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The jewel in the crown?

Potato agronomy

Closed transfer systems can improve both operator safety and efficiency of spraying operations. CPM speaks to two Herefordshire farms that have reaped the rewards when using Crown (maleic hydrazide) in their potato crops.

By Rob Jones and Lucy de la Pasture

Since the withdrawal of chlorpropham (CIPC), potato growers have had to adapt fast to maintain cost effective control of sprouting in store. Many now start their storage programmes in the field with a foliar application of maleic hydrazide (MH), a product that has been familiar to potato growers like Tom Powell for many years.

Based at Yazor, near Hereford, the farm produces some 900ha of arable crops, including winter wheat, oilseed rape, spring beans, winter barley and potatoes. Other enterprises, include cider apples for Thatcher's and a broiler unit.

Potatoes have long been part of the rotation, but his area has been scaled back in recent years largely due to the fierce competition for good land within the local area, and he now grows about 70ha of processing varieties, Royal and Innovator, for McCain.

Volunteer control

As Tom's trying to keep production within the farm's boundaries, MH has been used regularly for volunteer control over many seasons. His approach forms part of an integrated pest management (IPM) strategy by minimising potential sources of blight inoculum and reducing the propagation of soil pests and diseases in between potato crops — all of which helps to make the farm's potato enterprise more sustainable.

“We have widened the rotation to one in six and are only growing potatoes in fields that should have them, both from a topography and soil type point of view,” he explains.

“We've reached a happy medium, where it's comfortable for one harvester. That's particularly important in this area, which historically has produced maincrop varieties harvested in late September or early October under weather pressure.”

Tom has seen the benefit of MH for sprout control — previous veiled by the availability of CIPC — in the farm's

ambient bulk stores, which keep potatoes in good condition until January-March delivery. Royal is the first to go in January and over the past two seasons the variety has remained dormant until then, using just a well-timed application of liquid MH. The Innovator follow in February and March and the stores holding the HZPC variety have ethylene introduced using the Restrain system to maintain sprout control for the final weeks before loading out.

The sequence of MH then ethylene is working well too, with some of the Innovator going out the door in April this ▶



A closed transfer system has been added to Tom Powell's Agrifac Condor 5 sprayer and is used to transfer liquid maleic hydrazide from an IBC to the tank.

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We create chemistry



MH should be applied applying to an actively growing crop 3-5 weeks before haulm destruction, when the temperature is below 25°C and relative humidity is higher than 50%.

► year without any problems, says Tom. The only investment that's gone into the stores to make the approach work has been extractor fan systems to remove CO₂ and protect fry colours.



Craig Chisholm advocates Zorvec during rapid growth and again at stable canopy, with a max of four applications permitted.

Craig claims Corteva's oxathiapiprolin-based chemistry has been instrumental in meeting growers' needs to get a start clean. Two applications in the rapid growth phase, making use of both its curative and systemic activity, provide a clean base on which to build an effective programme, he says.

"Its ability to deliver robust protection for 10 days, versus the industry-standard seven, means that if weather prevents sprayers from travelling, or capacity restricts visits to more distant crops, they will still be protected. In addition, its curative properties also deliver kickback on any latent disease in the crop."

With up to four applications permitted on a potato crop, growers are advised to apply two applications of Zorvec early in the season and retain the other two for later in the season, as blight pressure demands.

"Your strategy for using Zorvec isn't going to change that much for 2022. It's still an insurance policy with late blight. We want the cleanest possible start to the programme and having good curative material, with systemic movement into new growth, is going to be of benefit during the rapid growth phase.

"But then retaining Zorvec for the stable canopy phase, so you have one to two sprays kept in reserve, certainly makes good sense," he concludes.

Planning is everything

As the 2022 maincrop begins to develop, potato growers are turning their attention to blight control programmes at a time when strains continue to evolve and the tools to control the disease are diminishing.

Last year, blight began to show itself during rain events in May, and by the time the rapid growth phase started in early June, Hutton Criteria was being met in most locations across the UK.

"We had an outbreak in the south and east, starting in Kent in mid-June," said Craig Chisholm, field technical manager for Corteva Agriscience. "Those conditions were met pretty much continuously through the season, though the focus tended to remain in the south and east where innoculum levels meant blight pressure was greatest."

Data from the James Hutton Institute reveals that strains of blight found in the UK continue to evolve, making for a particularly dynamic and challenging population. The 6_A1 strain continues to account for a significant portion of the population, although it's being steadily displaced by the more aggressive 36_A2.

The resilience of 37_A2 within the UK late blight population continues to cause concern because of its insensitivity to fluazinam and the

41_A2 strain, which has started to dominate the Nordic region, was discovered in one sample in Scotland, relatively late in the season.

"While not something to be unduly concerned about at this stage — it was a single sample in 2021 — it's another reason to maintain a tight spray interval and a robust programme in 2022," believes Craig.

Meanwhile, the chemistry available to growers remains limited as the number of active ingredients permitted to control late blight continues to dwindle, he adds. "Resistance to the phenylamines has been present within the UK blight population for some years now, resulting in their loss from UK programmes. Insensitivity to fluazinam restricts our options further."

Although dithiocarbamates are currently available, their future looks uncertain, says Craig. "Dithiocarbamates are no longer authorised for use in Europe but are currently still available to us in the UK. We want to make use of that for as long as we can."

Craig suggests growers make use of mancozeb while it's still permitted too, because it provides strong protectant activity against alternaria. He advises mixing it with Corteva's Option, a straight cymoxanil.

"When blight pressure is high, we've been mixing Option to give a bit more curative activity to protectant fungicides," he explains. "And there's a good argument to say that we should be mixing it in with single active products as part of an anti-resistance strategy."

Trials from 2021 reveal significantly better levels of blight control were achieved where Zorvec (oxathiapiprolin) was included at a 10-day interval rather than using an alternative spray at seven days, particularly where it was included at both rapid growth and stable canopy phases of the crop.

"Blight came in later in our trials, and there was lower infection during the rapid growth phase. In 2021 we saw a more pronounced benefit, in all trials, from retaining at least one or two applications of Zorvec for use during the stable canopy phase when late blight infection was at its highest."



Data from the James Hutton Institute reveals that strains of blight found in the UK continue to evolve, making for a particularly dynamic and challenging population.

"We were always late appliers of CIPC, and MH was allowing us to do that. Now we don't have CIPC, we're seeing the full benefit of MH and it's helping us control costs — Restrain is double the price. I think if we lost MH, it would be a bigger blow than losing CIPC for a medium-term storage operation like ours. It's the number one sprout suppressant option out there now," notes Tom.

Like with any crop input, there's a concerted effort to get application correct to achieve maximum uptake and subsequent efficacy, he says.

Guidelines include applying to a healthy, actively growing crop 3-5 weeks before haulm destruction. It should also be applied when temperature is below 25°C, and relative humidity is higher than 50%. Tom has also ensured that no rain is forecast for at least 24 hours, used high water volumes of up to 400 litres and angled nozzles for optimum coverage.

Last year, he added a closed transfer system (CTS) into the spraying operation to transfer liquid maleic hydrazide, Crown MH, into the farm's Agrifac Condor 5 from a 600-litre intermediate bulk container (IBC).

It proved to be an easy process to adapt the sprayer for use of the Wisdom System's Fastran 850, which delivers the chemical into the sprayer quickly. Tom says a major benefit has been much reduced handling for his staff, with the product moved to the fill up area with the telehandler rather than handling bags of granular product. "We also like the formulation, as it foams much less than



MH has historically been used to keep on top of volunteer potatoes but its contribution to sprout suppression in storage has become invaluable since the loss of CIPC.

granules," adds Tom.

Another fan of the non-foaming formulation is David Innes of FM Greens at Ditton Farm, near Ross-on-Wye, who operates the outfit's 36m 4000-litre Househam Harrier. The business manages about 1,400ha of crops, including wheat, barley, OSR, sugar beet, beans, beetroot and just over 300ha of potatoes.

The farm grows a mixture of chipping varieties, Innovator and Challenger, for Lamb Weston and crispers Brooke, Taurus, VR808, Lady Rosetta and Lady Claire, with some crop used to produce hand-cooked crisps for the Two Farmers brand.

Avoids foaming

In previous roles on other farms, David had been using granular formulations of MH and he says the biggest bugbear was foaming when filling. In many instances, he had to run the sprayer tank three quarters full to avoid either filling it right up and spilling dilute chemical on the ground or waiting for the foam to settle. "That meant doing at least a tank less a day," explains David.

The switch last season to Crown MH in IBCs with a Fastran 850 CTS eliminated the foaming problem and allowed him to realise the sprayer's full capacity. There's also the bonus of a much safer and more efficient filling process, with less lifting, ripping, and pouring of bags into the induction bowl, he says.

According to David, setting up the sprayer for the Fastran 850 is simple, with a three-way valve plumbed into the venturi on the farm's newest Househam sprayer before delivery. Calibration is straightforward, with Wisdom Systems providing a calibration factor chart for various products with different viscosities, he says.

"It's surprising how much time you can waste moving boxes and bags around. For other applications, it allows you to draw from an IBC while introducing additional products into the hopper.

"We've pushed for a lot more product in IBCs this year. Not just Crown MH, but Roundup (glyphosate), magnesium, and trace elements because the system is just that much easier and more efficient for the operator," says David.

He adds that he saves about 10 minutes every time he fills and reckons that if you were doing 10 loads in a day, it would be possible to squeeze another load in using the CTS and IBC combination.

Along with running two sprayers, this



At Ditton Farm, David Innes says the move to liquid MH and a Closed transfer system has eliminated the foaming problem seen with granules and allowed him to realise the sprayer's full capacity.

helps the business cover ground quickly when conditions are ideal for MH application and the sprout control results in the farm's 8000t of storage have been good.

In the first season using MH when CIPC was withdrawn, David says the farm's Lady Claire — a notoriously difficult variety to store — didn't require any in-store treatment using mint oil until March.

"In the past, I've seen crops of Lady Claire struggle to be held with CIPC, but we've been really impressed with how the MH has performed since we started using it. We've only applied two applications of mint oil to see the crop through until June this year, when lifting green top Lady Rosetta starts," explains David.

He adds that the Fastran 850 is relatively inexpensive, with Wisdom Systems quoting £595 plus VAT for the unit itself, which is supplied with a 3m hose. Customers then choose their own fixtures and fittings, depending on the sprayer.

David reckons it's worth the investment, as many growers are moving to liquid nutrient products like Nutrino Pro or Efficie-N28-t in cereals, which are also available in IBCs. "That's why we've bought a second system now for our Sands sprayer. It's so straightforward and takes a lot of mess out of the operation.

"We also like the reduction in packaging. We simply empty the containers and send them back for recycling or refilling. It would be good to see more manufacturers adopt a similar system with their product," adds David. ■