Resistance is not futile

Technical Managing Herbicide Resistance

Though the launch of Luximo may change the game for grassweed control, IPM will still be the core strategy in the battle against blackgrass. *CPM* explores the topic.

By Charlotte Cunningham

The chemical armoury has declined rapidly over the past ten years, leaving growers grappling for solutions — particularly against yield-robbing grassweeds like blackgrass.

As such, there’s been an increase in adoption of integrated pest management (IPM) strategies on farm — with growers trying everything from rotational ploughing to spring cropping in a bid to wage a war on blackgrass.

However, most agree there was a collective sigh of relief when BASF announced a new mode of action was on the horizon within its specialist grassweed herbicide, Luximo (cinmethylin).

But that’s not to say everything that’s been learnt about controlling grassweeds should be forgotten, says Steve Dennis, BASF’s head of business development.

“As much as Luximo will, subject to approval, usher in a new dawn for weed control, that doesn’t mean we should forget everything we’ve learned over the past decade about the role cultural and non-chemical controls have to play in sustainably reducing weed burdens. No product, no matter how good, will ever be the total solution for grassweed control.

“Delayed drilling, thinking about rotations, spring cropping and rotational ploughing are all examples of IPM strategies that can all have a significant impact on weed burdens.”

Weeds in arable rotations

Research scientist Dr Sarah Cook, and her colleagues at ADAS, have spent many years researching and understanding the biology behind weeds, leading her to be one of the key figures behind AHDB’s ‘Managing weeds in the arable rotation guide’.

While Sarah says the launch of a new mode of action would be a good thing, growers shouldn’t rest on their laurels when it comes to weed control. “Not only is Luximo a new mode of action, but it’s also a pre-emergence herbicide so it would be an incredibly valuable addition to the chemical armoury.

“What’s more, with a lot of over-use of products like flufenacet over the years, Luximo would be a welcome ally in the battle against blackgrass.

“From a resistance perspective, because of the nature of the mode of action group it’s in and how it works, Luximo is less susceptible to the development of resistance than products like Atlantis (mesosulfuron+ iodosulfuron), for example. This is another really important positive for the industry.”

That said, and even with a product as potentially powerful as Luximo, herbicides should still be the last line of defence, stresses Sarah.

However, this is something BASF has built into the strategy with Luximo right from the start, she points out. “Ever since we saw Luximo in trials in the early days, BASF has always and only supported it as part of an IPM strategy — not just another product, or ‘the cavalry’ coming to rescue weed-stricken growers.”

Over the past three years BASF has run its ‘Battling Blackgrass Together’ campaign and now its ‘Strong Against Weeds Together’ campaign to share knowledge in the industry about holistic weed control strategies, explains Steve. “This is particularly important when considering the prominent levels of resistance to other herbicides currently found in the UK.

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new chapter, but weeds are constantly evolving. A valuable tool today can gradually lose its efficacy if it's not used in conjunction with IPM strategies."

So how exactly can IPM be used to give growers the edge when it comes to grassweed control?

The old adage that less is more is certainly true of managing resistant blackgrass and ryegrass populations, explains Steve. "Every farmer who battles with resistance is well-versed in keeping weed populations to a minimum, knowing that this is at the heart of maintaining good levels of control.

"Whether the weed population is just beginning to show signs of resistance, or established as a severe problem, it's a numbers game," he says.

Effectively, it all comes down to getting as high a control of blackgrass as possible without increasing the frequency of the resistant plants, explains Steve. "There's an important point here though that's often misunderstood, and that's use of a herbicide does not create resistance — it selects for it.

"So if a herbicide is used where a significant percentage of the plants are tolerant to it, a lot of sensitive plants will be taken out leaving a higher proportion of resistant plants.

"In turn, this changes the profile of the blackgrass population."

In terms of yield, every seed that returns to the soil will multiply and further increase pressure within the seedbank — which will no doubt have penalties on yield, explains Stuart Kevis, business development manager at BASF. "A lot of research has been done on exactly how much this yield penalty is and it's widely accepted that each plant/m^2 can cost 1% of yield, so controlling every single plant possible really is critical."

It's widely understood that to prevent the blackgrass population from increasing, 97% of plants have to be controlled.

"It's essential from a profitability perspective to reduce the weed burden, but if we only remove the sensitive individuals, we allow the resistant individuals to grow without competition and have a huge seed return, creating an even bigger problem."

This is where IPM strategies should be brought in, like appropriate cultivations, stale seedbeds and delayed drilling, he adds. "Unlike chemistry, these cultural methods control resistant plants as well as herbicide tolerant plants and there are an entire range of things growers can do."

Keep it clean

"At the heart of good control is reducing seed return by maintaining a diligent 'keep it clean' approach — of yard, machinery, and fields. The reduction percentage of these controls can be variable, but we know from various independent research that the success rate can be very high," Stuart says.

But what happens if a grower is still left with a lot of weeds? This is where chemistry should then be considered, adds Stuart. "Just like chemistry isn't a silver bullet, while cultural controls are very good they are unlikely to provide 100% control. Bringing in an effective herbicide at this point will really help to nail down those last few percentage points to maximise overall control as much as possible and minimise potential yield losses."

At this stage, it's important to consider the risk factor of chemistry before making a decision on product, explains Steve. "Some products are at greater risk of losing their performance more completely and rapidly and we refer to this as 'high-risk chemistry'.

"Some active ingredients, like mesosulfuron, pyroxsulam, pinoxaden, fenoxaprop and iodosulfuron, tend to have an on-off target site resistance. If this chemistry is relied on, sensitive weeds will die giving resistant plants the ability to tiller and shed huge quantities of resistant seed."

In contrast, lower resistance risk herbicides include actives like pendimethalin, diflufenican, tri-allate, prosulfocarb, flufenacet, picolinafen and now, on the horizon, Luximo, he adds.

As pointed out earlier by Sarah, Steve explains that resistance to these types of herbicides is enhanced metabolic resistance (EMR) which develops much more slowly, reducing the risk factor. "As blackgrass reduces in sensitivity, control levels don't drop off rapidly.

"However, it's still important to incorporate and optimise IPM measures as these types of resistance mechanisms can work across different herbicides (cross-resistance). But at present, BASF isn't aware of any mechanisms of cross-resistance for Luximo to other herbicides."

Optimising IPM strategies will be a key part of maintaining and prolonging the longevity of Luximo, says Stuart Kevis.

That's not to say growers should take their foot off the gas, adds Stuart. "Sometimes when new chemistry has come along, growers have relaxed on IPM strategies, but our advice is not to do that — which means not going back to early drilling and reducing cultural control methods. These measures will be a key part of maintaining and prolonging the longevity of Luximo."

Steve adds: "I'm quite positive that the industry as a whole has made such good progress with culturally controlling grassweeds that this will now be engrained in practice for many, but going forward, it's about remembering this — even in a pressured workload scenario."

Having just gone through a rather pleasant autumn after two complete washouts, Stuart adds that this can sometimes be easier said than done. "Here we're thinking specifically about cultural methods like delayed drilling. If you've been implementing it and getting good results, hold your nerve and don't be tempted to drill early and undo all the hard work you've put in — even in a difficult situation."

Going forward, the evolution of technology may help growers become even better at IPM, reckons Stuart.

"Increasing accuracy of weather prediction technology is something I think a lot of growers would like to see. We've got such a difficult climate here in the UK and I think this could potentially be a critical tool for basing decisions on — such as when to drill," he says.

"Independent research really does show that IPM is so important for grassweed control, so even as a new era is on the horizon for chemical control, remember that it's important to do as much as you can before you open the can." ■