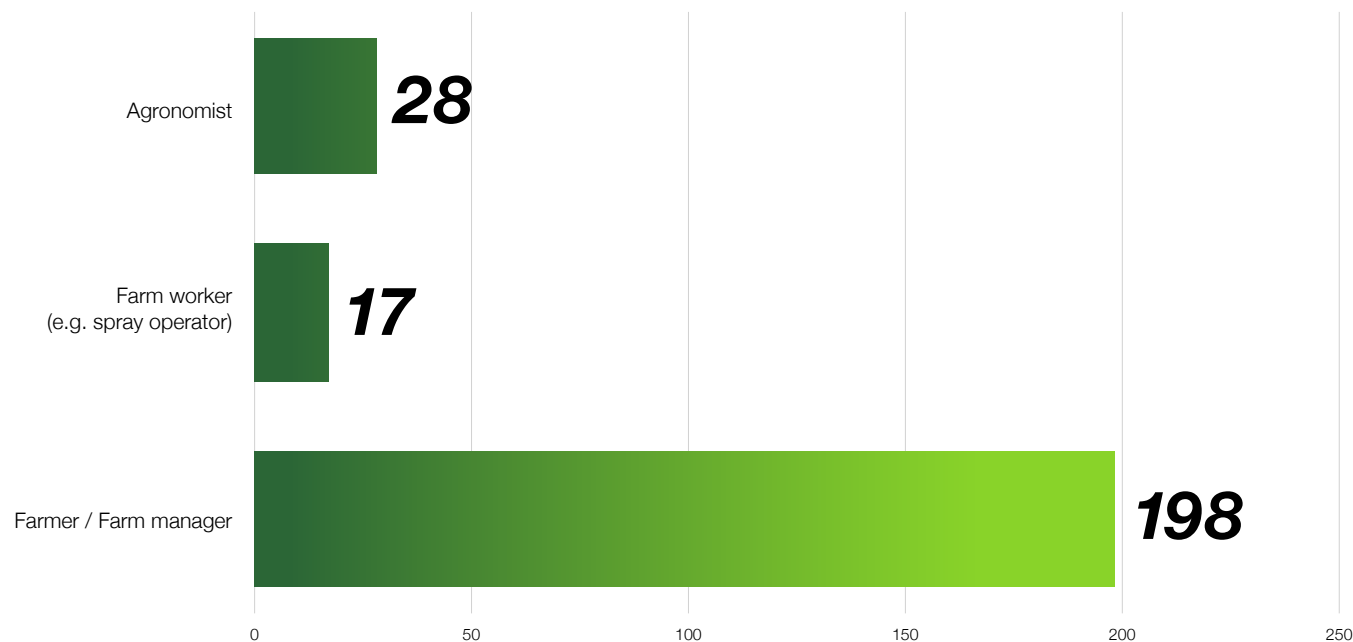
This document gives the results from the survey and some initial commentary. More detailed information on key knowledge gaps identified by the survey will follow in the coming months from Bayer experts and from the wider industry.

Read on to learn more about what the survey has found out.

1

243 people completed the survey, most were farmers and farm managers, but a smaller number of agronomists and farm workers also contributed.

What is your role on farm?



2

In question 2, we asked which weeds are the most challenging to control. Respondents could select up to three options.

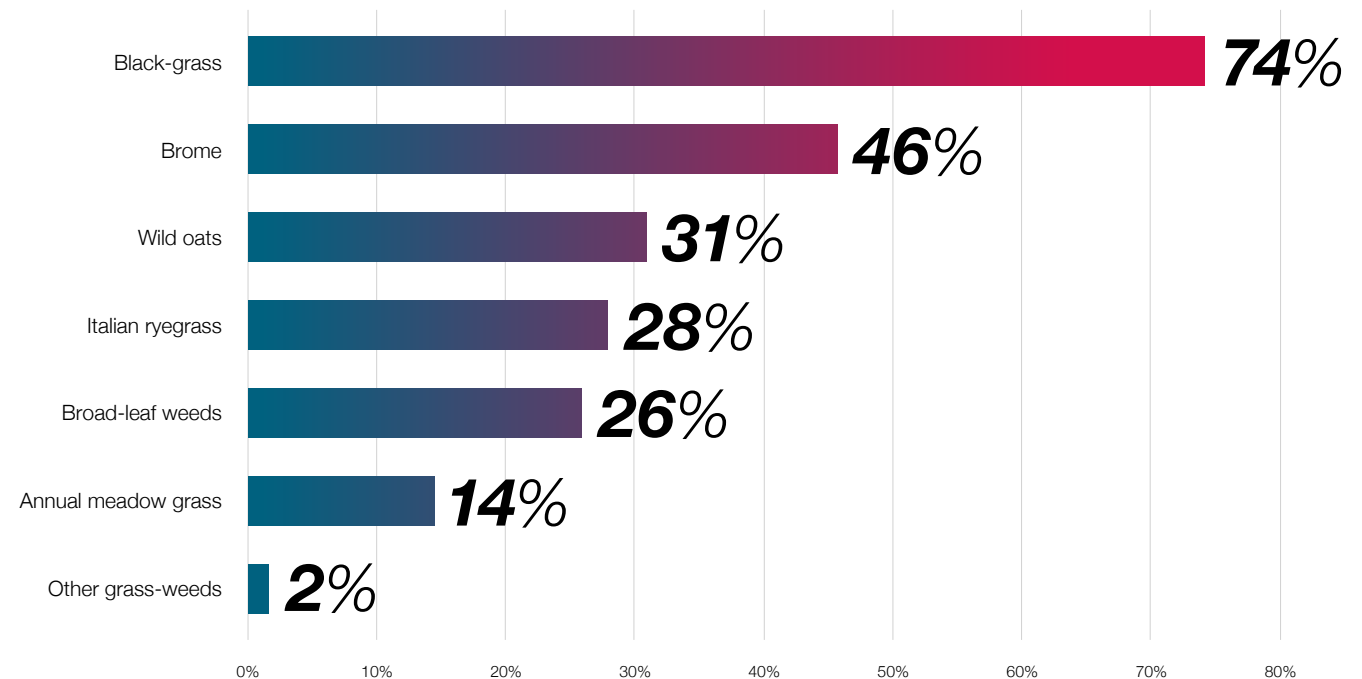
Black-grass took the top spot as the most problematic weed with **74%** reporting it as a challenge to control. The results for the next three weeds may come as a surprise. Although **Italian ryegrass** is a common second to black-grass when discussing problematic weeds, this survey found that only **28%** ranked it in their top three most challenging weeds, with both **wild oats (31%)** and **brome (48%)** ranking as more challenging.

Just behind Italian ryegrass, **26%** of respondents reported **broad-leaf weeds** as challenging to control. Cleavers, Groundsel, Cranesbill and Mayweed were the most commonly reported problem broad-leaf weeds. For other grass-weeds, three people said Rat's-tail Fescue (*Vulpia*) is a problem and one for *Poa Pratensis* (Smooth Stalked Meadow Grass).

Broad-leaf weed problems

Various broad-leaf weeds featured in participants challenging weed list, Cleavers, Cranesbill, Groundsel and Mayweeds were the four most common, but 20 other weeds were mentioned. With such a varied profile of weeds, understanding specific life cycles, and close scrutiny of herbicide labels, is essential to ensure broad-leaf and grass-weed control complement each other as far as possible.

Which weeds are challenging to control (% respondents)



Comment from Bayer's Tom Chilcott:

"This result was a bit of a surprise, but it most likely does reflect that Italian ryegrass is still confined to particular regions of the country, as shown by the [Ryegrass Survey in 2021](#). On the other hand, brome and wild oats are more common across the whole arable area, and according to these results are not as easy to control as we sometimes think."

2 continued

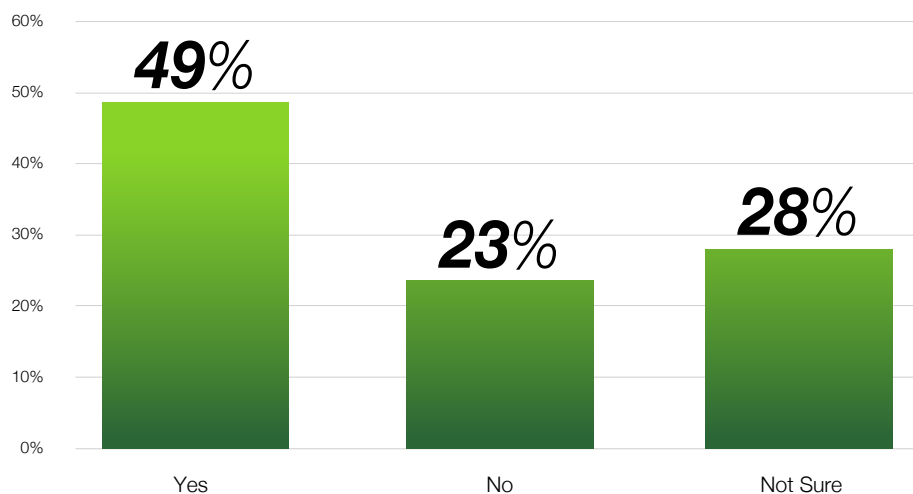
Problem broad-leaf weeds (the larger the text, the more people reported it as a problem)



3

Just under half of respondents think that their grass-weed control programme is working, a quarter don't think it is working and slightly more are not sure.

Is your grass weed control programme working?

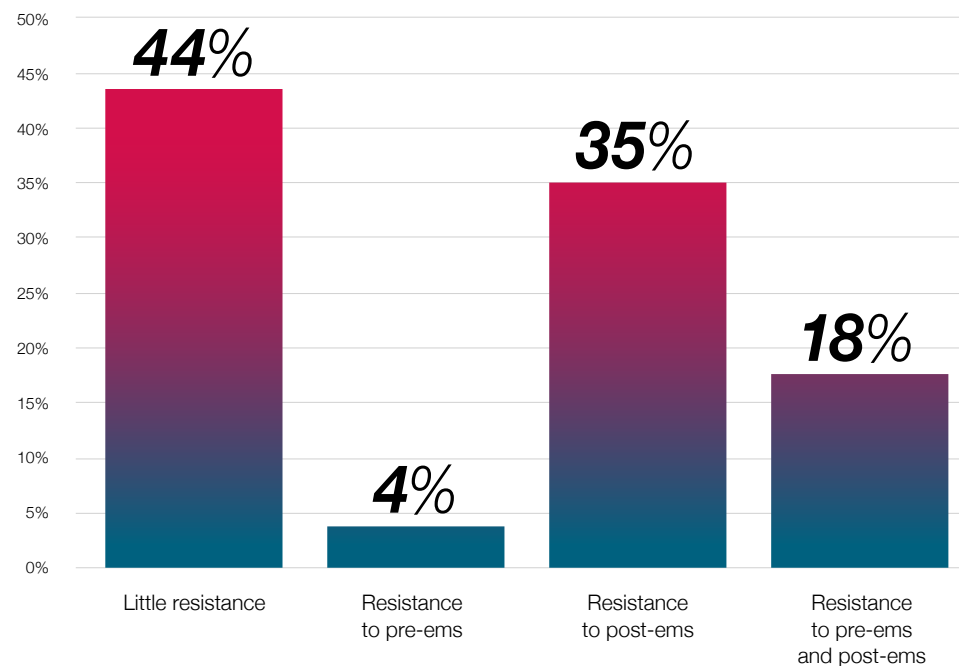


4

Over 55% of respondents reported some kind of resistance, predominantly to post-em chemistry, nevertheless, pre-em resistance was still reported. Research shows that ryegrass, particularly, can develop resistance to pre-em chemistry, including cross-resistance to several actives, although mixing actives can overcome this.

On the other hand, 44% of respondents reporting little resistance is pleasing to hear, but to this group, good information about resistance management is even more important. Farmers who have seen herbicide efficacy fall away are all too aware of the danger.

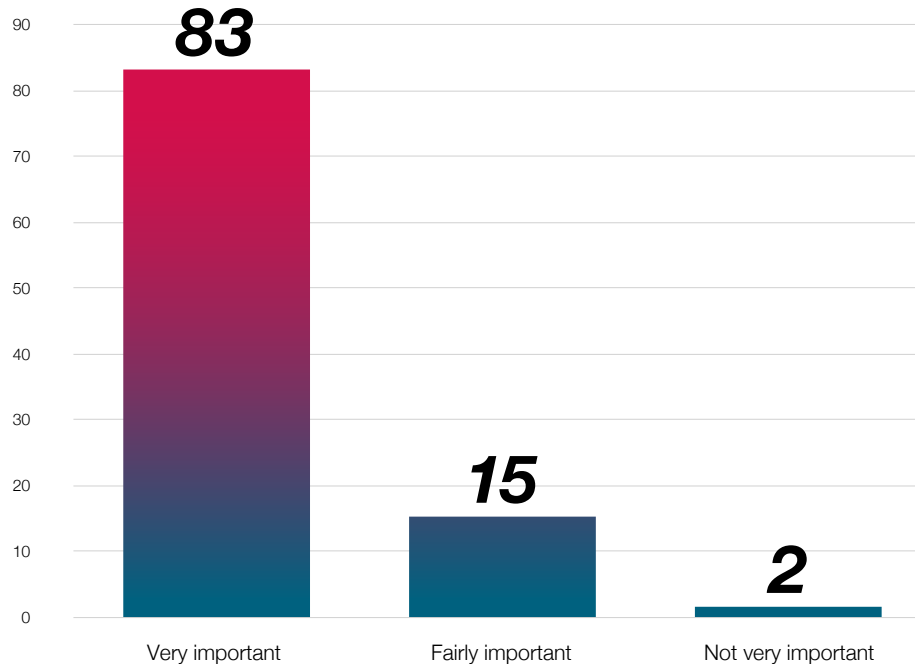
How would you describe the level of resistance on farm?



5

Resistance management is very important in agronomic decision making for most participants in the survey. This response is a positive answer and reinforces the good work farmers and agronomists have done over the past decade in fighting grass-weeds.

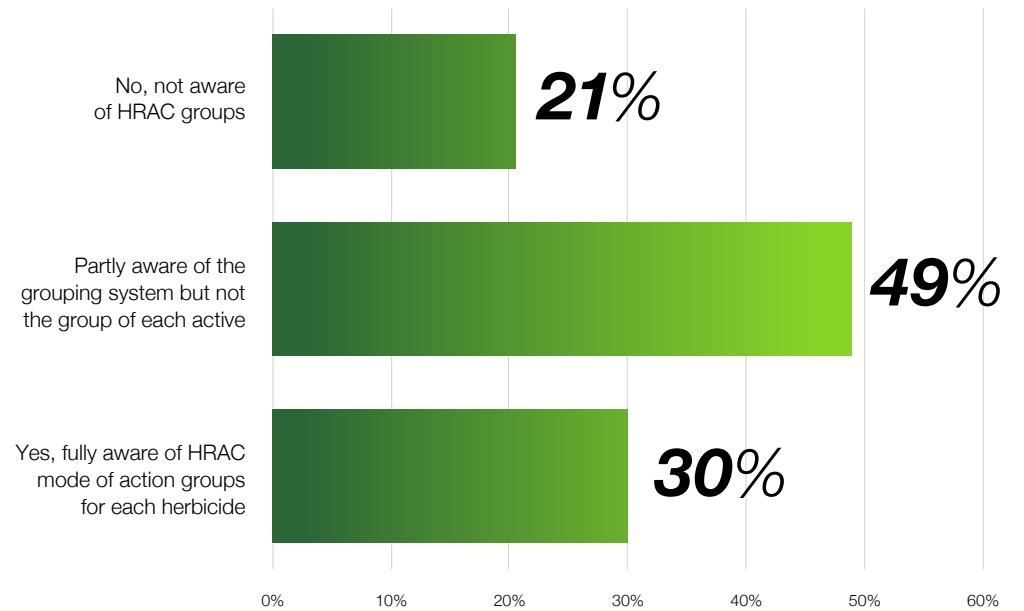
How important is resistance management to agronomy on farm?



6

Despite resistance management being highlighted as very important, the majority of respondents are only partly aware of the HRAC mode of action groups for each active, with **only 30% fully aware**.

Are you aware of which actives are in which HRAC Mode of Action Groups?



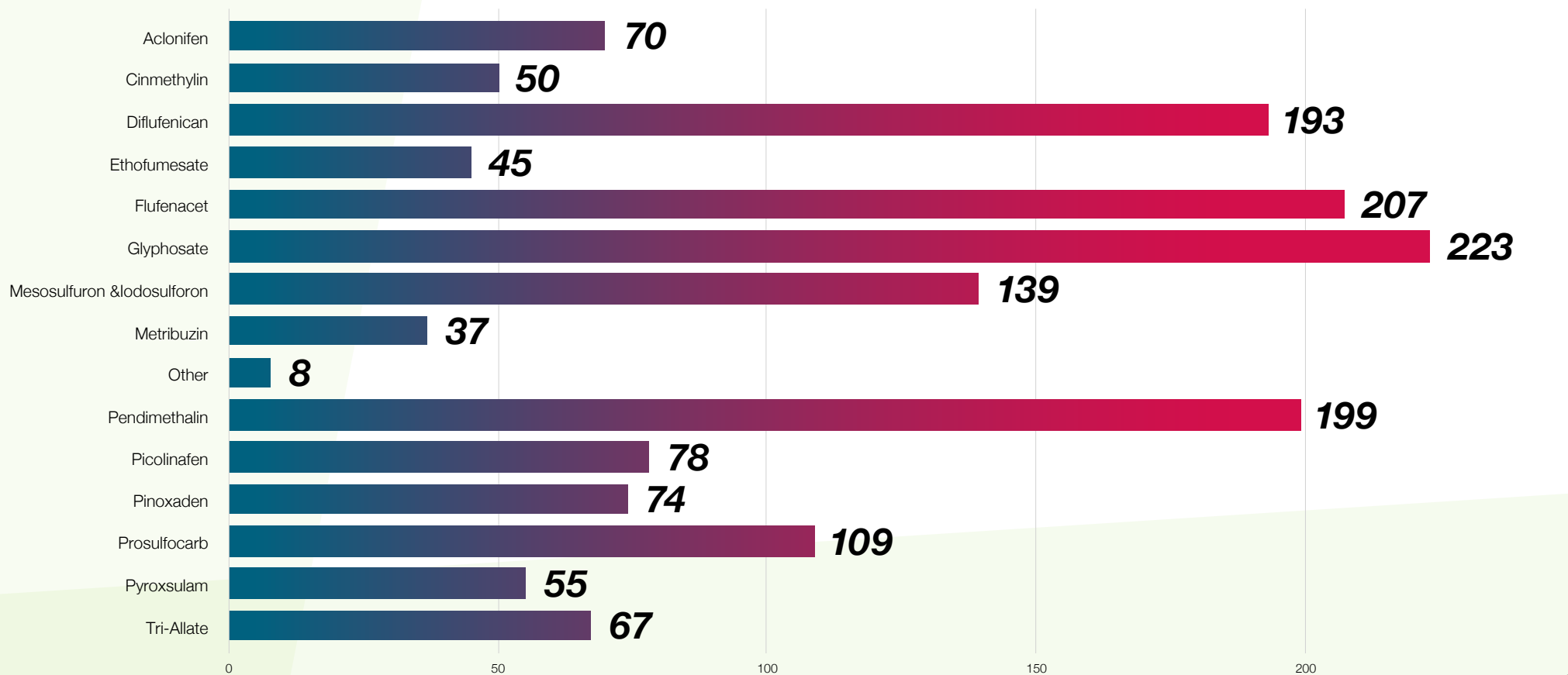
7

By some margin glyphosate, flufenacet, pendimethalin and diflufenican were reported to be the most widely used actives, however, despite being new to the market, aclonifen and cinmethylin already have quite a high number of users. If this continues, it will be interesting to see how this list will change in 2–3 years' time. Nevertheless, smart use of older chemistry can still deliver excellent control, although probably

requiring a more diverse overall stack and suitable conditions to achieve it.

It is also worth noting that **over half of participants have used Atlantis-type chemistry** and nearly one third pinoxaden, even though the spring post-em timing is considered to have declined in importance as farmers shift weed control programmes to autumn.

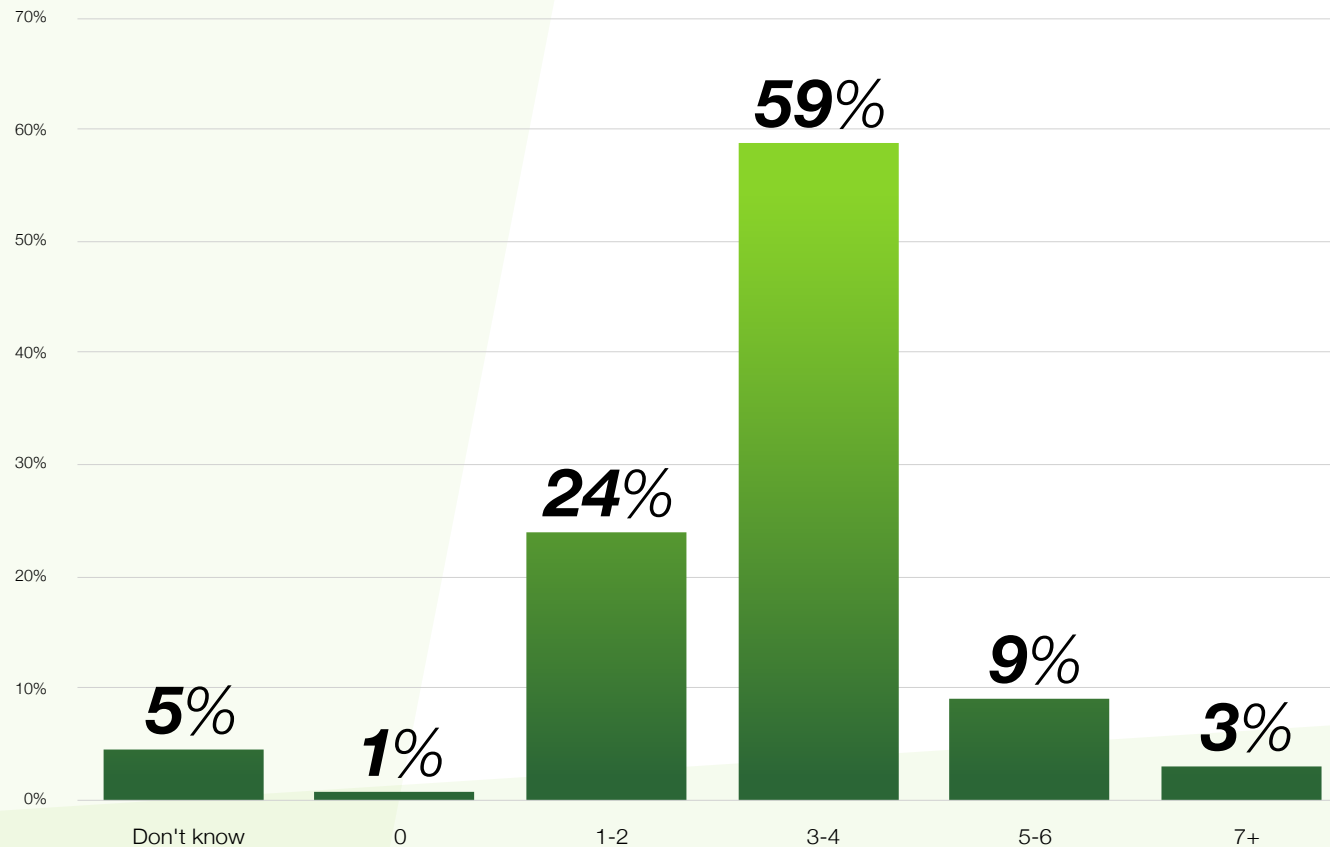
Which of the following actives have you used over the last 3 seasons? (number of users)



8

The **most common number of modes of action (MoA) used** in the programme (not including glyphosate) was **three to four**, with 58 respondents using a simpler programme containing one to two MoA. Relatively few people were using five or more actives despite available herbicides making it fairly straightforward to reach this number.

How many Modes of Action do you use in your typical wheat weed control programme (excluding glyphosate pre-drilling)?



Comment from Bayer's Tom Chilcott:

"I would've, perhaps, expected slightly more people to be using five MoA in the programme, taking into account that farmers may be doing a pre-em, a peri-em and a post-em. One of the reasons not, probably being that HRAC Group 15 chemistry (flufenacet, tri-allate, prosulfocarb and ethofumesate) is often used in the same programme which reduces MoA diversity. But it is worth saying that even diversifying actives within the same group is better than increasing the load of one herbicide.

"Cost, diminishing returns and fears over crop effects are likely to be other reasons why four MoA seems to be a plateau on many farms.

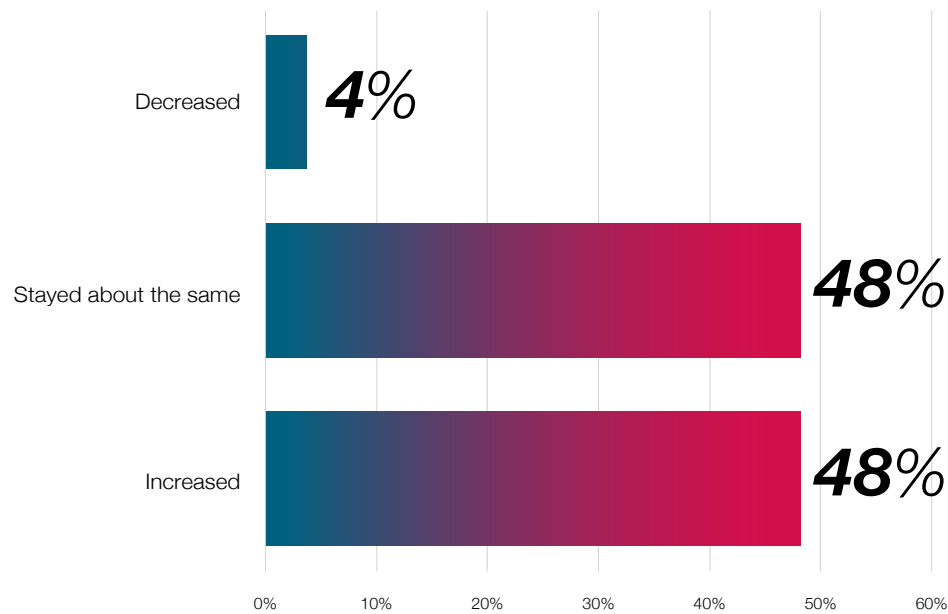
But four MoA coupled with appropriate cultural controls should be a very capable programme in most situations provided application timing and conditions are right."



9

Just under half of participants reported using more modes of action over the last five years. For the same number of farmers, usage has stayed the same and a small number report a decrease.

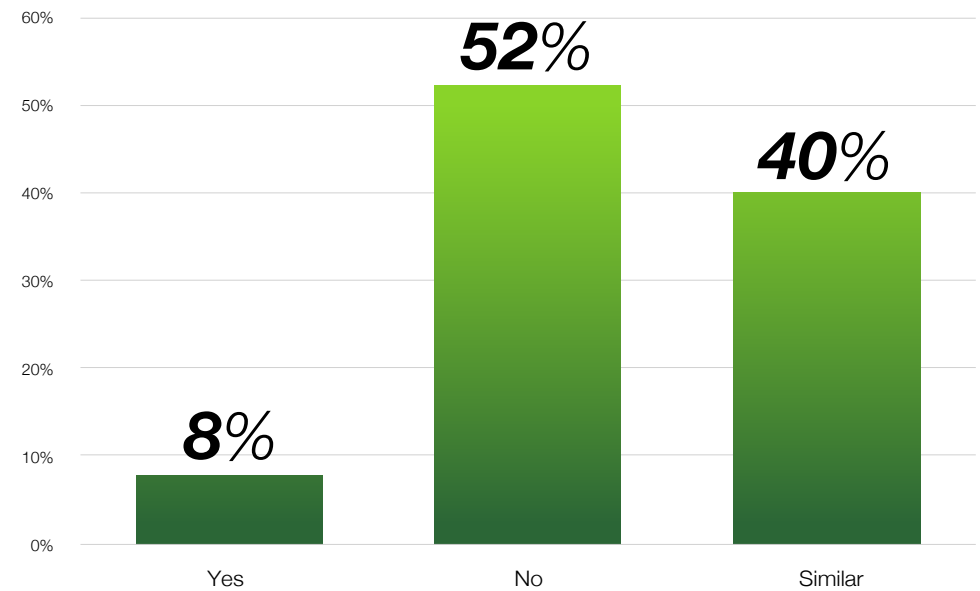
Over the last 5 years the number of modes of action used has:



10

Very few farmers are using the same programme each season, for most there is some variation which is undoubtedly a benefit for resistance management.

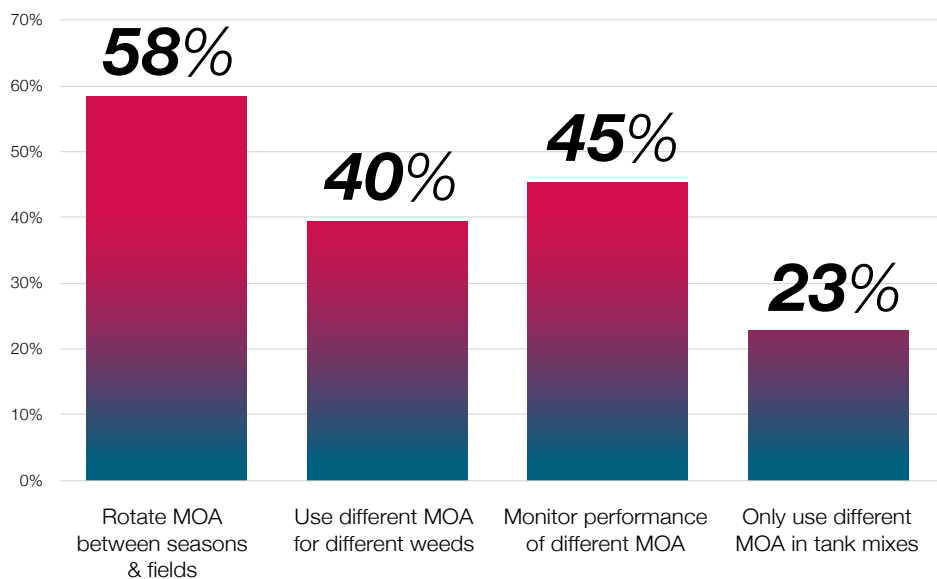
Do you use the same herbicide programme / tank mixes for cereal grass-weed control each season?



11

Every respondent was taking at least one of the steps listed in question 11 to protect MoA. Rotating MoA between seasons and/or fields was the most common step used with just under 60% reporting doing this.

Which steps are you taking to protect MoA?



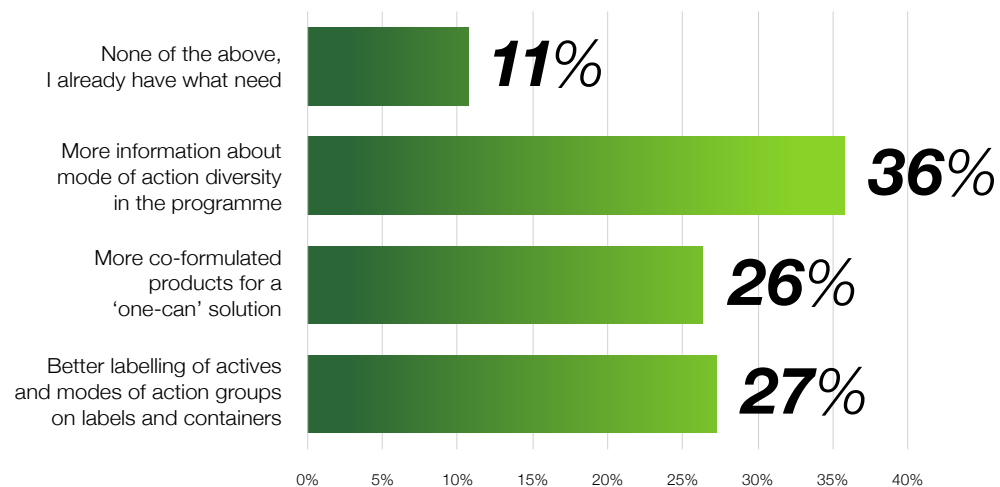
12

Most respondents believe there are things that can be done to help them improve planning and use of MoA on farm. A quarter prioritised better labelling, in fact, recent WRAG Guidelines now state all containers and labels should clearly display the HRAC Group.

The results of this survey mark the start of a campaign by Bayer to improve knowledge of MoA. The timeliness of this initiative is highlighted by the 36% of respondents who cited better information about MoA diversity as a priority.

A further quarter said that co-formulated products with multiple MoA would be the most helpful addition. Whilst true, registering co-formulated products particularly three-way mixes has become increasingly challenging due to the regulatory requirements. As seen with aclonifen and cinmethylin, new chemistry most frequently reaches the market as a straight with approval for co-forms not guaranteed. Just 11% of participants were happy that they already have what they need.

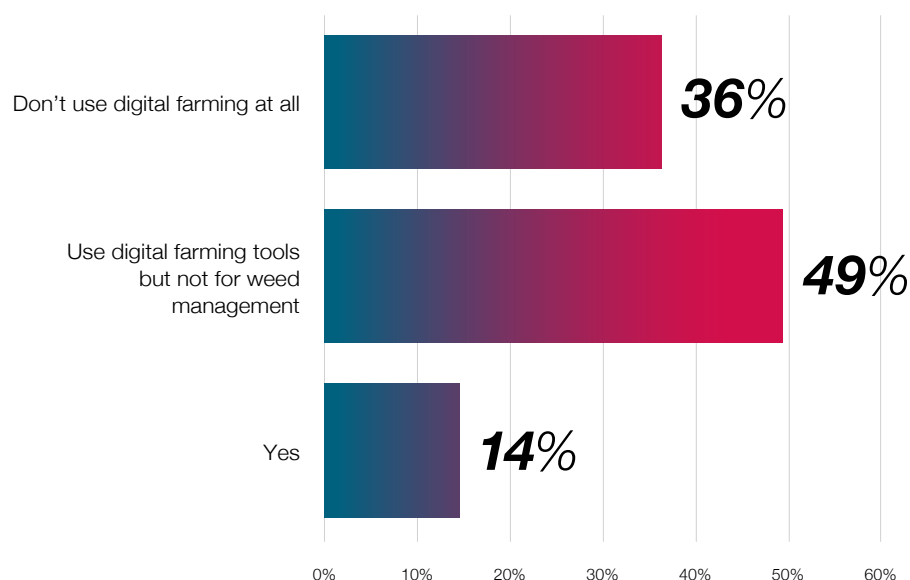
What would help you diversify the actives and modes of action you use on farm?



13

Responses show that digital farming tools are widely used but so far have had limited application to weed management, with only 14% using them for weed management on farm.

Do you use digital farming tools for weed management on farm?



Next Steps

The big question is how to turn this set of interesting results into something useful for weed management on farm. On reviewing the results and some of the comments people made when completing the survey, there seems to be a thirst for more in-depth knowledge about how chemistry behaves in the field so farmers and agronomists can be more discerning in their choice of herbicides.

Tailoring choices to specific weeds, soil conditions and the rotation is important to getting the most benefit out of the wide range of options available at pre and peri-em. Moving into the autumn, here are some of the key questions to consider when planning the programme.

- Does my crop rotation provide enough diversity in chemistry by default, or do I need to consider rotating actives as well?
- Am I choosing the best actives for the weed spectrum in question?
- Are there simple and cost neutral adjustments to the programme that could increase mode of action diversity?
- Have I considered how chemistry will interact with the specific conditions this autumn?

More information about these and other questions can be found at:

<https://cropscience.bayer.co.uk/weedmanagement>



Use plant protection products safely. Always read the label and product information before use. Pay attention to the risk indications and follow the safety precautions on the label.

For further information, including contact details, visit www.cropscience.bayer.co.uk or call 0808 1969522.

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