

techtalk

Effective sprout suppression

Potatoes remain the UK's most popular vegetable, but with ever unpredictable growing conditions, meeting consumer demand is becoming increasingly challenging.

Offering plant protection solutions that support growers in the storage of this valuable crop is something UPL is proud of. Here we discuss how to get the best from sprout suppressant chemistry including new natural options.



All is not lost

From the field to the store, potato sprout suppression strategies require attention to detail at every stage. CPM calls on one of the industry's specialists to discuss tuber management techniques and the product options currently available.

By Janine Adamson

Many feared life after CIPC, but the message is, with careful management, it's possible to store a quality potato crop for a good duration of time. However, whether growers choose to achieve sprout suppression through treatment in-field, in-store, or both, has implications.

Industry specialist Geoff Hailstone is based in East Lothian and is UPL's potato lead. He discusses the nuances of keeping sprouting at bay, the role of essential oils, and some

of the additional benefits from opting to tackle the problem in-field.

What influences dormancy break and how do varieties vary?

Dormancy is a complex balance between genetic background, tuber development, plus environmental and management conditions during growth and storage. It's established during tuber formation, with influencing factors including day length, temperature, nutrient

and water supply.

For example, research has shown that potatoes cultivated during shorter days also have a shorter dormancy period. As for a high growing season temperature, this not only impacts tuber formation, but can also cause secondary growth and premature sprouting. Hot and dry conditions were a particular challenge during 2022, with some tubers entering storage having already sprouted in-field, or sprouting quickly once in-store.

It's important to understand that dormancy break occurs before the visual sign of sprout development.

Temperature is also critical once a crop is being stored. Potatoes stored at lower temperatures tend to have a longer dormancy period compared with those kept at warmer temperatures.

Due to genetic variance, some varieties are more prone to sprouting than others — Desiree and Russett Burbank are known for their long-term store-ability. To investigate further, AHDB conducted work to develop a dormancy ranking system, storing and assessing key varieties at the

“ Ultimately, the earlier sprouting is identified, the better. ”

former Sutton Bridge Crop Storage Research facility.

This work is important because it provides growers with a guide to



High growing season temperatures impact tuber formation and can cause secondary growth and premature sprouting.



How does maleic hydrazide help?

Maleic hydrazide, 'MH' is a plant growth regulator used to suppress sprouting in potatoes and since the loss of chlorpropham (CIPC), it's become an integral management tool. Unlike other sprout suppressants, MH is a foliar spray applied to the growing crop, translocated from the leaves to the tubers in the phloem.

The active ingredient is systemic, providing long periods of sprout suppression so is particularly useful for instances of long-term storage where an application of MH can be used alongside post-harvest treatments.

MH, which UPL markets as Fazor, is multi-faceted in its benefits. Not only does it reduce sprouting once tubers are in-store, it can also control secondary growth and volunteer potatoes. A benefit not always recognised is it's been shown to inhibit internal sprouting, and is the only option available for this problem.

understanding how each variety may perform once in-store, ideally housing tubers with similar dormancy lengths together to improve management efficiency.

How do you get the best results?

Although effective in its mode of action, MH does require careful attention. This starts by ensuring that plants are actively growing and at the correct stage in their lifecycle, being the first signs of lower leaf senescence when most flowers have fallen. Importantly, stress, either heat or drought-related, should be avoided.

To help MH to translocate to the tubers, humid conditions are preferred which extend the period of absorption into the leaf. Growers may find applying later in the day or following irrigation will help to achieve this.

In terms of crop size, MH should be applied when saleable tubers are larger than 25mm as otherwise, the active ingredient can inhibit development and cause yield loss. The recommended water volume is between 350 and 550 l/ha to achieve optimum crop coverage. But to that end, avoid the temptation to tank mix because MH has to be applied on its own.

This all means achieving the



Using maleic hydrazide requires careful attention which starts by ensuring the crop is actively growing and at the correct stage in its lifecycle, says Geoff Hailstone.

correct timing can be difficult, particularly when juggling blight spray programmes and irrigation. However, where ideal application conditions can't be met, there's still value to be had in applying maleic hydrazide to achieve a useful level of in-store sprout suppression. ▶

Winning chips

East Riding potato farmer, David Lee, had initial concerns following the withdrawal of his preferred potato sprout suppressant, CIPC. After a short stint using spearmint oil he's now found the perfect partner for MH — orange oil.

David and brother Rob plant around 32ha of potatoes each year, storing and then selling direct to the chip shop market — a sector which thrives along the Yorkshire coast. Corner Farm, which grows Maris Piper, Sagitta and Ramos varieties, is currently taking part in storage trials for UPL having realised the potential of Argos.

"We've always used MH even when CIPC was available. Back then it was mainly for volunteer control, but more recently we've realised its full potential as a sprout suppressant," says David. "Initially, we followed MH with in-store applications of spearmint

oil which was effective, but orange oil arrived which appealed more from a cost perspective."

For October 2022's harvest, which finished leaving the store mid-July this year, the tubers received their first application of orange oil in February, up until then being covered by MH. In total, the crop was treated four times with the natural extract which David says was impressive given a storage temperature of 7.5°C for chipping potatoes.

"Monitoring is vital when using orange oil. As soon as you see initial sprouting, check the conditions are suitable and then apply. Some might be tempted to wait for larger sized sprouts but this doesn't improve the efficacy," says David.

"We're lucky to work alongside Tom Green from Stored Crop Conservation who checks the quality of the tubers and provides additional

reassurance for application timings."

According to David, a programme of MH followed by orange oil is working well, which he partly credits to effective circulation. "We have a suction/plenum wall and circulation fans in addition to the ventilation system, which help to maintain airflow during orange oil applications.

"It's also important to be aware of any condensation on either the tubers or the store's infrastructure as the product can scorch if this is present. This can often be a result of a sudden change in storage temperature," he adds.

Understanding application best practice is the reason for UPL's trial at the farm, with work also taking place involving Potato Storage Insight's Adrian Cunnington. But for David, an added bonus is the environmental profile of the product. "It's quite pleasant to work with given it's a natural



Following the loss of CIPC, David Lee began using a sprout suppression programme of maleic hydrazide followed by orange oil.

extract and is certainly less persistent odour-wise than spearmint oil.

"Ultimately, because we sell direct to our customers, having a reputation for quality is a primary driver for us. It must be working, in fact one of our customers was recently named the Fish & Chip Takeaway of the Year," he concludes.



Orange oil works by physically damaging growing sprouts on contact, drying and disrupting the soft tissue.

► What about management in-store?

Good store hygiene and etiquette are critical to maintaining tuber quality including temperature and respiration management, both of which are reliant on adequate air circulation. Poor ventilation can lead to uneven temperatures and condensation which has an impact on marketable yield.

This can be influenced by box stacking, so it's important to carefully design the arrangement of the store. It's key to ensure box stacks are the same height with no obstructions to air flow as well as avoiding overfilling the store.

Whereas a few years ago in-store sprout suppression

options were very limited, UK growers can now use dimethylnaphthalene (DMN), which was given full approval for use last year. For those unable to apply MH in-field at all, this provides an effective back-up.

Two essential oils are also available — spearmint and orange. UPL's Argos is a natural product containing pure orange oil which is applied in-store as a hot fog. Argos has been available since autumn 2021, offering up to nine applications per crop.

Spearmint oil contains active substance r-carvone and although it can be applied in different ways, applications in the UK tend to be as a hot fog.

How does orange oil work?

Like MH, orange oil is classed as a PGR. But how it differs is it works by physically damaging the growing sprouts on contact, drying and disrupting the soft tissue. The sprouts then fully desiccate and drop off, with control achieved for several weeks. Orange oil can then be reapplied after 21 days but the average period between applications is five weeks.

This mode of action is particularly useful for small sprouts less than 1mm in size when affecting no more than 20-25% of the stored crop.

Regular in-store inspections with a hand lens can ensure this optimum timing is met. Ultimately, the earlier the sprouting is identified, the better.

However, only stores equipped with ventilation systems where the air is circulated through the potatoes are suitable for orange oil. This is because of the contact action of the product.

What are its advantages?

Orange oil's greatest advantage is it's very flexible — it can be used in both box and bulk situations in all varieties for chipping, crisping and fresh markets.

Because it's extracted from orange peel with no chemical solvents or additives, it has an excellent sustainability profile and no MRL. It's also suitable for use alongside other sprout suppressant chemistry such as MH.

Unlike DMN, there's no waiting period (pre-harvest interval/PHI) so tubers can be delivered shortly after application, meaning growers can react quickly to market demands. And whereas DMN is applied preventatively, which can sometimes waste a potato's natural dormancy, you don't apply orange oil until you've

Sprout prevention: top tips

- **Persevere** — although stewardship guidelines apply, even if perfect field conditions aren't met for MH, applying and achieving a level of control will still have value in-store
- **Regular in-store inspections** — checking tuber quality is critical, including hard-to-access boxes and neglected areas of the store
- **Understand the air flow** — if you choose to apply orange oil, air flow needs to be uniform and balanced, and it's worth checking this in advance

identified initial sprouting.

In terms of useability, the orange oil fog is light and dry and when applied in optimum conditions, reaching all parts of the store. The vapour disappears within a few days and produces no taint on the treated potatoes or store itself.

Orange oil a great partner for MH and the two can be used together as part of an integrated approach to potato sprout suppression. ■

A stored potato crop before and after an application of Argos (orange oil).



Sponsor message

Following the loss of CIPC in 2020, maleic hydrazide found itself thrust into the spotlight. However, understanding how best to use this active ingredient has long been on the agenda for UPL, along with extending the armoury to include natural sprout suppressants.

Maleic hydrazide is an in-field treatment used by around 90% of potato growers and is the main component of UPL's flagship PGR, Fazor. By adhering to best practice guidelines, 'MH' is one of the most effective options available to prevent potato sprouting.

This is complemented by Argos — a recently launched natural product containing pure,

food-grade orange oil which is applied in-store.

Argos is part of the company's recently launched Natural Plant Protection (NPP) portfolio — sustainable solutions that help farmers today and for the future. Not only does this mean creating healthy, abundant and affordable food sources, but it also means a more thoughtful, responsible way of co-existing with nature.



GOING GREEN DELIVERS PROFITS



Maintaining sugar beet green leaf area into the autumn is paramount in growers' decisions for fungicide programmes this season, advocates **Syngenta sugar beet specialist, Andy Cunningham**.

PRIORIOR® Gold gives the combination of effective disease protection and the advantage of green leaf retention.

British Sugar agronomists report healthy beet crops can put on an additional 25% of adjusted yield from mid-September, with sugar content increasing by 0.2-0.4% a week through to November.

MONITOR CROPS FOR RUST



Rust infection in sugar beet

Yields from PRIORIOR® Gold treated beet achieved an average 87 t/ha, compared to less than 75 t/ha in untreated, and only 83 t/ha with either mefenftrifluconazole + fluxapyroxad or fluopyram + prothioconazole applications.



"PRIORIOR® Gold is clearly the best product for rust control," says Andy. "Other trials repeatedly demonstrate outstanding broad-spectrum effects on beet diseases, including *Ramularia*, powdery mildew and *Cercospora*."

Andy Cunningham,
Syngenta Technical Manager

Andy's Top Tips for autumn sugar beet disease control:

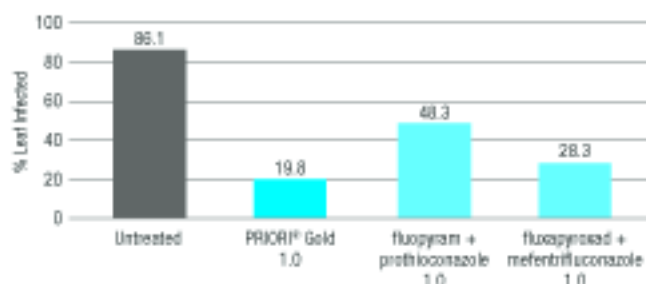
- Monitor crops regularly for signs of disease
- Maintain a 21-28 day spray interval to prevent significant re-infection
- Reduce intervals in high pressure situations
- Select PRIORIOR® Gold for broad-spectrum control
- Target green leaf retention to boost yield



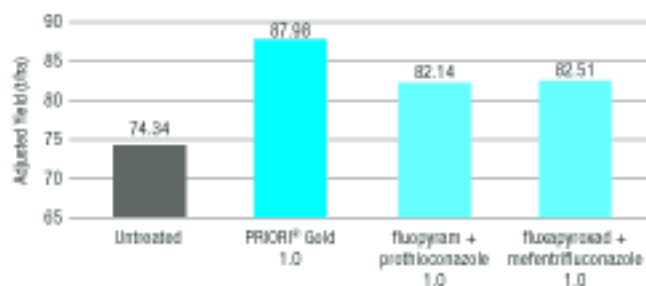
Wet leaves create ideal condition for disease infection

Cool wet conditions increase rust infection risk from active leaf spores. Late infection was the cause of serious early autumn leaf loss last year. Trials in Lincolnshire proved PRIORIOR® Gold (also marketed as ANGLE®) delivered 33% better control of the disease, compared to mefenftrifluconazole + fluxapyroxad. The two spray PRIORIOR® Gold programme reduced the leaf area infected from over 85% of the crop in untreated plots, to less than 20%.

PRIORIOR® GOLD PROVIDED BEST CONTROL OF BEET RUST



DELIVERING THE HIGHEST ADJUSTED YIELD



DISCOVER MORE:

[www.syngenta.co.uk/
crop-support/sugar-beet](http://www.syngenta.co.uk/crop-support/sugar-beet)



syngenta.