

Integrated thinking for blight

“ We need a change of attitude as far as resistance management is concerned. ”

Roots Potato blight

Earlier this spring AHDB produced comprehensive new guidance on controlling late blight in light of the increase in the aggressive blight strain 37_A2. CPM takes a closer look.

By Lucy de la Pasture

There's been much talk about blight programmes since the 37_A2 late blight genotype emerged in the UK. It's of particular significance because the new strain appears to be aggressive, highlighted by its relatively rapid increase in the blight population last season (from 3 to 24% of samples tested). As well as its ability to compete with rival blight strains, 37_A2 has a reduced sensitivity to fluazinam, which played a part in some of the problems experienced with tuber blight.

It's impossible to predict the likely prevalence of 37_A2 this season, but it's

a widely held belief that it's likely to increase. Although current advice is to avoid fluazinam application in areas where 37_A2 has been confirmed, in practice continued use of fluazinam in other areas is too risky, believes potato agronomist John Sarup.

Uncertainty on areas

He points out there's uncertainty that 37_A2 is confined to the areas where there've been confirmed outbreaks because of the limitations of the testing under AHDB's Fight Against Blight (FAB) campaign, which is dependent on agronomists sending in samples.

ADHB has responded to the challenges presented by 37_A2 by producing extensive guidance to the industry, co-written by SRUC's Dr Ruairidh Bain and ADAS' Dr Neil Paveley and Dr Faye Ritchie. One of the key recommendations is to focus on resistance management rather than just the efficacy of blight products alone, explains Ruairidh.

"In the past the focus has generally been on applying the product with the best efficacy at particular growth stages of the crop, according to blight pressure.

Resistance management was not uppermost in agronomists' and growers' minds."

Although the potato crop is remarkably well endowed with 13 different MoA groups with activity on late blight, according to the ▶



Ruairidh Bain says there's no way of knowing how prevalent 37_A2 really is because the FAB sampling produces a skewed result.



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Potato blight

► most recent Defra Pesticide Usage Survey the most frequently used active ingredients (including fluazinam) come from just five MoA groups.

Resistance management

"We now need a change of attitude as far as resistance management is concerned and step-up the knowledge of MoA groups so that fungicides from the same group are deployed effectively in terms of resistance management within programmes," says Ruairidh.

Strategies known to slow the selection of pathogen strains with decreased sensitivity to fungicides include alternating products with a different MoA and using mixtures of products from different MoA groups.

John is planning on using more mixtures and co-formulated products rather than products that rely on a single MoA. "If you take fluazinam out of the equation, there are only two fungicidal MoA with good tuber blight activity, so the effective loss of fluazinam puts added selection pressure on this chemistry," he explains.

The MoA groups in question are the Quinone inside Inhibitors (FRAC code 21) which includes Ranman (cyazofamid) and Shinkon (amisulbrom) and the MoA group (FRAC code 43) containing fluopicolide, contained in Infinito (fluopicolide+ propamocarb).

"Both products in the Qil group have



Careful planning is needed to make sure products with tuber blight activity are available for use at the end of the season.

single site activity so you must put something else with them. I'll be adding Curzate M (cymoxanil+ mancozeb) to either Ranman or Shinkon," says John.

Although mancozeb is the predominant

multi-site used in blight programmes, chlorothalonil also has an approval in potatoes in co-formulation with cymoxanil, which has a maximum of two applications per crop. ►

Maximum permissible number of applications of Infinito, Ranman Top (Qil) and Shinkon (Qil) per crop per season for tuber blight control following the use of Qil-containing treatments during rapid canopy growth.

	Application kg or l/ha	No. of applications of Qil during rapid haulm growth		
		Zero	Two	Three
Ranman Top	0.5	3	2	2
Infinito	1.6	4	4	4
Shinkon	0.5	3	2	1
Total number of tuber blight sprays		10	8	7

Source: AHDB Guidance on how the potato industry should respond to reduced fluazinam sensitivity in late blight populations, 2018.

Better coverage improves foliar blight control

A key timing for full-season blight control is during stable canopy, with AHDB advising that the drift retardants, Crusade and Sterling are valuable tank mix partners for reducing the risk of tuber infection through improved control of foliar blight.

"All fungicides are vulnerable to achieving poor coverage because of the umbrella-like structure of potato crops, which can lead to scattered infections within the crop," explains Interagro's technical manager, Stuart Sutherland.

Ruairidh agrees that spray coverage is one of the factors that needs to be better to protect the crop against the new, more aggressive blight genotypes. Weak spots in haulm protection are more likely to be found out, and both strong and weak fungicide actives can have weak spots due to poor coverage.

"Where coverage is sub-optimal there tends to be a scattered infection across the crop. Such scattered infection moves the risk of tuber

blight to the whole crop, rather than in defined areas," he explains.

Independent trials conducted by SRUC and Eurofins have consistently shown Crusade can help to maximise the performance of blight fungicides by reducing drift and improving coverage of all parts of the crop, thereby preventing scattered infection.

Crusade works by binding very small spray particles prone to drift, into larger droplets more capable of hitting all leaves and stems.

"The effect of larger droplets has two important effects, firstly, it reduces drift, resulting in more fungicide reaching its intended target and secondly, it allows better access to the lower crop canopy," says Stuart.

Tests by Clare Butler Ellis at Silsoe Spray Applications Unit found that when Crusade was added to a tank mix of Percos, the amount of spray contained in drift-prone droplets smaller than 100µm was reduced by 24%.

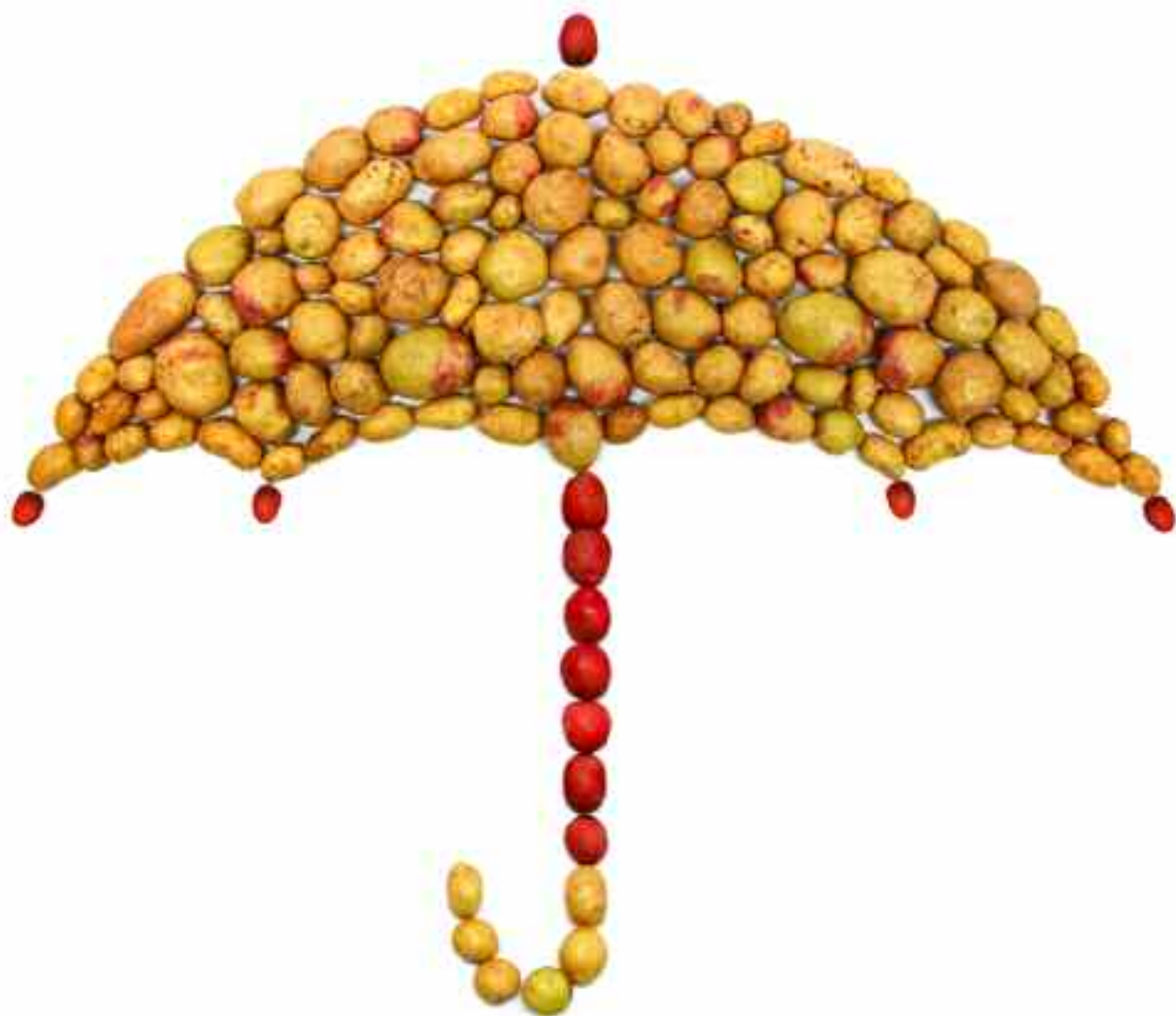
The performance of Crusade has been proven



Using drift retardants (Crusade or Sterling) with certain blight products is suggested in the new guidelines as one of the ways to enhance foliar blight control.

with a wide range of fungicides throughout the blight programme, with an indirect average increase in efficacy of 19%.

Ruairidh has been working with Crusade in SRUC's potato blight trials since 2014 and confirms he has seen an indirect improvement in efficacy of a range of blight fungicides where the drift retardant has been included.



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An important part of cultural control is to make sure volunteer potatoes in stubbles and on discard piles are destroyed.

► “Chlorothalonil is an active that’s worth looking at as it’s very rainfast and relatively cheap,” says John. “Mancozeb has the practical disadvantage that it’s very bulky. But it’s possible to get around this by using co-formulated products with a decent amount of mancozeb in them, such as Valbon (benthiavalicarb + mancozeb) and Invader (dimethomorph+ mancozeb).”

“The non-mancozeb actives in both these products are in the same group so shouldn’t be used in sequence,” he notes, illustrating how important it is to know which FRAC group each product’s

actives belong in.

Although it’s the tail end of the blight programme that’s most affected by the advice not to use fluazinam in areas where 37_A2 has been found, the restrictions on the number and frequency of application of Qil’s means looking at the blight programme early is essential to make sure enough products with tuber blight activity are available to use later on, advises John.

Maintaining adequate control of tuber blight becomes even more tricky where propamocarb isn’t allowed under buyer protocols, he adds. ►

It’s all in the planning

After a late start to the season, potato crops are making good progress thanks largely to the warm and sunny weather in May that helped crops recover some of the lost time. But with the favourable conditions that have been so welcome, also comes higher blight pressure, says Greg Dawson of Scottish Agronomy.

This has been confirmed by the number of Hutton Criteria warnings issued despite there being only a few confirmed cases of disease.

“We need to be conscious of conditions,” he warns. “Hutton Criteria warnings have been issued for every postcode area in Scotland that grows potatoes, while blight incidents have been confirmed in Kent and Pembrokeshire.”

With crops under pressure, he’s urging growers to plan strategies carefully if the problems that many encountered last year are to be avoided.

“Although crops looked clean through the season there were many reports of tuber blight once crops entered store. Growers understand the need to keep intervals tight during rapid canopy growth, but great thought needs to be given to product choice to alternate between MoA, while ensuring there are options for tuber blight protection at the end of the season,” he says.

Greg highlights some of the issues that need consideration. These are when to use the new

The Hutton Criteria has already triggered several blight alerts this season as blight pressure builds.



fungicide Zorvec Enicade for best protection; which twin-pack partner to use with it, either Gachinko or Rhapsody, to ensure suitable protection through rapid canopy growth; and how to protect against tuber blight following emergence of 37_A2 which has shown reduced sensitivity to fluazinam.

In practice the considerations only really come in to play once crops reach stable canopy, he says. “Where possible growers should keep the number of applications of a carboxylic acid amides (CAA) product, such as Revus, Invader and Valbon, during rapid canopy to two, so there’s scope to use these later in the season,” says Greg.

FRAC guidelines are for no more than six applications of a CAA fungicide or half of the intended number of total applications to one crop. In addition, there should be no more than three consecutive products containing CAA active substances.

“To avoid this breach of best practice, a fungicide in another group, such as Ranman Top, should be used to complete protection during rapid crop canopy development,” he explains.

The development of fluazinam resistance raises questions as to how the remaining products can be used without breaching resistance management guidelines, particularly when the focus shifts to tuber protection.

“Only three modes of action were considered to have good activity against zoospores and therefore against tuber blight. Fluazinam was one of them so now only two effective modes of action remain, placing an increased reliance on a limited number of products, namely Infinito, Ranman and Shinkon or Gachinko.”

The fluopicolide in Infinito has a unique mode of action for tuber blight control while both cyazofamid and amisulbrom are in the Qil mode of action group so cannot be repeatedly used in alternation or mixtures with each other. The



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choice of mixing partner used with Zorvec during rapid canopy growth determines which partner can be used for tuber blight protection.

“If amisulbrom is used, it will further restrict the options for tuber blight control later in the season. Similarly, Ranman is also frequently used prior to tuber initiation. FRAC guidelines recommend no more than three consecutive Qil sprays be applied and that Qil fungicides should not form more than half of the intended programme.”

Greg also advises that care should be taken when using Electis. Although zoaxamide has zoospore-activity it is not as effective as fluopicolide, amisulbrom or cyazofamid products in controlling tuber blight.

“It stops spores developing into sporangia before they are released. This raises the importance of timing as the product only acts before the zoospores are motile. For tuber blight the preference is to use Infinito at 1.6 l/ha or Ranman at 0.5 l/ha as part of the mid-season programme as well as for the last two to three sprays,” he says.

Achieving protection of both foliar and tuber blight is possible but doing so while observing resistance management best practices to protect other modes of action and retaining a degree of flexibility is becoming increasingly difficult.

MALEIC HYDRAZIDE INTEGRAL IN PREVENTING POTATO SPROUTING



Growers looking to control sprouting in potatoes are encouraged to use foliar-applied maleic hydrazide to help improve the quality of their marketable crop.

Unlike other sprout suppressants, maleic hydrazide is applied to the crop whilst it is in the field, not in storage. It works through translocation down to the tubers, inhibiting cell division.

A plant growth regulator, it also controls secondary growth and significantly reduces volunteer potatoes in the rotation, providing added value.

Arysta LifeScience Product Development & Technical Manager for UK & Ireland, Don Pendergrast, said: "For the industry to provide a year-long supply of key crops such as potatoes, the control of sprouting is essential.

"Tubers for crisping and chipping need to be stored at a higher temperature to minimise the conversion of starch to sugars, which adversely affects the fry colour. Of course, this means they



An added benefit of maleic hydrazide is its ability to control volunteer potatoes in following rotations.

are more susceptible to sprouting.

"Applied correctly, maleic hydrazide can offer sprout suppression for up to four months and beyond, whilst also offering other key benefits such as

Fazor isn't just for suppressing sprouting, it's highly successful in reducing the number of volunteer potatoes, which become a problematic weed for a wide range of crops.

DON PENDERGRAST
Arysta LifeScience Product Development & Technical Manager for UK & Ireland.

volunteer control.

"As pressure increases on CIPC, having already seen a reduction in total dose rate, growers are seeking alternative products. For those who haven't already introduced it, we believe maleic hydrazide is the key alternative."

Maleic hydrazide is the active ingredient of Fazor* by Arysta LifeScience, a product which is

also registered for use on onion, preventing sprouting whilst the crop is in the field, during transport and when in storage.

Mr Pendergrast added: "Fazor isn't just for suppressing sprouting when potato tubers are in storage. It's highly successful in reducing the number of volunteer potatoes, which become a problematic weed for a wide range of crops, especially cereals.

"As volunteer potatoes are a primary source of blight, Fazor can also be effectively incorporated into the blight programme, offsetting the extra cost.

"Arysta LifeScience is committed to developing a robust portfolio of products for potato growers, that address key issues such as sprouting, late blight and volunteer control.

"Arysta LifeScience is committed to developing a robust portfolio of products for potato growers, that address key issues such as sprouting, late blight and volunteer control. "We have some exciting trials in place for alternative sprout suppressants, and hope to bring new products to the market in 2019, further supporting growers as regulations change and restrictions on product use are introduced."



Applied correctly, maleic hydrazide can offer sprout suppression for up to four months and beyond.

Potato blight



Where fluazinam is used for sclerotinia control, the advice is to apply another blight product and a multisite with it.

► “To help take the pressure off these two MoA groups with tuber blight activity, we need to consider blight management in a more integrated way, including more robust control of foliar blight and implementing cultural controls,” advises Ruairidh.

Cultural controls are primarily aimed to delay the exposure of the crop to the late blight pathogen by reducing the sources of inoculum, with outgrade piles, volunteers and seed considered the most likely sources.

Seed quality is of particular importance with 37_A2 because of its association with tuber blight outbreaks in some English seed-producing areas, and its detection on imported seed. So it's important to be careful where your seed comes from, stresses Ruairidh.

Enhancing foliar blight control, particularly during stable canopy, is one way of reducing the blight inoculum later in the season which leads to tuber blight. Choosing blight products with the best EuroBlight ratings is one way of bolstering blight control, he says.

Another way of enhancing foliar activity is to use a wetter with some blight products, adds John. “Some products, such as Ranman, already have a very sophisticated wetting system but others benefit from the

addition of a wetter. Valbon is one of these and should be used with Zin-Zan,” he points out.

The guidelines specifically highlight the drift-retardants Crusade and Sterling and John is planning to try them for the first time this season with some blight products. “The trials work shows that the addition of Crusade has vastly improved blight control when used with Electis (mancozeb+ zoxamide) and Presidium (dimethomorph+ zoxamide),” he says.

“Blight protection will undoubtedly increase in price, there's no two ways about it, but you just can't afford to let blight in,” says John.

Another of fluazinam's main uses in the potato crop has been for sclerotinia control and the guidelines suggest that where it's still used for this purpose, predominantly in areas where 37_A2 has been confirmed and late blight risk is low, it should only be applied in mixture with a multisite and an additional blight product.

Early blight

Products which are applied for early blight (*Alternaria sp.*) control with known activity against sclerotinia in other crops may provide incidental control, says John. One of these prompting interest among agronomists is Amistar (azoxystrobin). Although there's no label recommendation for sclerotinia in potatoes, Syngenta have found clear physiological effects in plant health and green leaf retention in season-long trials.

“Amistar is used to target sclerotinia control in oilseed rape. However, there's been no directly attributable conclusions from the limited trials for sclerotinia in potatoes in Europe,” reports Syngenta eastern counties potato specialist, David Wilson.

“Where a series of consecutive Amistar applications were trialled in a late blight



Since fluazinam can no longer be relied upon, only products from two MoA groups are effective against tuber blight.

programme during independent UK Eurofins assessment last season, there was evidence of enhanced physiological plant health and green leaf retention — even though Amistar is not active on late blight. That indicated that where Amistar is being used to target early blight, it might also be having a beneficial effect on plant health.”

Amistar has a label recommendation which allows three 0.5 l/ha as a foliar treatment, in addition to the in-furrow application of 3.0 l/ha at planting if that had been used.

Sclerotinia risk in potatoes is very dependent on area and variety, adds John. “Tall varieties, susceptible to lodging tend to be most at risk as infection comes in on the back of wind damage, particular when the canopy begins to open up, he says.

John advises careful nitrogen management in risky regions to help avoid over-thick, lush crops and to keep the water volume up when applying fungicides for sclerotinia control. “It's the stem you're targeting and if any damage to stems has occurred, then that's when protection is needed,” he reminds. ■

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