



“Luximo’s efficacy is inherently stronger than flufenacet”  
– John Cussans.

# Hidden gem to market leader?

**Technical  
New chemistry**

**A promising new product with a new mode of action could be about to shake up the cereal herbicide market. CPM takes a first look.**

*By Mike Abram and Charles Abel*

**It’s not often something put aside and forgotten about decades ago could become a significant herbicide launch 40 years on. But that’s exactly what BASF’s new residual herbicide, currently awaiting approval, could be for grassweed control in cereals.**

Cinmethylin — the active branded as Luximo by BASF — was originally discovered in the late 1970s and intended for the North American market. But issues around production, particularly sourcing raw materials for making the active ingredient, meant it was never commercialised in that region, explains Stuart Kevis, BASF business development manager for cereal herbicides.

“But it was never screened for activity against blackgrass and ryegrass that first time round.”

Indeed, during the 1970s and 1980s, blackgrass wasn’t even the primary grassweed threat in the UK, with couch and wild oats big issues. It was also

a period when active ingredients like isoproturon were effectively controlling blackgrass, where it was present.

The global push in the 1990s and beyond for herbicides to be used within tolerant, genetically modified crops also put much less emphasis on developing new soil residual herbicide chemistry, says Stuart.

### Excellent efficacy

So it wasn’t until 2010 that Luximo was re-evaluated after a request from a BASF European lead technical manager. “We did a basic screening in the glasshouse and found excellent efficacy against blackgrass.”

A development programme was initiated and small plot trials were conducted in the key target countries, with the results remaining extremely positive.

The raw material sourcing issue which had derailed the production in North America was also solved, says Stuart. “We found a new, sustainable, renewable precursor that comes from pine trees and is a waste by-product in paper production. We further synthesise that into the material we need to make Luximo.”

Now just completing its second season of use in Australia, Great Britain could be the second market globally to have access to the product. If approval is granted, it would be the first new active to emerge from the GB post-Brexit registration process, which includes a full HSE environmental

and human safety assessment and public consultation.

Luximo has a completely new mode of action — classified by the Herbicide Resistance Action Committee (HRAC) as an inhibitor of fatty acid thioesterase (group 30). That’s distinct from group 15, the inhibitors of very long-chain fatty acid synthesis, which contains many other well-known residual herbicides, including flufenacet, triallate and prosulfocarb.

“It inhibits cell membrane production in the weed,” says Steve Dennis, head of business development for BASF. “That’s vital for cell integrity, so the weed just can’t grow.”



*Luximo will not be a replacement for good weed management, stresses NIAB’s John Cussans.*

## Comparison of Luximo and flufenacet pre-em on ryegrass



This ryegrass trial from autumn 2021 at Kirk Hammerton in Yorkshire shows flufenacet (left) side-by-side with Luximo (right), the difference being the better level of weed control from Luximo, says BASF.

In the field, root and shoot growth of sensitive plants is inhibited and often the weeds are never seen to emerge. Where plants do emerge, discolouration and yellowing of green leaf is seen, before the plant withers and dies as the plant starves.

BASF has requested approval for both pre- and early post-emergence use in

winter wheat, with target weeds including blackgrass, Italian ryegrass, perennial ryegrass, annual meadowgrass, loose silky-bent and poppy.

Stuart suggests Luximo would provide not just an alternative, but ultimately a replacement for flufenacet as the base of blackgrass and ryegrass control



Luximo was never screened against blackgrass or ryegrass when it was initially discovered in the 1970s.

programmes. "It is the active ingredient that will provide the greatest efficacy in your programme."

His confidence is based on 103 trials over four years, comparing pre-emergence flufenacet with Luximo, as solo applied actives against blackgrass. In 85% of the trials, Luximo was more effective.

The mean control from Luximo in those trials was 78% compared with 58% from flufenacet, with a much more consistent range of performance.

Stuart has witnessed the superior ▶

## The independent researcher's view

Luximo is set to be a "proper step-up" from flufenacet, but is not a substitute for good weed management, says John Cussans, NIAB weed biology expert.

"It's efficacy is inherently stronger than flufenacet. It does have a quite narrow spectrum — blackgrass and ryegrass. Brome control is very variable and BASF won't be seeking a claim for wild oats."

In trials where flufenacet plus partner was compared with Luximo plus the same partner, John says there is around a 10-15% improvement over flufenacet.

"It would be strong enough in a blackgrass or ryegrass situation that you would be able to substitute the 240g/ha of flufenacet at the base of a programme with Luximo. Then depending on the situation, I would start stacking other actives, perhaps including flufenacet.

"In the end what that programme would be, would come down to pricing. If approved, I expect Luximo would be priced at a premium to Crystal (flufenacet + pendimethalin) because of the better performance, so what you mix with it might be constrained by not wanting to spend much more than £100/ha on weed control in total."

It would not be a replacement for good weed management, he stresses. "It would be a step up from flufenacet, but all the other things we have been saying about grassweed management would still be true — drilling date, rotation, careful

planning of cultivations etc. If you are able to use Luximo, it wouldn't mean you could stop growing spring crops and go back to September-drilled wheats."

Against ryegrass, where flufenacet resistance has been identified in a small, but increasing number of populations, Luximo would have an advantage, he believes. No cross-resistance has been found, says John, and in trials Luximo has given better control of difficult ryegrass populations.

"Performance against ryegrass is probably even stronger than against blackgrass. We tend to do ryegrass trials in these problem populations, and the uplift against flufenacet is higher because the flufenacet is struggling."

There would be variability in performance, he stresses. "You have field trials where all pre-em herbicides struggle, and field trials where you get very high performance. Regardless, Luximo is consistently better, although the overall level of control will vary."

It wouldn't be transformative, perhaps in the way Atlantis was when first launched, but that's potentially a good thing for resistance management, he says. "It means you would have to use tank mixes/sequences/follow ups and as a result you would have lower selection pressure."

The attractiveness of returning to the bad old days of just using chemistry to control grassweeds would also be diminished, as wider

non-chemical control strategies would still be needed, he adds.

Also, crop safety always needs to be watched when stacking multiple actives, he warns. "If you were to substitute flufenacet for Luximo into some of the existing pre-em stacks, there could be an issue with crop safety — it is more on the edge."

If approved, part of adopting Luximo in practice may well be backing off on the total herbicide loading on some of the bigger stacks being used, he suggests. "Rather than adding the Luximo on top of existing programmes, you would look to see whether something could be dropped."

As with all soil residual herbicides, there is expected to be a familiar warning of seed being drilled into a fine, firm seedbed and covered with a minimum of 30mm of soil. Where direct drilling, and the slots are open exposing seed, it is expected it will be recommended to harrow to cover the seed before spraying.

"Crop safety is not black and white," says John. "You don't have a problem every time you apply, but there is less safety margin. Typically, if it occurs, it will be where growers are using massive stacks and there is poor seed coverage at drilling — then you may see thinning and discolouration of the crop."

Ensuring effective seed burial to separate the seed from the chemical, and avoiding applying before high rainfall events where the chemical may be washed down to the seed, will remain crucial for growers to avoid problems, he notes.



*Cultural controls will remain a vital part of the armoury when battling blackgrass.*

► performance of Luximo in numerous trials over the past four years. “If approved the active ingredient would provide growers with the greatest efficacy in a cereal grassweed herbicide programme,” he says.

Like most soil residual products, Stuart says the best efficacy would come from pre-emergence use, both of the crop and grassweed. “However, we have requested approval that would also allow use into early post-emergence, which can be important if we have autumns like recent ones, where conditions are very wet and you can’t follow the drill with the sprayer. It still works well and better than flufenacet at that timing, but you do see a drop off in overall performance, as with all residual



*The benefits of Luximo can be seen from the air. In this blackgrass trial in West Camel, Somerset, Luximo-based programmes (white box) were compared with flufenacet-based programmes (five rows of plots to the left of the white box).*

chemistry. The best place to use it would be pre-emergence.”

“We’re also finding a lot of interest in how it works against ryegrass,” says Steve. “It is taken as read that growers are excited about something new for blackgrass, as they are crying out for a new mode of action, but it is the same in ryegrass as well.”

Despite its notable performance, Stuart notes that if approved, growers would need to continue with integrated weed management programmes, and not use

Luximo as a solo product — something BASF would be expected to facilitate by only selling it in combination with another mode of action, such as pendimethalin.

“The need would remain for the cultural control techniques that growers have developed and used effectively, such as stale seedbeds and delayed drilling, spring cropping or grass leys.

“We wouldn’t want to see growers going back to try to drill wheat in early September — we’re not looking to shift current practices in that respect.”

## Case study 1: Ed Ford, Childerditch Farms, Brentwood, Essex

Essex grower Ed Ford has trialled Luximo on 2ha for the past two seasons, with the rest of the field receiving a farm standard pre-em herbicide.

Blackgrass is his main weed challenge, although ryegrass is starting to creep in. He has progressed from a place where 10 years ago he was regularly spraying off 40ha of wheat in March because of blackgrass. By using a combination of no-till, delayed drilling, spring cropping and robust residual herbicide programmes, it has allowed him to get the farm to a position where hand roguing can be used to remove any remaining grassweeds pre-harvest.

“Every year we are seeing less blackgrass, to the extent we’re now drilling earlier.”

That begins late September, with the aim of drilling 100-120ha a week over a month using a structured plan with fields prioritised. “When that week’s drilling is complete, we will stop — it’s not all go.”

A new 12m Horsch Avatar drill, which replaced a smaller Cross Slot a year ago, can drill 100ha in a day, helping the business expand by taking on a new 400ha block.

His usual pre-em of Crystal plus Hurricane (diflufenican) is backed up with Avadex (triallate)

granules and followed up with flufenacet plus diflufenican plus Defy (prosulfocarb). “That would normally see us clean [enough to hand rogue],” he says.

Approached a couple of seasons ago by BASF to join the firm’s Real Results Circle, he was given the opportunity to trial Luximo both in the current season and the previous one.

Last year’s trial was drilled late in the second week of November into less than perfect conditions, he says. “It was drilled with a tine drill, we couldn’t roll and didn’t get the Avadex on, which I think we underestimate.”

Luximo was applied with 0.1 l/ha of diflufenican and 2.5 l/ha of pendimethalin, to compare with the farm standard of Crystal plus Hurricane. No crop effects were seen with either, despite poor drilling conditions. “It’s important to have a good covering of soil.”

But it was easy to see the difference in blackgrass control from May onwards.

“I am confident we saw a 25% uplift in control from the Luximo area against blackgrass, but it’s not a silver bullet. There was still blackgrass left that needed roguing out.

“This year might be different as it was drilled



*Essex grower Ed Ford is confident he saw a 25% uplift in control from using the new herbicide.*

into perfect conditions, and we’ve also applied Avadex.”

When it is commercially available, he plans to use Luximo where ryegrass is creeping in, as the product is strong against that weed. How much more he uses will depend on price, and whether he thinks the likely premium is justifiable on the home farm where blackgrass is mostly under control.

Edward’s approach won’t necessarily be the same on the new block he’s just taken on, which has as bad a blackgrass problem as he has seen. “It’s lighter land though and we haven’t decided how we are going to tackle it yet.”

## Strong Against Weeds Together

Aiming to unite growers, agronomists, and industry experts in the fight against problematic weeds, such as blackgrass and ryegrass, BASF's 'Strong Against Weeds Together' campaign highlights success stories and learnings from the field, and provides practical weed control advice.

"With many growers having clearly adopted such a robust, integrated weed management approach over the years, we wanted to recognise and celebrate successes from the field, whilst also providing a platform for growers to hear from and engage with industry experts," explains campaign manager, Jane Kitchen.

The campaign is part of BASF's Real Results Circle initiative (see page 16), which focusses on

industry collaboration and community. "In recent years growers may have seen our 'Battling Black-grass Together' bus at our demo days, and just like 'Strong Against Weeds Together' is an evolution of this former campaign, we have of course also had to evolve our communication approach. With face-to-face interactions severely limited, we moved online to our Real Results Virtual Farm, hosting in-field webinar, 'Hardwick Live,' asking the community about their weed challenges and hopes for the future; and creating a virtual trials hub where growers can see Luximo in the field," says Jane.

The virtual trials hub can be accessed at [www.basfrealresultsfarm.com](http://www.basfrealresultsfarm.com).

Programmes would also remain key to herbicide efficacy. "While Luximo would improve the overall level of efficacy, it wouldn't do the job on its own, so you would still need a programme and to stack other herbicides.

"But if growers were to become more used to it, and where the pressure is lower, a robust pre-em programme might be all the herbicide you need in some situations."

If approval is granted, using Luximo in combination with other modes of action and in an integrated programme would also be key to minimising the development of herbicide resistance. As a new active substance with a novel mode of action, no selection pressure has so far been exerted, says Steve.

Greenhouse sensitivity testing on 196 blackgrass populations from across

Europe, including 77 which were classified as resistant to Atlantis (mesosulfuron + iodosulfuron), suggested there was no cross-resistance to Luximo. In these experiments, Luximo gave good control regardless of Atlantis resistance status, according to data submitted as part of the Luximo regulatory approval process.

Given the propensity of blackgrass to develop resistance, it would still be advised that the usual suite of resistance management strategies, such as maximising cultural controls, employing a diverse rotation of winter and spring crops, using different modes of action, and investigating reasons for poor control would need to be used.

"It's impossible to say a product isn't or won't be affected by enhanced metabolism," admits Steve. "It's such a complex



*Like most soil residual products the best efficacy will come from pre-emergence use, both of the crop and grassweed, says BASF's Stuart Kevis.*

world with a diverse set of resistance mechanisms. Those mechanisms might already be in a population even if the herbicide has never previously been used.

"But the blackgrass population has never been exposed to this mode of action, and so far, we haven't been able to detect any level of insensitivity."

The usual best practice advice around spraying within 48 hours of drilling would apply to Luximo, as would that around seedbed preparation and drilling. "There would be a minimum seed depth, the need for a consolidated seedbed, no big clods that will expose seed, and if you're direct drilling, to be aware to make sure slots are closed," says Stuart.

"It's all the same standard advice you see for other residual herbicides." ■

## Case study 2: Daniel King, Pasture Hill Farm, Bourne, Lincolnshire

Like many UK growers, Daniel King describes how high populations of blackgrass on his Lincolnshire farm 15 years ago have been turned around through shallower cultivations, delayed drilling, higher seed rates, vigorous varieties, spring cropping and pre-em herbicide stacks built around Crystal and Avadex.

"We still have an annoying amount of blackgrass, not a yield-sapping amount, which keeps topping up the seed bank. But we don't have any areas where we need to spray the crop off like we used to do."

His first trial comparing Luximo against his standard programme failed after the trial field flooded on multiple occasions over the winter.

This year's trial, in a field following winter oats where the blackgrass control was disappointing, will compare Luximo plus DFF plus pendimethalin, with Crystal plus Liberator. Both areas will also be

treated with Avadex, while there is a small area of untreated and some crop that's just been treated with Avadex alone, to understand what the stalwart herbicide is contributing, and the volume of blackgrass being dealt with.

As a development product, Luximo was easy to apply, he says. "It's odourless, which makes it nicer to use than Crystal. Crystal is also a bulky product, so there is much less to put in the tank with Luximo."

Having seen Luximo in other trials he's keen to use it when it is approved. "I'm expecting it to be more expensive, so it does need to perform better than my current standard.

"But I can't farm with blackgrass, so if it is better, I will definitely be using it."

He's hoping that it might allow him to drop Avadex, which needs a contractor to apply it. "It costs around £50/ha applied, so I'm hoping if



*Annoying amounts of blackgrass topping up the seed bank should be well controlled with Luximo, allowing adjustments to herbicide strategies, says Lincolnshire grower Daniel King.*

Luximo is good, and blackgrass levels remain the same, I'll be able to ditch Avadex in place of Luximo, used with a good, diverse range of partners."