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Weed management

Seed return concerns

Following a year of high grassweed pressure backed by limited success in pre-em applications last autumn, it seems as though a higher than average seed return is on the cards for many. CPM investigates ways to get back on track.

By Janine Adamson

Not only did conditions last autumn cause havoc with drilling, but the relentless wet weather also hampered some growers’ ability to apply pre-emergence herbicides to regain control of proliferating grassweed populations.

And for those who did travel and apply chemistry, depending on drilling date, crops may have struggled, providing little competition in high blackgrass situations.

So in many instances, this makes for two back-to-back years of poor grassweed control, meaning there’ll be higher than average seed return entering the coming season, says weed expert, Will Smith.

Additionally, due to the adverse ground conditions last autumn, some remedial

cultivations could be required to rectify wheelings and restructure soils following waterlogging. However, this could also prove an opportunity to get back on-top of grassweeds at the same time, he continues. “If you’re having to do that, could this be the year to undertake a deep cultivation and resurrect the plough? If so, it’s worth ensuring it’s done properly to deliver a true inversion.

“It’s also key to monitor for persistent species such as wild oats and broadleaf weeds which may emerge as a result, particularly if the plough hasn’t been used for a while.”

Elongating the opportunity

Where fields are in good condition, there should be an opportunity to utilise the stale seedbed technique, comments Will. “Growers will have to look for ways to manage this season’s seed return to elongate the opportunity for weed control, particularly for blackgrass, and this starts with post-harvest management.”

But, how to approach this depends on weather conditions at the time of the operation, he warns. “Where you have dry conditions, the first step will be to do nothing – leave seed on the surface in the case of blackgrass and ryegrass, to maximise predation as well as natural decay prior to any cultivation.

“Conversely, if soils are damp, then cultivating can help to encourage germination of weeds and volunteers

but remember, these cultivations have to be at no more than 5cm depth to avoid bringing older seed to the surface. By reducing the impact of freshly shed seed, it’s hoped growers can enter next season at net seed-bank levels.”

Although Avadex (tri-allate) is a familiar product for many, this year could see it particularly prove its worth, adds Will. In his role as technical lead at Gowan, he says the company recognises it’s an additional product within programmes, but believe it can play a role in a ‘weed reset’.

“In high grassweed situations, we see an uplift of control across all species including brome, which is a benefit that other actives might not offer to the same degree.

“Particularly for those who did miss



According to Gowan’s weed expert Will Smith, remedial cultivations could also prove an opportunity to get back on-top of grassweeds at the same time.

their pre-em applications, Avadex is an effective broad-spectrum herbicide which could assist in catching up on previous years of poor control," suggests Will. "For those without an applicator or with wider constraints, the liquid formulation (Avadex Factor) is also effective."

Avadex advantages

Association of Independent Crop Consultants (AICC) member, Jonny James of CCC Agronomy, agrees that Avadex provides an uplift across key grassweed species. "This is particularly the case where Luximo (cinmethylin) is the starting block for a programme," he says.

"An added benefit of Avadex is that there are no known resistance issues, so it's a very solid option. For weed such as wild oats, where control is becoming increasingly variable, the additional spend could indeed prove worth it this year."

According to a joint research project undertaken by NIAB and Adama, achieving optimum blackgrass control is down to manipulating crop competition, irrespective of drilling date. In fact, upping seed rates can also help crops to bounce back from potential damage,

as a result of high herbicide use.

The work was instigated after technical specialist Dr Bill Lankford noted that despite growers using more robust autumn herbicide stacks, blackgrass control wasn't always as expected. Together with John Cussans, a winter wheat experiment was designed to understand the potential contributing factors using extremes of variables, in hope of pinpointing the sweet spot.

"The trial was based around variable seed rates and herbicide treatment regimes across two drilling dates (mid-September and late-October). The aim was to understand the relationship between these three variables and the resulting impact on grassweed control," explains Bill.

Seed rates varied from very low (75 seeds/m²) to very high (600 seeds/m²) and herbicide programmes were designed to reflect low through to high input (see table). At high herbicide input, Bill says although the aim is to achieve ultimate weed control, when all applied together, there could be resulting crop safety concerns.

"Such a highly loaded tank mix isn't something which manufacturers would endorse and best practice is to sequence,



Adama's Dr Bill Lankford instigated a grassweed trial with NIAB after noting that despite growers using more robust autumn herbicide stacks, blackgrass control isn't always as expected.

but we have to acknowledge that due to resistance issues in post-emergence herbicides, more active ingredients are being added into residual stacks.

"Equally, drilling later can reduce the opportunities to make repeated residual herbicide applications," he adds.

With the results now in, John says at the heart of the findings is the importance of competition – both weed versus

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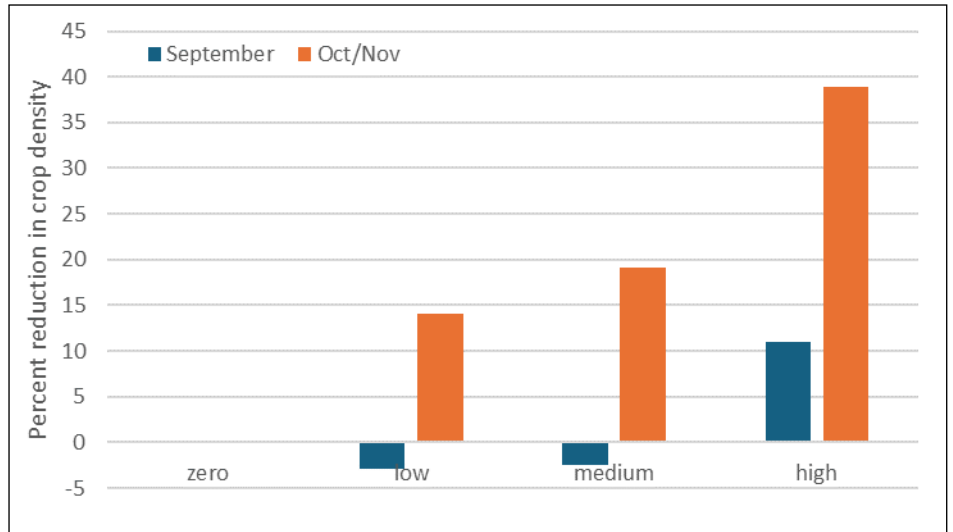


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It's well acknowledged that upping seed rates is a tactic against grassweeds, but what hasn't perhaps been understood is how it's compensating in two synergistic ways, says weed expert John Cussans.



Percentage reduction in crop density at different herbicide regimes for both an early and late drilled winter wheat crop. Source: NIAB/Adama 2024

► crop through seed rates and closing the gap on herbicide selectivity. "It's the underlying competition between the crop and the weed – what herbicides do is manipulate that by shifting it in the favour of the crop. Effective weed control is in fact an indirect result of reducing the weed size early doors," he explains. "But applying more and more herbicide doesn't always mean greater weed control and it can also have an impact on the crop, particularly sensitive species such as spring barley and

oats. Where herbicide begins to have a greater impact on crop suppressiveness than it's efficacy – reducing weed seedling numbers – the eventual effect of weed control is reduced. So it's asking whether you can overcome that knockback through increasing the seed rate," continues John. Furthermore, Bill says the trial results indeed reflect this hypotheses. "What we see, using aerial RGB 'human eye' imagery, is the impact on crop vigour from the high input herbicide treatment is compensated for when increasing the seed rate. In fact, at

600 seeds/m², there's little to no damage from any of the herbicide treatments." Subsequently, John says his advice will now be for growers and agronomists to be bolder with seed rates. "It's well acknowledged that upping seed rates is a tactic against grassweeds, but what hasn't perhaps been understood is how it's compensating in two synergistic ways. "You could be looking to add up to 150 seeds/m² more in a high blackgrass situation," he suggests. "Equally, at low seed rates, all herbicide regimes had an impact on crop vigour."

Seed predation research

Explorative research is taking place to understand the role of seed predation across different tillage systems in a bid to support the future of sustainable weed control. The work forms the basis of Jasper Kanomanyanga's PhD and is being undertaken in conjunction with NIAB, Syngenta and Lincoln University. The aim of the research is to understand the fate of weed seed on the soil surface in terms of germination rate, predation and persistency. This is particularly relevant as growers adjust management approaches to include spring cropping and reduce soil disturbance. Weed seed predation by insects, birds and small mammals is a natural process which can contribute to weed suppression, but, tillage practices can have a significant impact on its dynamics, says Jasper. "To understand this further, work has taken place to assess weed seed predation in blackgrass, wild oats and meadow brome across different sites and two seasons (autumn

and spring). This included using the seed card method to compare predation levels in conventionally tilled fields versus long-term no-till, plus differing herbicide use. "So far, we've found there are higher predation rates in the no-till compared with fields under conventional management. We've also observed higher predation in the spring season rather than the autumn, although results varied across species and sites," he explains. As a result, he believes no-till systems can promote sustainable weed control through an increase in natural predation rates, which for some might go against the grain. "It's important to capture the positives and negatives of a change in system – it could be argued there's been a trend towards concentrating on the negative impacts of no-till on weed control. "Instead, this research demonstrates that there are benefits to be had which can accumulate over time," suggests Jasper.



PhD researcher, Jasper Kanomanyanga, hopes to understand the fate of weed seed on the soil surface in terms of germination rate, predation and persistency.

"Furthermore, a move to spring cropping could also enhance seed predation as a part of conservation ag practices," he concludes.

Different herbicide regimes (all applications made at pre-emergence)

Untreated control	-
Low input	Diflufenican plus pendimethalin plus flufenacet
Medium input	Flufenacet+ diflufenican plus aclonifen plus prosulfocarb plus pendimethalin
High input	Tri-allate plus cinmethylin plus pendimethalin plus diflufenican plus prosulfocarb plus flufenacet

Weed seedling densities

As for drilling date, the trial also measured blackgrass seedling density at a high pressure site at Hinxton; counts were undertaken in December. Perhaps unsurprisingly, blackgrass populations were much higher at the earlier sowing date across all seed rates and herbicide treatments compared with 10 blackgrass seeds/m² or less in the later drilled plots (including untreated).

However, although blackgrass populations were lower at the later drilling date, the higher the herbicide input, the greater the reduction in crop density. Bill says this means despite drilling later being better from a starting point of weed pressure, if herbicide programmes can't be sequenced adequately due to a lack of opportunity, there'll be a considerable risk to crop safety.

"The trial indicates a

noticeable thinning impact as a result of all herbicide use at the later sowing date, reaching 40% at the highest input level," he says. "Therefore, drilling early and having a greater chance of sequencing and multiple applications, allows improved crop safety.

"From a practical perspective, this means that growers dealing with herbicide insensitive blackgrass could drill earlier than the end of October and still achieve good blackgrass control by focusing on reducing the seed-bank present at drilling and using different herbicide active ingredients in sequence, plus manipulating the seed rates."

The same can't be said for Italian ryegrass, stresses John, which was assessed at a site at Faversham. Due to inclement conditions during the trial period, while the weed seedling data from both drilling dates



During work conducted by NIAB and Adama, it was observed that although blackgrass populations were lower at a later drilling date, the higher the herbicide input, the greater the reduction in crop density.

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According to Jonny James of CCC Agronomy/AICC, it's important to balance the benefits of early drilling and the potential weed control gains against broader management challenges such as lodging and disease pressure.

could be reviewed, the later drilling date trial wasn't taken to maturity because of uneven establishment. Despite this, the relationship between drilling date and ryegrass control remains clear, adds John.

Bill agrees that with an increase in herbicide-resistant ryegrass populations, active ingredients continue to struggle to perform. "Drilling date is pivotal in combating this tough weed.

"With blackgrass, there's the flexibility to adjust and compensate which is a positive message, but herbicide insensitive ryegrass is just too difficult to control at an early drilling date. Growers won't see the return on investment from the inputs required."

To conclude, John adds there has to be an acknowledgement of how the weed seed-bank impacts the crop. "Historically, there's been a school of thought that it doesn't matter what the seed-bank level was, you'd achieve the required control from herbicides and all would be well.

"However, because this trial has illustrated the importance of manipulating crop competition, it's evident that the seed-bank population does have an impact. The real solution is to reduce that population in the first place," he says.

Reflecting on these findings from an agronomic perspective, Jonny says he's still reluctant to advocate early drilling when such a wide array of other factors are at play. "You have to balance the benefits of early drilling and the potential weed control gains against broader management challenges, whether that be lodging or disease pressure. As for upping seed rates, this

Liquid versus granule

Opinions can be split between whether to use Avadex Factor (tri-allate), the liquid formulation, or Avadex Excel, the granule version. While Avadex Factor can be tank mixed with most other pre-emergence herbicides, the higher loading of tri-allate in Avadex Excel has led many to stick with the granular application.

Reflecting on the performance in trials last season, Gowan technical lead, Will Smith, believes the performance of the two formulations is closer than previously believed. "It's pleasing that both Avadex Factor and Avadex Excel continue to deliver a significant benefit in weed control when used alongside other herbicide options as part of a grassweed control programme," says Will.

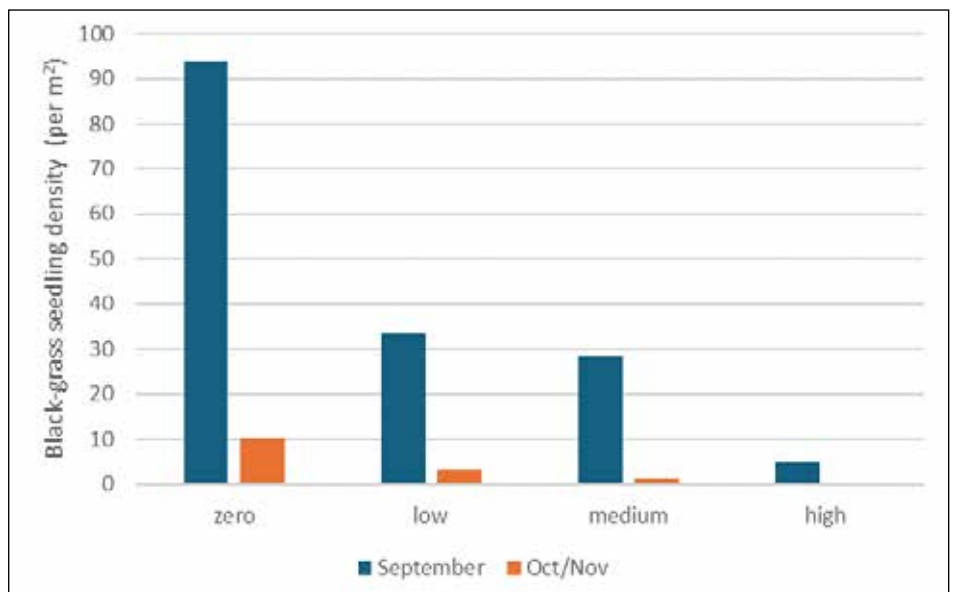
"This season we've observed that Avadex Factor is performing extremely well and, in some cases, even as well as Avadex Excel. This is a trend we've noticed during the past few seasons particularly when it's been wet at

drilling – our understanding is this is related to the formulation in these circumstances."

Will adds that overall, Avadex Excel tends to deliver better control across a range of situations. As such, he encourages growers who've invested in application equipment or have a good relationship with contractors who can deliver timely applications, to continue using Avadex Excel.

For those who don't have access to either of these, he explains that the positive results for Avadex Factor should provide confidence that grassweed control can be improved by including tri-allate in herbicide programmes. However, later drilling is where both products may sit alongside one another, says Will.

"It's very well drilling late, but programmes may look different in this situation. The weather may only allow one chance to apply herbicides. In this situation, Avadex Factor is a strong option for inclusion in a tank mix," he concludes.



Blackgrass seedling density at different herbicide regimes for both an early and late drilled winter wheat crop. Source: NIAB/Adama 2024

can have an impact on spec weights.

"There's also the issue of herbicide persistency and half-life – products don't have the same longevity when applied in dry conditions. This is especially pronounced in an active such as prosulfocarb (as in Defy) which is most effective in cooler, moister conditions," he adds.

And whereas grassweeds are usually the primary concern for most growers, Jonny highlights the increasing prevalence of

groundsel, poppies and other broadleaf weeds. "Populations of groundsel are certainly increasing but control using SU type herbicides is poor. This means there's an increasing pressure to maximise the potential of residual products.

"As a result, options such as Tower (pendimethalin+ diflufenican+ chlorotoluron) and Alternator Met (metribuzin+ flufenacet+ diflufenican) seem to be helping with the control of these weeds," he concludes. ■