Timing is everything

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Roots
Potato agronomy

Foliar-applied maleic hydrazide is set to become an important foundation in potato sprout control programmes after the withdrawal of chlorpropham (CIPC). *CPM* seeks some expert advice on getting the most out of the active ingredient this season.

By Lucy de la Pasture and Rob Jones

Many growers will be using maleic hydrazide (MH) for sprout control for the first time this year and experienced users stress that planning ahead is critical to its success. Ensuring MH application hits the optimum timing, while climatic conditions at spraying are favourable, isn’t always easy to achieve in practice.

The 2020-21 storage period will be the first without CIPC as an in-store treatment for decades, so many will be entering unknown territory — particularly those storing processing crops long-term where temperature can’t be brought down to help control sprouting.

Norfolk-based independent potato storage expert Tim Kitson says that untreated crops going into store will be a worry without CIPC to get growers out of trouble.

Alternatives like ethylene, spearmint oil and the soon-to-be-approved DMN are all, to varying degrees, more expensive than CIPC on a per tonne basis according to AHDB figures, so inevitably storage costs will increase.

Volatility weakness

These compounds all have strengths and weaknesses too, with the main weakness common to all being volatility. So, without correct store management users may experience efficacy issues or require more frequent reapplication, particularly in the early stages of storage, he explains.

CIPC will be particularly missed where growers have large stores being loaded from multiple fields. In these situations, treatment with volatile compounds such as ethylene won’t start until everything is safely in the shed, explains Tim.

“If you experience poor lifting conditions and are delayed 10-14 days, the impact of not having been able to apply ethylene on those crops in the early stages of storage can be massive,” he explains.

To get around this, growers can fall back on an application of MH while the crop is still growing in the field to help suppress sprouting in those early storage stages until growers can use the more volatile in-store treatments in a controlled and cost-effective way, he suggests.

“We know products such as mint oil are expensive — perhaps four or five times the cost of CIPC — so if you can save one application early on, it can only be a good thing.”

Tim has been advising his packing and processing clients to use MH for a number of years, both for sprout suppression and a reduction in secondary growth, which can lead to storage issues such as jelly end rots. MH also reduces the viability of ▸

For best results from maleic hydrazide, timing and uptake are crucial to ‘stop’ small tubers and inhibit sprouting in store in larger ones.

Tim Kitson says growers will get the best results from maleic hydrazide when it's applied about five weeks before desiccation.

▸ undersize tubers lost at harvest, thereby reducing the number of potato volunteers through the rotation.

He has seen it do a fantastic job on both fronts, highlighted by a client's crop last year where MH application was disrupted halfway through.

See to a line

"You walked in the store and you could see to a line which had received an optimum application, and which hadn't. It showed how well the product works when it is applied correctly.

"People who have knocked MH in the past probably haven't applied it correctly and it's an expensive exercise when you get that wrong. For those switching to MH this year, it's all about timing," explains Tim.

This is something echoed by Certis Europe's Netherlands-based technical specialist Fokke Smit, who has been working with the active ingredient in trials and commercial settings since 2006.

He explains that because MH is a systemic plant growth regulator, it needs time to be absorbed by the leaves and translocated down though the plant and into the tubers, where it inhibits any further cell division.

"To allow time for this process to take ▸

Late blight kicks-off with a bang

A flurry of Hutton Period warnings in mid-June has served as the official start to the 2020 blight (*Phytopthora infestans*) campaign. Not that growers needed reminding that humidity favours disease sporulation, but it is perhaps a useful barometer for comparing seasons, says Eric Anderson, senior agronomist at Scottish Agronomy.

While 2020 may have been a relatively late start compared with some in recent years, the unsettled yet warm weather that's graced much of the country means pressure has intensified rapidly.

"Give it 10 days to two weeks and the consequences of this will be visible for all to see," says Eric, when asked to describe the disease pressure confronting crops.

"The considerable number of volunteers following last year's difficult end to harvest means there'll be a significant reservoir of infection from which disease can spread. Growers are aware of this, but it will make the challenge of keeping crops clean from the outset more difficult. There's also the need to steward the more effective products for use in future seasons," he adds.

The aggressiveness of 36_A2 means it's able to sporulate on leaves where levels of blight active ingredients would be effective against other blight strains.

Even though each season is always different to the last, a development that occurred in 2016 is still to be fully appreciated, believes Eric.

"The industry is now waking up to the aggressiveness of 36_A2 and what it means for crop protection. It accounted for almost 30% of GB samples sent for genotyping tests in 2019 and it's now established in the main potato growing areas of England, Scotland and Wales."

The factor that separates 36_A2 from the blight strains that came before is its aggressiveness. And it's this evolutionary advantage that explains its success, suggests Eric. The spread of earlier strains, such as 13_A2 (Blue 13) or 37_A2 (Dark Green 37) required growers and advisers to make changes based on a simple question that involved a yes or no answer, he explains.

"Life was so much easier when a blight strain demonstrated a level of resistance to a certain group of fungicides or a specific fungicide that meant their continued use was no longer worthwhile. 36_A2 deserves respect because it requires growers and advisers to make an informed judgement on product choice, mixing partner and application rate."

The specific issue Eric identifies is the level of aggressiveness seen in response to low doses of fungicides. The rates involved in the AHDB fungicide sensitivity testing are far below field rates but are a reminder of the need for robust resistance management.

"In short, products should no longer be applied at less than the full dose and nor should they be applied alone, but instead in a mix with a product belonging to another mode of action," he advises.

This observation is perhaps the single biggest development in crop protection since fluazinam resistance, says Eric. "The findings don't point to a failure of an active substance to control 36_A2 or any other strain of late blight under field

Eric Anderson believes blight sprays should be applied at full rates in mixture with an alternative mode of action to help combat new aggressive strains of blight.

situations, rather that the results should serve as a warning to growers and their advisers to take resistance management seriously to safeguard products for the future.

"It's vital that growers understand the results if crops are to be protected and products preserved for future use. 36_A2 can still develop at fungicide doses that could be relied on to control other genotypes. It also has greater sporulation capacity, combined with a shorter latent period between lifecycles. This means it spreads faster and is harder to control," he says.

"Propamocarb is arguably the best anti-sporulant product we have. As with cyazofamid, both need to be protected and their use carefully stewarded. Both should be applied with an effective mixing partner belonging to another mode of action.

"In the case of propamocarb, this is done for us with Infinito (fluopicolide+ propamocarb), but cyazofamid will need mixing with mancozeb or an alternative effective mode of action. Both should be applied at the full application rate," he adds.

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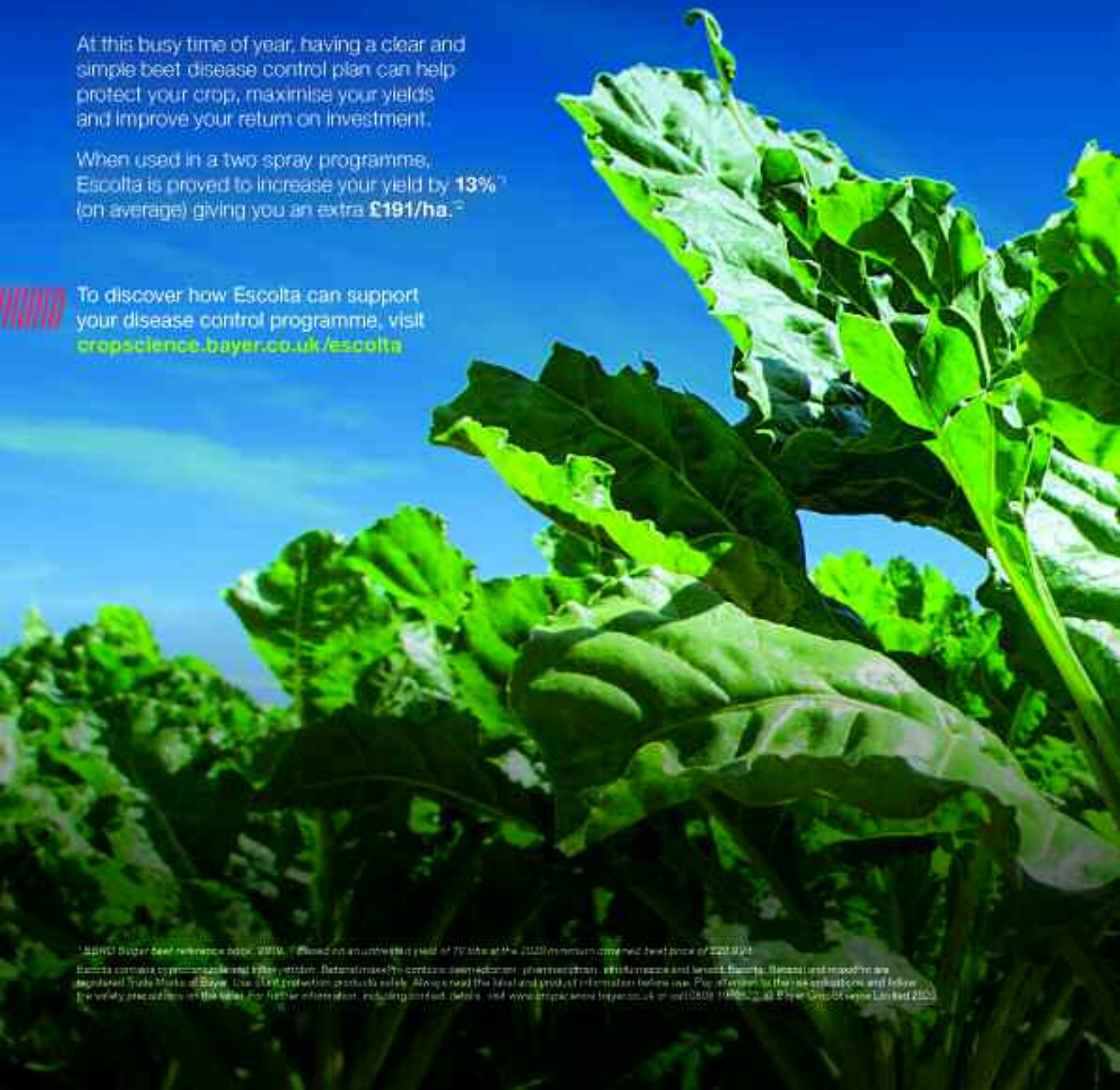

[1] ADAS Sugar beet reference data, 2019. [2] Based on an untreated yield of 70 t/ha at the 2020 minimum contract beet price of £27.30/t.

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A well-timed application of maleic hydrazide can prevent secondary growths from occurring late in the season.

▸ place, we advise it should be applied between three and five weeks before desiccation, with the optimum being five," notes Fokke.

In his own experience, Tim sees the latter part of this window (three weeks before harvest) as a period growers should avoid if possible and he believes planning ahead is the most important part when it comes to hitting the five-week optimum.

Knowing the determinancy of varieties plays an important role, says Tim. "Some determinate varieties, such as Innovator, Estima and Accord, senesce very quickly, while indeterminate cultivars, such as Markies, Cara or Royal, hold on to green leaf area much longer."

He adds that there are other risk factors that can accelerate senescence, such as potato cyst nematode (PCN) pressure and the moisture status of soils. All of these should be factored into application planning.

Processing crops

"For processing crops, look at when your end date will be and count back seven weeks and get it in your diary as the date to start thinking about MH. By the time you've got product on farm, in the sprayer tank with the right weather window is, you're usually five weeks down the line.

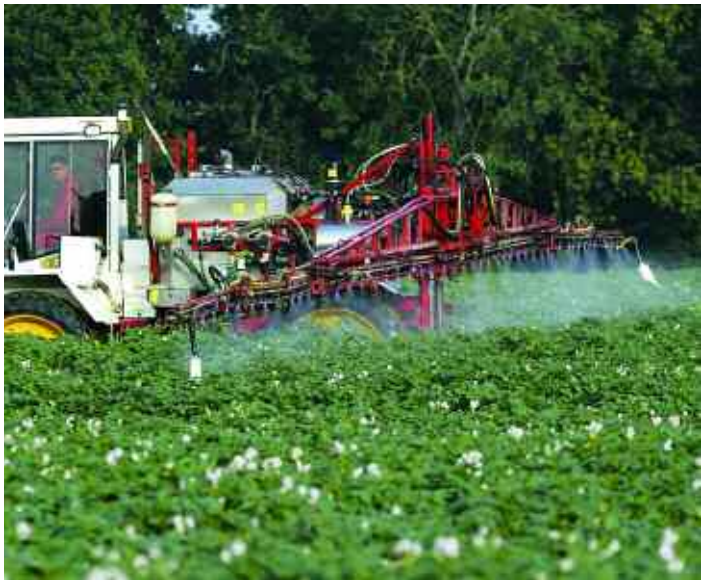
"For those only thinking about it as optimum time arrives, if it then rains or comes too hot, before you know it you're down to three weeks and in my experience, it's then a waste of time applying it," stresses Tim.

In crops destined for packing where size fraction is critical and the desiccation date is more fluid, it may be trickier to plan, he says. Tim is keen on exploring the potential of data-driven tools such as Crop4Sight to help support application decisions.

The platform helps growers track crop development and accurately predict when the majority of tubers will hit marketable size and, therefore, optimum burn-off date. Simply counting back five weeks will then provide a best application window for MH, he explains.

"Any scientific tools or crop knowledge that allow you to accurately identify the end point is very useful," he notes.

Volunteer potatoes are a source of early blight inoculum and maleic hydrazide is an effective way of reducing the viability of smalls that will be left in the field.



Maleic hydrazide should be applied as a standalone treatment as blight sprays can dry too quickly on the leaf, preventing uptake.

While timing is a top priority, the climatic condition when the sprayer gets into a potato crop is also another important piece in the puzzle where MH application is concerned. Plants should be healthy, fully functional and suffering no signs of biotic or abiotic stress from disease, drought or heat, explains Fokke.

He explains that on sunny days, when temperature is high and relative humidity is low, plants shut down and there's a risk of the MH crystallising on the leaves, potentially limiting uptake.

In these conditions, the spray solutionl is also likely to dry much more quickly on the leaf, so MH should be applied when temperature is below 25°C and RH is above 75% and not likely to fall for several hours after, he suggests.

"When you have hot and sunny days, we recommend spraying in the evening when temperature is cooling and before the dew. Also, applications beforeirrigation is scheduled or rain forecast should be avoided."

Fokke adds that water rates are also important in uptake, particularly in drier conditions, and growers should be aware that work rates may be slower than they're used to with blight sprays.

From trials, the absolutely minimum water volume, in perfect cool and humid conditions, is 250 l/ha, says Fokke. But he recommends between 300-400 l/ha as the ideal range for sprayer operators to work in.

Standalone applications

"Also, don't combine with other products. Standalone applications are the best way because some blight products contain adjuvants that make the spray solution dry too quickly and this consequently reduces MH uptake," he adds.

There are two formulation options available to growers, including the long-established water-soluble granular formulation Fazor (Arysta) and liquid soluble concentrates Crown MH (Certis) and Itcan (Gemini Ag), both brought to market in 2017.

Tim says from an efficacy viewpoint, there's nothing between the products, but the formulation and packaging of Crown MH make it more user friendly.

"For a lot of guys using MH, the IBCs are really handy, and the liquid formulation is without a doubt better from an operators' point of view," notes Tim. ■