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Changing perspective on blackgrass control

Technical OSR herbicides

Could blackgrass in oilseed rape be managed differently to reduce the losses of propyzamide to water? Some work being conducted by Stephen Moss on behalf of water companies seems to suggest it's possible. CPM finds out more.

By Lucy de la Pasture

As autumn gradually creeps towards winter, oilseed rape growers will be keeping a keen eye on the temperature and ground conditions to catch the optimum window for propyzamide application. The stalwart OSR herbicide takes the last curtain call before the spring, with a tricky spot in terms of timing. The soil temperature ideally needs to be 10°C at a depth of 30cm, which typically occurs around 10 November when field conditions can be more difficult to travel.

But growers are being asked to consider drinking water supplies when propyzamide is applied because it's one of the pesticides of most concern to the water companies, explains Rebecca Carter of Anglian Water.

“When present in high amounts, propyzamide can overwhelm the water treatment work processes. Although propyzamide can be partially removed using conventional treatment processes, unlike metaldehyde, peaks in levels cause operational problems and the issue has been getting worse rather than better, in

spite of industry stewardship commitments,” she explains.

“The abstraction monitoring data shows a steadily increasing trend in propyzamide levels at river abstractions over the past six years. The average detection moved from 0.22 ug/l (2015) to 0.43 ug/L (2020) and the scale and number of peaks have increased over this time, according to Water UK data.

“Significant peaks, as occurred in 2017 and 2021, overwhelm available treatment capacity in the short-term and in the longer term pose a risk of contamination to reservoirs.”

Significant detections

The trouble with propyzamide is that it isn't just a problem that occurs in the window of use, which legally closes by 1 February according to statutory label requirements. “Propyzamide detections at abstractions between January and May 2020 showing a significant level of detections occurring beyond the commencement of the closed period,” comments Rebecca.

“1123 detections were recorded between 1 January and 30 April 2020 and, of these, 161 (15%) were above the 0.1ug/l legal drinking water standard for an individual pesticide. The majority of detections were after 1 February — 729 (65%) — of which 10% were over the 0.1ug/l limit.”

Despite a significant fall in OSR area over the past few years and stewardship measures already well established, the rising trend for propyzamide in water is a worry. In an effort to find a solution, Anglian Water and Affinity Water have been looking at ways growers could reduce their reliance on the herbicide for blackgrass control in field trials carried out by blackgrass expert, Dr Stephen Moss.

“The idea was to explore whether more reliance could be put on clethodim to help control blackgrass. This shift in strategy could enable growers to follow up later in the season with a reduced rate of propyzamide, if required, particularly at low grassweed populations or where there's a high risk of leaching,” he says.

The thought of using an ACCase inhibitor herbicide to control blackgrass may make some growers throw their hands up in horror because of the target site resistance long associated with this group of chemistry. But Stephen points out that clethodim is less affected than other herbicides with the same MoA and resistance develops at a slower rate, so it can still be used to improve the overall control of blackgrass.

“A worldwide research review considered clethodim to be the lowest resistance risk ACCase-inhibiting herbicide as it found only two of the 11 known target site mutations confer high resistance,” he says, adding that there is also no evidence that it's affected by enhanced metabolic resistance.

Stephen explains the project set out to get



Levels of propyzamide in drinking water has not been improving in spite of stewardship measures, explains Rebecca Carter.

Propyzamide trend 2014-2020



Source: Water UK, 2021

an idea of the levels of resistance to clethodim in the field and how it varied. The results confirmed that blackgrass resistance has much less effect on the field efficacy of clethodim than cycloxydim.

“There was a lot of variation in results between samples — from different farms and even fields on the same farm — which shows that resistance testing should be

carried out on a field-by-field basis. The good news is that, even where relatively high levels of resistance were found, the efficacy of clethodim in the field was still very good in the trials,” he says.

Once their resistance status was established, three OSR field trials were carried out to test 14 different herbicide treatments and the resulting blackgrass ▶

How does propyzamide move?

Propyzamide is strongly adsorbed in soil and not readily desorbed, explains Corteva’s Edward Bardsley, and adsorption increases as soil organic carbon content increases. “Because propyzamide isn’t readily mobile in soil because of its low water solubility and strong soil binding, the majority of chemical remains in the top 5cm soil.”

Even so, some is finding its way into water through surface run-off and subsurface field drainage.

“Heavy rainfall events can cause run-off by soil erosion with increased risk where there is soil compaction.

“Losses via field drainage is probably more important where soil structure allows a direct route from the surface to the field drainage system. Where applications to saturated ground are made and are followed by persistent rain, this keeps propyzamide in solution and allows water containing propyzamide to be drained off. But whether run-off or field drains pose



One of the pathways by which propyzamide gets into water is by surface movement due to soil erosion as seen in this field ‘catch pit’.

the biggest risk will be dependent on soil type, slope, etc,” he explains.

“The overland flow noted in Stephen Moss’s work has been seen by farmers and agronomists anecdotally, for example one of the trial host farmers showed Stephen where he had applied propyzamide and it had run into his grass buffer strip,” adds Becky.



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Field trials indicate there may be an opportunity to reduce the rate of propyzamide without compromising blackgrass control, when it follows a clethodim application, says Stephen Moss.

► control was assessed. Each treatment had four replicates in a randomised block design to minimise the effects of in-field variation.

“We found clethodim alone, applied in September/October, gave good control of blackgrass (75-87%) at all sites.”

The trial also investigated how much difference the additions of a water condition (X-Change) made to the efficacy of clethodim, which is generally considered to be affected by hard water — it’s common practice to recommend clethodim together with a water conditioning treatment.

“We found an average benefit of 10% (range 6-14% across the three sites) from using X-Change. Interestingly this was regardless of water hardness so it’s possible that acidification of the spray solution is more important in increasing clethodim efficacy,” suggests Stephen.

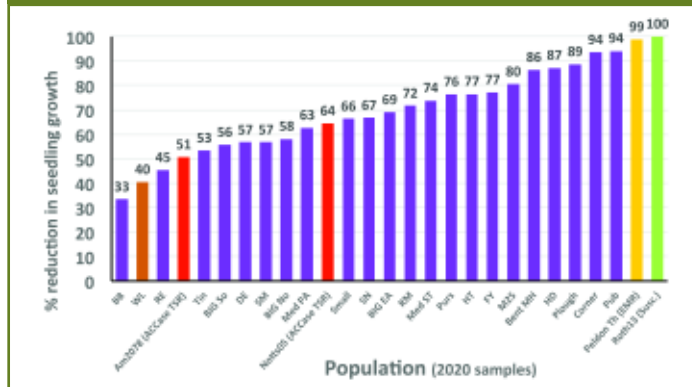
Propyzamide used alone was applied at 500g/ha, 750g/ha and 850g/ha (full label rate). It also substantially reduced blackgrass populations at both the Twyford and Loddington sites. The two herbicides used in sequence gave the most consistent control of blackgrass, but the trials indicate there may be an opportunity to reduce the rate of propyzamide without compromising blackgrass control, says Stephen.

“There was no evidence that the higher dose of propyzamide gave more benefit when used in sequence with clethodim. The lowest rate tested (500g/ha) gave similarly good control as 850g/ha at both sites.”

But what about the duration from control propyzamide if the rate is reduced? Stephen doesn’t believe this is an issue.

“Propyzamide is applied during November/December when the majority of blackgrass

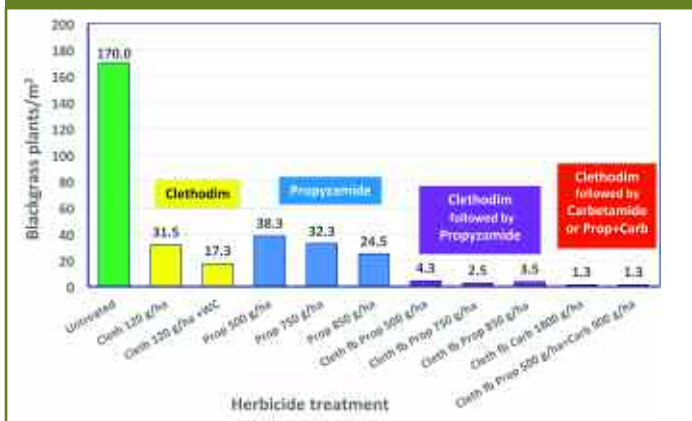
Sensitivity to clethodim



Clethodim was applied to different blackgrass populations in petri dishes at 1 ppm and the % reduction in blackgrass growth was assessed.

Source: Stephen Moss, 2021

Herbicide trial results



Twyford blackgrass populations (Feb/April 2021) after different herbicide approaches in OSR.

Source: Stephen Moss, 2021

Stewardship guidelines

Fields at high risk include those that have underdrainage or slope down to a watercourse. High-risk fields may also include those that have problem levels of blackgrass or other grassweeds that require a programme of herbicides to maintain control.

- Minimise soil and water movement by drilling across the slope or not putting in tramlines
- Use low ground pressure tyres
- Lift tramlines to reduce compaction
- Avoid high risk fields e.g. sloping fields with watercourses
- Consider infield grass buffer strips- good for beneficials and will help slow the flow across the field
- Retain surface trash

- Use companion cropping
- Consider CS options for wider buffer strips to protect water courses and where fields slope down to watercourses, buffer strips of 12-24m wide should be considered. Where fields include long, steep slopes, consider establishing fallow strips along the contours to reduce downhill flow
- Check if you are in a water safeguard zone by going to MAGIC maps. If you are, then speak to your local water company to see if they have any locally specific advice relating to propyzamide usage or are running any campaigns to reduce pesticide losses

What does Corteva say?

CPM asked Corteva whether there was trials information to support reduced rate propyzamide. A Corteva spokesperson said: “Kerb Flo 500 and AstroKerb are extremely important products for arable farmers with OSR in their rotation who have to manage grassweeds — especially blackgrass — and broadleaf weeds to protect yields.

“Label recommendations, including the maximum use rates and maximum number of applications on labels, for applying all crop protection products are achieved from a robust regulatory procedure and years of trials work under a wide range of conditions to ensure chemistry remains effective against the target species and safe to the environment and users.

“While recognising the vital role of research in this area, it’s important that findings are robust and backed up by numerous studies carried out in different locations, varying weather and across a range of soil types and conditions to meet regulatory standards.

“Growers already have flexibility on the label, which allows them to modify the rates of propyzamide applied appropriate to the grassweed population, species and resistance status. All growers, advisors and manufacturers have a responsibility to promote and use crop protection products appropriately to maintain efficacy, reduce the risk of resistance and the impact on the environment of these vital active ingredients.”

will have already come through. There was little evidence of late emergence in the trials where reduced rates of propyzamide had been used. The impact of reduced propyzamide rates on broadleaf weed control must not be ignored, but there are more alternative options now."

Stephen believes that applying a well-timed application of clethodim would allow growers to assess how well it has worked before any decision about propyzamide application has to be taken. "If it has worked well, and drone monitoring can be useful when assessing this, then you can start to look at reducing propyzamide rates — particularly in areas of the field which are at a high risk of leaching or where there's a low density of blackgrass."

One of the interesting observations made during the trial was that downward movement of propyzamide isn't the only way it can move into water. Stephen noted

overland flow was also at play.

"Some trial plots showed substantial lateral movement of propyzamide, either surface or sub-surface, due to a slightly sloping site. One trial was 'lost' because of this movement," he comments.

In light of these findings, what should growers do to help reduce the passage of propyzamide into water? Rebecca believes it's about doing everything possible to reduce both soil and water movement overland to reduce one of the pathways of propyzamide flow.

"These include using cultural controls as a first port of call — which means thinking about blackgrass control as part of a longer-term rotation, crop type, cultivations, mechanical chitting, stale seedbeds etc.

"Then make use of the full range of blackgrass chemistry available, making sure if propyzamide is used then it's at the right time, right place and right rate."



A reduced rate of 500g/ha propyzamide (on right) following an earlier application of clethodim gave good control of blackgrass in the Essendon trial compared with the untreated (left).

Rebecca also points out that any propyzamide product should only be applied once per season. She encourages farmers to reconsider using different propyzamide products in sequence, at rates which would result in exceeding the statutory maximum dose per season of 850g/ha.

Affinity Water are funding more field trials in 2021/22, says the company's agricultural advisor, Danny Coffey. "These will include a larger scale field trial to investigate whether the use of reduced rates of propyzamide can be upscaled and successful blackgrass control maintained.

It will also look at water quality and, eventually, this will help us assess whether this approach can be incentivised in target catchments.

"Some agronomists and farmers may not be keen on the idea of reducing rates of propyzamide. However, our field trial data suggests a targeted approach of reducing propyzamide dose rates in sensitive catchments could be one way of safeguarding drinking water supplies, maintaining effective blackgrass control and protecting the future use of propyzamide by applying it in a more sustainable way." ■

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