Flexing new muscles

> *“There’s no active ingredient out there that blackgrass won’t develop resistance to if it’s wrongly used.”*

Blackgrass control

Battling blackgrass is a yearly struggle for many growers, but FMC has a new herbicide that could soon be joining the fight. *CPM* took a trip to FMC’s French research facility to get a first-hand look at Isoflex in trials.

By Melanie Jenkins

The fight between weeds, legislation and chemistry is one that rages on each year, but amid this battle ground is a company that firmly believes in enhancing the growth of the agricultural sector. And this isn’t just a belief for FMC, it’s the firm’s core purpose, at the heart of everything it does.

Visiting FMC’s European Research and Development Centre (ERDC) in Nambsheim – situated in the Alsace region of France a mere stone’s throw from the German border – in mid-May, it was apparent that the company is driven towards providing new and effective chemistry for its customers.

Coming up to its 140th birthday, FMC has only actually been based at its ERDC site since 2017 when it acquired DuPont’s crop protection portfolio. The area is highly suited to a research site as the majority of European crops can be cultivated there, with an abundance of quality land and a supportive local community with a wealth of scientific expertise.

Product development

FMC’s regional headquarters are based in Geneva and it has sites across Europe, the Middle East, Africa and in the USA. Globally, it’s best known for its successes with insecticides — which make up 61% of its revenue — and herbicides in Europe, which account for around 40% of its European sales.

Fungicides have proven to be a trickier nut to crack, with fewer available products than it has in its insecticide and herbicide arsenals, but FMC is working to improve its portfolio and it’s moving into the realms of molecular biology.

A tour of the facility during our visit showed just some of the lengths to which the company has to go to get a product to market. Comprising 95ha of land for field trials, as well as 37 growth chambers, 23 laboratories and three greenhouses, the site hosts multiple research techniques — from isolating a product’s efficacy against specific insects and avoiding unintended casualties, to testing spray coverage using UV light and identifying the impact of rainfall on products.

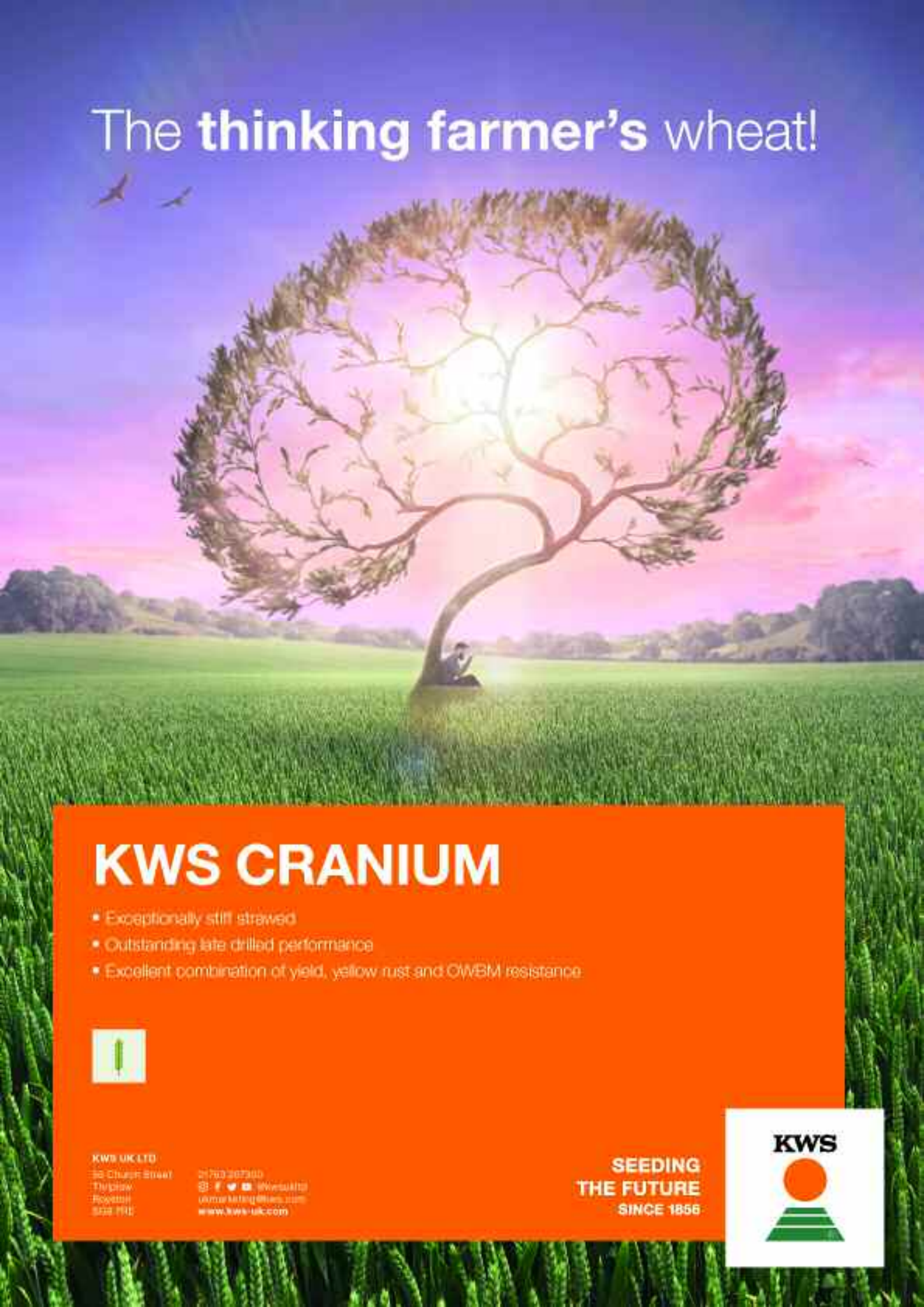
This all leads into the final stage of quality control. Thousands of hours of work go into research and development and millions of pounds in investment, and a product can get this far and still isn’t guaranteed to get authorised.

But with strained chemical efficacy and tightening regulations taking active ingredients off the market faster than new ones can be discovered, plus the need for weed control on farm more prevalent than it has ever been, FMC is aiming to produce the goods.

“It’s becoming more and more complicated for us to bring new active ingredients and formulations to market,” explains FMC vice president, Sebastian Pons. “This is the most difficult part of the process for us.”

But the firm is on the cusp of bringing not one, nor two, but three new modes of action to the market in the next few years. ▸

FMC has only been based at its ERDC site since 2017 when it acquired DuPont’s crop protection portfolio.


The thinking farmer's wheat!
KWS CRANIUM
• Exceptionally stiff strawed
• Outstanding late drilled performance
• Excellent combination of yield, yellow rust and OWBM resistance
KWS UK LTD
SEEDING
THE FUTURE
SINCE 1856
KWS

Getting new actives to the market is becoming increasingly complex and difficult, says Sebastian Pons.

▸ "It's been 30 years since the last new herbicidal mode of action for cereals was discovered and authorised within the company," says Sebastian. "We now have three new modes of action in the pipeline and two new biologicals coming in the next two-to-three years."

Beyond this, FMC has 11 new actives in development and 25 in the discovery pipeline. But the one closest to launch is a new herbicide that might finally help growers make some chemical headway against blackgrass, known as Isoflex active.

Isoflex is a new 2,4-dichloro form of isoxazolidinone found during the original discovery of clomazone. According to FMC, it has a unique mechanism of action that will be novel to many of the crops it's likely to be authorised for use on.

It provides both systemic and contact activity, with residual control and can be applied as a single dose pre-emergence and early post-emergence across a wide range of agronomic environments, says the company.

Isoflex potential

All going to plan, Isoflex should be available for use as a mix with a yet unnamed FMC product on a number of mainstay crops in the UK, including winter cereals, oilseed rape, maize, potatoes, sugar beet and other spring crops, pending registration.

When Isoflex has passed registration, growers will be pleased to hear it has shown to be as effective against key grassweeds and broadleaf weeds.

Based on FMC trials, Isoflex demonstrated good control over blackgrass and has good activity against Italian ryegrass, annual meadow grass, bromes, rats tail fescue, canary grass and cleavers, chickweed, speedwell, poppy, pansy, charlock, groundsel and shepherd's purse.

Isoflex's potential against blackgrass — should full approval be authorised — could have a significant impact for UK agriculture, as despite years of research and exploration into cultural control methods, it remains the single most economically important weed for farmers, according to Gareth Jones, UK technical lead at FMC. Based on research by ADAS and Rothamsted, FMC estimates that blackgrass causes losses of around £400M annually. "Resistance to old chemistry was identified as early as 1982 and then when stubble burning was banned, blackgrass became a really big issue."

FMC's ERDC site in France has 23 laboratories where different tests are carried out.

"So we're in a really exciting place," says Gareth. "It's hugely relevant to the UK and I've seen Isoflex in trials since at least 2016. It does depend on the trial, but I've seen comparable efficacy from Isoflex to other products on the market," he explains.

According to David Hennes of FMC, Isoflex and new BASF herbicide Luximo (cinmethylin) should be complementary to one another for use on blackgrass. "However, against ryegrass it should be better, but for sustainability growers will want other options. And though there are ▸

Isoflex in trials

A number of trials have been run at ERDC to look at the added value of Isoflex in the stack, with products such as Crystal (flufenacet+ pendimethalin), Liberator (flufenacet+ diflufenican), and other flufenacet mixtures. "We've looked at what benefit our product brings into that stack," explains Gareth.

The plots are split so that half is untreated (drilled at 300 seeds/m^2) and the other half shows the impact of Isoflex and other products. "This gives a visual direct comparison between the treated and untreated," he says.

"A trial of full rate pre-em applied Crystal at 4 l/ha, and 1 l/ha of flufenacet, showed some level of control, but not enough that growers would be happy with it. It was dry at application, which is a bit of a challenge for the residuals. And though it did give a reasonable level of control, it isn't enough for a commercial programme, so you'll want to put something else in."

A further trial looked at Crystal at 2 l/ha (again as a pre-em) — a rate FMC predicts could be the norm from a regulatory perspective in a few years' time. "There was significantly more blackgrass and more cleaver in this trial," says Gareth.

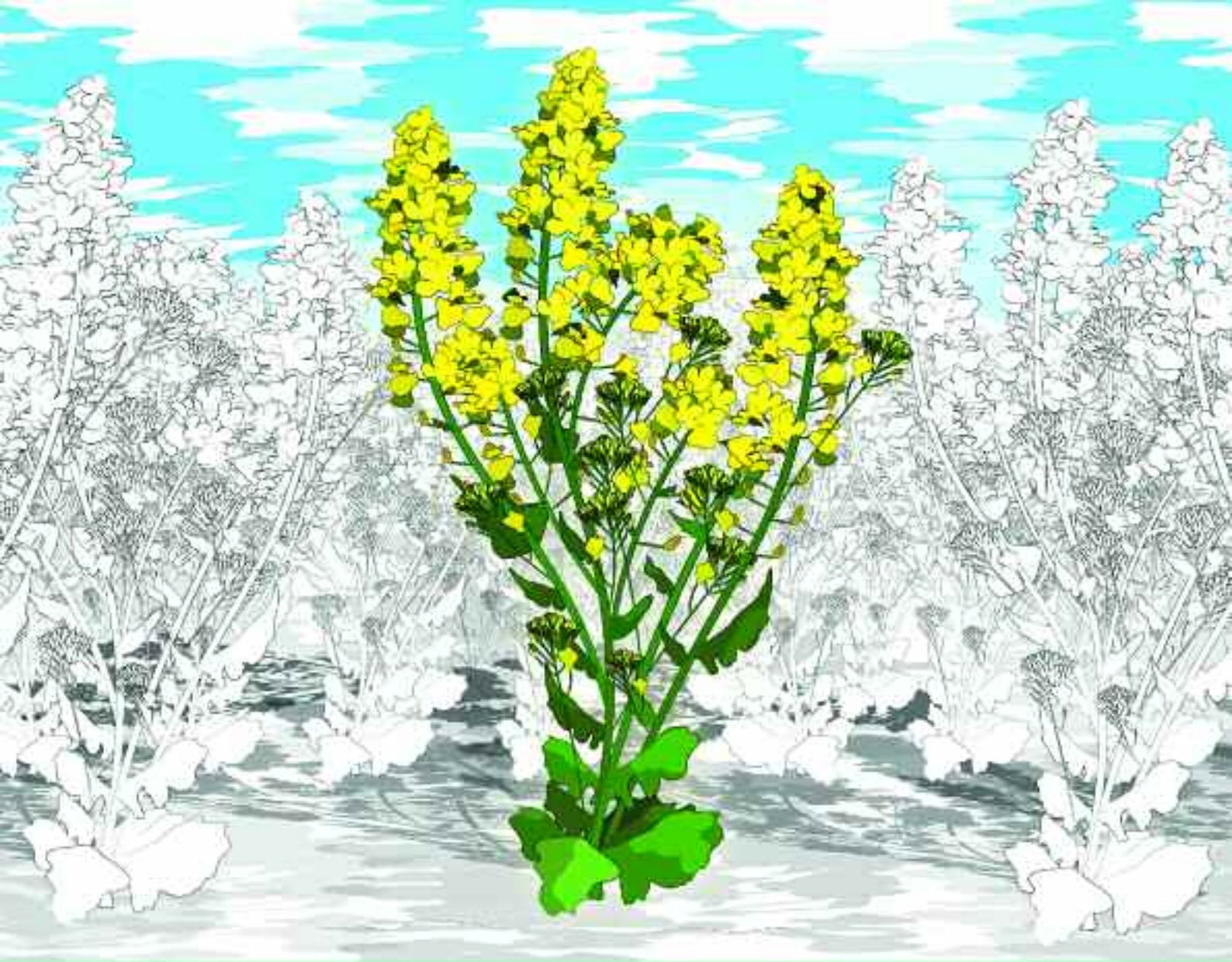
But in a third pre-em trial of Crystal — again at a rate of 2 l/ha — but with FMC's Isoflex product included, there was a visible benefit, he explains. "It's taken the poppies and the cleavers out. It's all about the additive effect and the different modes of action in the programme to get to the levels of control that we need to be seeing."

A final trail had the same products and rates as the third trial, but at the peri-emergence timing instead, says Gareth. "The trials of Isoflex I've seen over the years where it's been applied pre-em have shown a chunk of efficacy, and it tends to be pretty consistent. But if you then look at the peri-em timing — and you get the timing right relative to the weeds — you can see some great levels of efficacy. But if you apply it when weeds have gone beyond this, the efficacy drops off."

Peri-em applied Isoflex plus Crystal trial plot (left) compared with untreated (right).

FMC has also looked at Isoflex with and without adjuvants at the peri versus the pre-em. "Isoflex on its own, with an adjuvant at peri-em has taken out poppies and cleavers."

And further down the line, Gareth expects FMC to be able to provide percentages on Isoflex's efficacy against different weeds in different situations.



DUPLO – Stands out from the crowd

DUPLO – another Triple Layer flagship variety from DSV combining outstanding disease protection with top yields.

- Triple Layer protection against Turnip Yellows Virus (TuYV), pod shatter and RLM7+ resistance to phoma stem canker.
- Outstanding Autumn Vigour and strong establishment – ideal for reduced cultivation systems.
- High performance across the board with Gross Output (109% E/W), Seed Yield (107%) and Oil Content (46.8%).

Source: AHDB Candidate List 2021/22

DSV

Innovation for your growth

Phone 01295 757003
www.dsv-uk.co.uk

A UV light is used to demonstrate spray pattern and coverage.

▸ concerns about crop injury from residual chemistry, this isn't an issue with Isoflex," he says.

But growers should be aware that Isoflex is not a one-stop answer to blackgrass. "It won't be for individual use against blackgrass in the UK," says Gareth. "It should be used in a stack with existing products at the rates currently approved. And growers should be able to mix and match as suits them in terms of herbicide stacks, plus the more actives in a stack, the less chance of developing resistance.

"The pressures from blackgrass are so severe, no single product will do the job, which is why we've a stacked and sequenced approach," says Gareth. "It'll be a case of growers working out the best approach on their farm to try to get 98% control of blackgrass — the percentage needed to prevent the seed bank increasing."

And though growers still have use of flufenacet, pendimethalin, diflufenican and prosulfocarb, among others, the need to alternate and stack chemistry is a tool vocalised by agronomists up and down the country. According to FMC, future herbicide programmes could instead be based upon Isoflex active, cinmethylin, picolinafen and aclonifen and more.

"The fact that cinmethylin and Isoflex have come along now means we'll still have, I believe, enough tools to be able to control blackgrass effectively," adds Gareth.

The other good news, according to David Hennes of FMC, is that baseline work with Isoflex has shown no indication of any resistance to the chemistry from either blackgrass or ryegrass. "But, knowing blackgrass, it's vital to use good stewardship," he warns. "There's no active ingredient out there that blackgrass won't develop resistance to if it's wrongly used."

From trials conducted by FMC on Isoflex since 2018, Maxime Benichom of FMC advises targeting emergence for maximum efficacy, but does stress that there's a level of flexibility in the application window. "Isoflex should be used as part of an integrated weed management approach and in combination with other chemistry."

Unnamed partner

But the questions growers might be asking themselves are, what is the unnamed formulation product Isoflex will be in partnership with and will it cause registration issues? Well, at the moment this is still very much under wraps, but FMC is highly confident that it's extremely unlikely there will be any issues with the unnamed second formulation partner that would prevent Isoflex being available to growers come 2024.

So how does Isoflex work? According to David, it blocks the formation of isoprenoids — the precursors to carotenoid biosynthesis — essentially preventing effective photoprotection from the sun's rays. The loss of the protective function of carotenoids then causes bleaching symptoms of green areas in susceptible weeds.

The proposed HRAC classification group for Isoflex is 13/ legacy F4, and David states that there's currently only one other molecule in this group.

And though FMC is expecting a lot of change in terms of chemical controls in the EU — and potentially the UK — over the next few years, it hopes Isoflex will bring an additional value to what could well be lost from the rostra of chemical activity.

Gareth Jones feels that Isoflex could be a hugely relevant herbicide for UK growers.

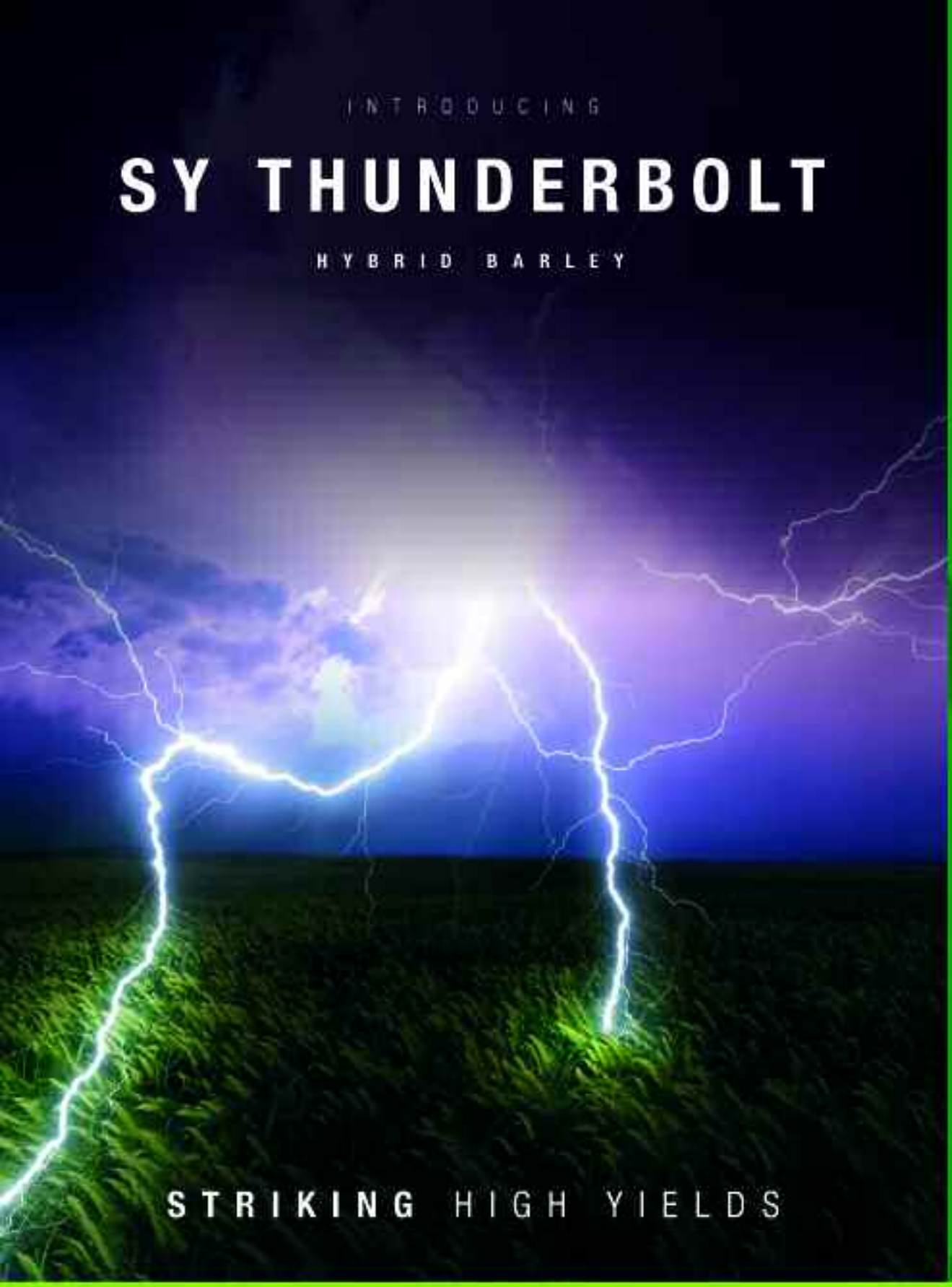
"We're expecting chemistry like pendimethalin and flufenacet to be restricted, in terms of the rates these can be applied at," says Gareth. "Though we're not sure about the extent of that restriction, the way we use those traditional, well-established products is going to change.

"So it's important to have products like Isoflex and Luximo to replace that chemistry in the stack, as the main blackgrass controlling element will have to come from somewhere, and we want to be part of that," he adds.

And Maxime is sure that Isoflex will get approval. "We don't have any concerns about the registration of the active. We expect UK registration of our formulation in the autumn of 2024, but this will likely be 2025/26 in the EU. And the World Health Organisation is aligned with the EU and so there are no major concerns there either."

"We hope Isoflex will become part of good resistance management," adds Maxime. ■

FMC has 11 new actives in development and 25 in the discovery pipeline.



SY Thunderbolt
Hyvido*

syngenta

Syngenta UK Ltd. Registered in England No. 849037,
CPC4 Capital Park, Fulbourn, Cambridge CB21 5XE.
Tel: +44 (0) 1223 883400 Technical Enquiries: +44 (0) 800 1696068
Email: customer.services@syngenta.com Website: www.syngenta.co.uk

AHDB
RECOMMENDED

Source: AHDB Recommended List. The full database can be consulted at www.cereals.ahdb.org.uk