Changing of the guard

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Roots Potato weed control

The loss of diquat is causing an adjustment in strategy at the beginning of the season as well as at the end. *CPM* investigates the impact on potato herbicide strategies this season.

By Lucy de la Pasture and Rob Jones

There's been a changing of the guard among potato herbicides with the loss of some well-known active substances, leading growers to develop new programmes and strategies. Good control is still achievable, but achieving it will require a little more thought, according to John Keer, agronomist for Richard Austin Agriculture.

Much has been made of the loss of diquat, but growers are likely to miss it more for its properties as a desiccant than for its performance as a herbicide, he believes.

"For most growers it was the preferred desiccant but now it's gone, growers will have to choose between pyraflufen-ethyl and carfentrazone-ethyl. At the pre-emergence timing, the weed spectrum to be controlled should be a consideration, but where possible I'll be keeping Gozai (pyraflufen-ethyl) in reserve as a desiccant," he says.

Scottish Agronomy's Eric Anderson agrees, noting that label restrictions for pyraflufen-ethyl will likely be the consideration that influences which contact is applied at the start of the season.

Maximum dose

"Carfentrazone-ethyl is registered separately as Shark for weed control uses, and Spotlight Plus as a desiccant, while Gozai has both uses on the same label. As a result, using Gozai as a herbicide (at 0.4 l/ha) will limit the amount of pyraflufen-ethyl available for desiccation if the maximum permitted dose in the season of 1.6 l/ha is to be observed.

"For crops that are expected to be vigorous at the point of burn down, it's prudent to use Shark pre-em to maximise desiccation options," he says.

While the loss of diquat is promoting growers to review contact herbicides, the bigger change will be to force growers towards greater use of residual herbicides at the early post-planting stage.

"The loss of diquat means earlier herbicide application and we'll be advocating spraying at seven to 10 days after planting, once ridges are settled. Contact sprays, such as Gozai or Shark, are limited to no more than 10% emerged, any later and the growth will be seriously checked.

"In a later planting season, like this one, it's growing time that growers can ill-afford to lose. It's a complete change in strategy to the one we're are used to because diquat could be applied much later, at up to 40% crop emergence," says Eric.

With the dilemma of which product to use as a contact option relatively straight-forward to resolve, thoughts will turn to the residual programme.

"Residuals remain the best means of post-planting weed control and the most cost-effective. I tend to favour three-way ▸

Eric Anderson says he'll be keeping Gozai for use at desiccation and using Shark as a contact herbicide at the pre-em timing.

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Herbicide programmes will have to be applied pre-emergence unlike diquat, which could be applied up to 40% emergence.

▸ mixes with Sencorex Flow (metribuzin) as the base treatment for its broad spectrum of activity. It also has better activity on weeds that escape either Gozai or Shark," says John.

Those faced with cultivated land that has baked hard and cloddy in the quick-drying conditions this spring may find it more difficult to achieve a good ▸

Straight product comparison in dry conditions

		Average number of weeds per sq m	Stomp Aqua (pendimethalin) 2 l/ha	Defy (prosulfocarb) 3 l/ha	Sencorex Flow (metribuzin) 0.58 l/ha equiv. to 350g AS/ha in Artist	Gamit 36 CS (clomazone) 0.15 l/ha	Praxim (metobromuron) 2.5 l/ha	Emerger (aclonifen) 1.75 l/ha
Weed species	**Spring barley**	16.33	0	0	100	0	100	100
	Cleavers	49.17	0	0	0	10	10	40
	Redshank	23.92	20	0	20	10	0	85
	Black-bindweed	5.25	20	20	50	0	0	90
	Fat-hen	10.75	20	0	70	0	5	70
	Crane's-bill	75.25	10	0	0	0	0	0
	Poppy	25.33	90	50	60	95	95	100
	Chickweed	30.42	10	0	70	0	5	80
	Creeping thistle	30.42	10	0	70	0	5	80
	Sow-thistle	34.33	20	0	40	30	20	20
	Charlock	11.58	20	0	30	10	20	70

Percentage control by species in 2019 weed screen.
Source: NIAB TAG weed screen, Hinxton, 2019

Desiccation choice dictates contact pre-em

For Stuart Maltby, senior agronomist at Frontier Agriculture, potato pre-em herbicide programmes start with his choice of desiccant later in the season now that diquat is no longer an option.

"Potato growers are going to need all of the remaining desiccation armoury to achieve cost-effective control, so why compromise on knock-down quality by using the wrong actives for pre and early post-em weed control?"

Stuart's plan since the loss of diquat for desiccation is to recommend Shark which has approval as the pre-em contact herbicide, a strategy which ensures he still has the option of either full rate Spotlight Plus or Gozai.

A clear advantage when using Shark is that it doesn't have a LERAP, allowing complete field application for weed control to the field boundary. It also makes field selection so much more flexible, says Stuart.

"Where blackgrass is known to exist, we recommend applying Shark at 0.33 l/ha plus glyphosate which must go on pre-em of the crop," he says.

"Nettle is a weed that can take hold very aggressively too. Shark in tank-mix with a pre-em residual option, such as Artist (flufenacet+ metribuzin), can prove very effective, especially on black bindweed where it's active at quite advanced growth stages."

Stuart highlights that nettle and shepherd's purse are host plants for black dot and emphasises that the need to control them is critical to reduce disease inoculum. He recommends applying Shark up to crop emergence at the recommended rate of 0.33 l/ha, with or without a residual herbicide partner — such as Stomp (pendimethalin), Praxim (metobromuron) or Artist, with choice depending on the expected weed spectrum.

The rates of residuals will depend on the soil type and should be applied at least seven days before crop emergence, he adds.

"The ability to apply Shark up until crop emergence adds significantly to the flexibility of the pre-em herbicide programme, especially in wet conditions. It's important to note the contact herbicide has such a broad-spectrum of weeds that it controls, Shark can be used on its own to good effect. A correctly timed Shark application can potentially remove the need for a post-emergence herbicide," he claims.

"On some black and sand-land soils, where residuals are not so effective, it's advisable to leave applying the contact herbicide until as late as possible," he adds.

At the other end of the season, Stuart says desiccant choice will depend on the season, variety and its end market. But he cautions that it's important not to go in too soon.

"If natural senescence has started, it takes the pressure off the desiccation process. Diquat was an excellent leaf desiccant but using the high rate of Spotlight Plus can achieve the same objective, it just takes a bit longer to get there."

Stuart Maltby is opting for Shark as a pre-em contact so he has the maximum dose rate of Spotlight and Gozai still available to use at desiccation.

The loss of diquat is going to add seven to 10 days to the time growers would normally achieve effective crop desiccation, stresses Stuart. "That means skin set will also take longer and is likely to be around four to five weeks rather than the three to four weeks with diquat-based programmes, especially in low UV light weather conditions. Applying Spotlight in bright conditions, around mid-morning, will help get the best effect from the product."

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John Keer points out that the performance of Emerger is less adversely affected by dry conditions than other residuals.

▸ tilth, in which case expectations of performance may need to be tempered, he says.

In these cases, John favours a three-way mix to bolster control. "On the silts, I opt for a rate of 0.4-0.7 l/ha of Sencorex Flow, depending on variety and soil texture, in combination with Emerger (aclonifen) and Defy (prosulfocarb)."

"Emerger isn't a replacement for the higher rates of linuron (that we used to apply) but, of the recent introductions, it has the best spectrum of control and is more cost effective too," he believes.

The new herbicide from Bayer is a residual with a different mode of action. As the weed emerges through the soil surface it picks up the active substance on its hypocotyl (in broadleaf weeds) or coleoptile (in grasses).

"Emerger's best attribute is that take-up by the weed is less constrained by soil moisture than with other residuals. It's also probably the best product for control of black-bindweed, although post-em treatments will still be required in several situations," says John.

Another result in this change of approach is the extended period of control required because of earlier residual ▸

Weed-free start key in potatoes

With the loss of diquat from the weed control arsenal this spring, potato growers are likely to be under even greater pressure to ensure residual herbicide sprays are both timely and effective. Up until now, weed control has been pretty straightforward — plant and wait for weeds to emerge and then apply a residual plus diquat tank-mix.

This simple treatment was pretty effective with a low risk of crop damage, says Interagro technical manager, Stuart Sutherland. Without diquat a rethink to herbicide applications may be needed, particularly where growers have been used to applying a residual plus diquat towards the later end of the pre-emergence/early post-emergence window.

He believes Gozai and Shark remain good alternatives to diquat for contact activity, but the crop safety risks they pose if applications aren't timely means residuals may well be applied first, at the true pre-em timing, and then followed by a contact later in the pre-em window to avoid any crop-safety hiccups should the weather cause delays in application.

"Now more than ever, it'll be vital to achieve the best weed control possible with residuals pre-em by limiting the impact of sub-optimal spraying and soil conditions on herbicide application. And this is where residual herbicide adjuvant Backrow, could be worth its weight in gold this spring," he believes.

"Residual herbicide performance depends on good application conditions and sufficient uptake in soil water by the roots and shoots of germinating weeds. Cloddy tilths and spray drift can both lead to poor coverage, preventing herbicide contact with germinating weeds. Weeds that don't come into contact with the herbicide at germination will emerge, putting pressure on follow-up contact treatments."

According to Stuart, adding Backrow can help. "Backrow creates the perfect size droplet for pre-em herbicide applications by reducing the number of fine spray droplets prone to drift, and by increasing the number of droplets in the optimum size range for better spray coverage of the soil," he explains.

"It's worth noting that there's more soil to spray in a hectare of potatoes than in a hectare of wheat due to the extra surface area created by the ridges. That means the rates of herbicides being used need to work even harder."

Residual herbicides also require moist soils to work well, while on the flip side, excessive rainfall or heavy early irrigation on light or stony soils can move herbicides to the mother tubers and damage the crop.

Where excessive moisture is a threat, Backrow will help by retaining herbicides in the top 5cm of the soil. This increases the availability of herbicides for uptake into weeds and prevents the movement of herbicide to the crop root zone, reducing the threat of crop phytotoxicity. This is particularly useful for herbicides which are more mobile, such as metribuzin.

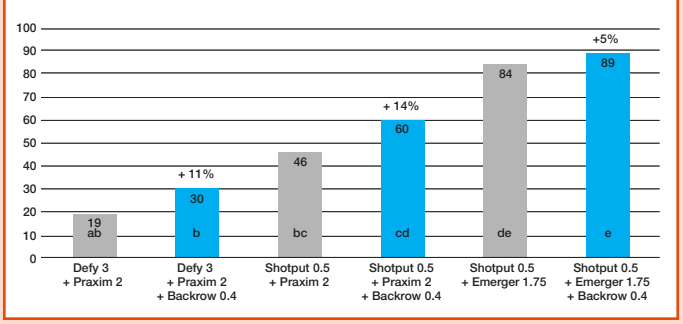
"Under dry conditions Backrow retains moisture in the surface layers of the soil, meaning more of the herbicide is available in soil solution and accessible for uptake into weeds. This is particularly important for herbicides such as pendimethalin, prosulfocarb and the new herbicide, Emerger, which are all less effective in dry soils."

Replicated field trials have consistently demonstrated improved weed control from the addition of Backrow to residual herbicide chemistry, with an additional 8% against weeds such as annual meadowgrass.

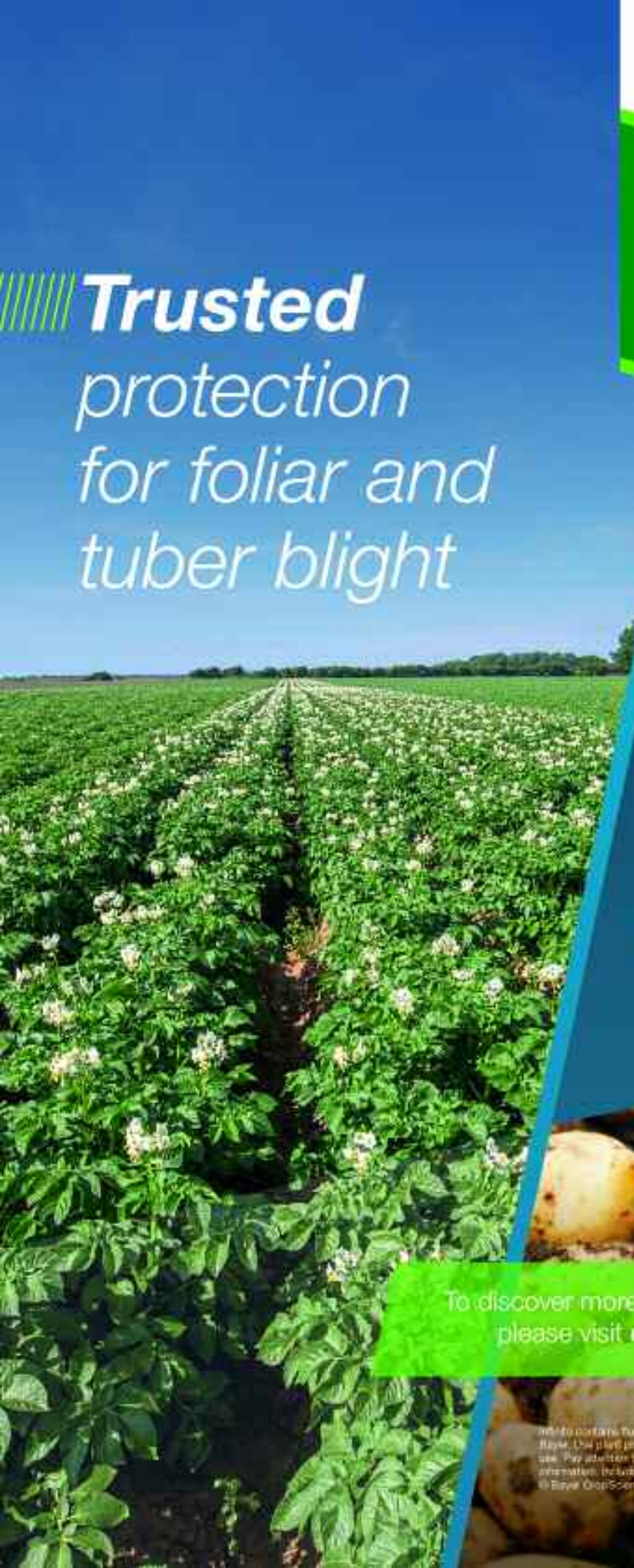
Weed control trials conducted with Scottish Agronomy in 2019 showed an 11% improvement from adding Backrow to Defy plus Praxim, and 14% with a Shotput plus Praxim mix.

"Weed control trials conducted with Scottish Agronomy in 2019 also showed an 11% improvement in weed control with Defy plus Praxim, 14% with Shotput (metribuzin) partnered with Praxim, and 5% with Shotput in tank-mix with Emerger."

Fumitory control



Replicated field trial at Scottish Agronomy showing improved fumitory control from addition of Backrow to residual herbicides in potatoes. Fumitory was the only weed present. Source: Interagro trials, 2019.



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▸ applications, and this supports the need for strong product combinations, adds Eric.

"The choice of partner products will depend on the weed spectrum present, but because applications are likely to be far earlier than most are used to, the weed picture is likely to be less than complete. This means growers will need detailed knowledge of the weeds present in their fields to inform product selection," he comments.

While weed spectrum will influence programme design, it's the variety selection that will limit product choice.

"Once annual meadowgrass (AMG) passes the two true-leaf stage, neither Gozai or Shark will touch it. Where AMG presents a strong challenge then I would advocate Artist (flufenacet+ metribuzin) which will also give good control of cleavers," he says.

The varietal restrictions of metribuzin and the phytotoxic effects of clomazone are well understood, but there are also considerations with Defy (prosulfocarb) and Stomp Aqua/Anthem (pendimethalin) that will influence programmes, suggests Eric.

"Defy has a shorter half-life so should be applied in mixtures just before crop emergence, while both Defy and Stomp Aqua are seriously constrained in dry soils. Both have gaps and strengths in their weed spectrums. Where fumitory may have previously necessitated the use of Defy, a more effective alternative may be Emerger, which is less constrained by dry soils," he says. ■

Mop up grassweeds before planting

In some fields where potatoes will be planted grassweeds, such as blackgrass, ryegrass and bromes, have all developed strongly where conditions prevented much, if any, winter or early spring control. The mild winter has enabled them to become firmly established and tillered. By mid-April they, and difficult broadleaf weeds, will be well into stem extension, making them challenging to control with even the best glyphosate formulations, says Bayer technical specialist, Roger Bradbury.

"Warmer soils will help delayed sugar beet and potato sowings get out of the ground and away more rapidly. But well-established weeds will also benefit and take even greater advantage of them. So late plantings need the cleanest possible start ahead of the in-crop herbicide sprays."

To achieve the cleanest late-sown start to spring crops, while adding as little to workloads as possible, Roger recommends careful integration of cultivations with the most effective glyphosate treatment.

Specifically, he advises an early glyphosate spray as soon as ground conditions allow, hitting weeds before they get too far into stem extension. This should be followed by the most appropriate cultivation for the soils concerned once they're fit, and a second glyphosate spray immediately ahead of sowing, if needed, to deal with newly-emerging weeds.

Take any opportunity to take-out large grassweeds and broadleaf weeds before later-planted ground preparation for late-planted crops.

For sugar beet and potatoes, this follow-up spray can be replaced by an approved glyphosate as a pre-em for extra workload flexibility.

"It will be more important to use a modern glyphosate formulation under challenging conditions to deal with weeds already into stem extension," he stresses. "Their superior rainfastness, from just one hour, and a cultivation interval of as little as six hours gives leeway to deal with uncertain weather and adds extra flexibility to fit in with very tight workloads."

Using the right rate is also important, he says. While 720g/ha of glyphosate in a modern formulation is normally sufficient for well-tillered grassweeds, where weeds have gone into stem extension he recommends increasing this to 1080g/ha. Rates can be reduced to 540g/ha for the second application which will only be dealing with seedling weeds.

"Taking sufficient care in glyphosate spraying is equally essential," he adds. "For the greatest efficiency, water rates as low as 100 l/ha will be fine. I'd also suggest a forward speed of no more than 12km/h, with a boom height of around 50cm and a medium to coarse spray for the best coverage."

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