

“The addition of Kantor can ensure fungicide coverage is optimised.”

# Prevention's better than cure

## Technical Pushing Performance

Filling the shoes left by chlorothalonil is a big ask, but new work has shown the multi-tasking adjuvant, Kantor, can give fungicide mixes containing folpet a performance boost. CPM investigates.

By Lucy de la Pasture

Over the past few seasons chlorothalonil has underpinned cereal fungicide programmes — providing good protectant activity at a reasonable price, with the added benefit of its multisite mode of action to help protect the single-site actives it's mixed with. From May 20 this year all that will change as CTL takes its final bow, leaving folpet or mancozeb as the only multisite alternatives.

Folpet has an extensive trials history of good efficacy on a range of diseases, according to Adama, including septoria in wheat and rhynchosporium in barley. Interagro suggests fungicide mixes may be enhanced by the addition of Kantor, based on the results of 49 trials (over seven years) which have recorded an average yield boost of 0.27t/ha with a range of fungicide partners, including folpet.

This spring will pose some specific

challenges where the properties of Kantor may come in useful, believes Interagro technical manager, Stuart Sutherland. One of these is ensuring the active ingredients applied are able to do their job, he says.

### Potential barriers

“Challenging application conditions can often stand in the way of active ingredients reaching their target site on or inside leaves. Potential barriers start in the spray tank, and this spring we can expect some larger and potentially more complex mixtures given the lack of autumn spray days and increased spring workload on farm.

“Tank-mixing offers flexibility, saves time and may increase pesticide effectiveness, but physical or chemical incompatibility can cause downtime, damage to the crop and reduce chemical effectiveness,” explains Stuart.

“Kantor is ideal in these situations — it's a self-micro-emulsifying compatibility aid, which enables tank-mix components to dissolve in the spray tank and remain thermodynamically stable over time. This reduces antagonism between products, improving crop safety and increases the bioavailability of active ingredients.”

With an early start to weed control expected in some fields to get on top of over-wintered weeds, all of these things are crucial when tank-mixing in cold conditions, at low water volumes or where prothioconazole and CTL are going in the tank, he adds.

Last season illustrated the importance of a good protective fungicide programme in early season to keep inoculum low in the crop, highlights Interagro's Sarah Ferrie.

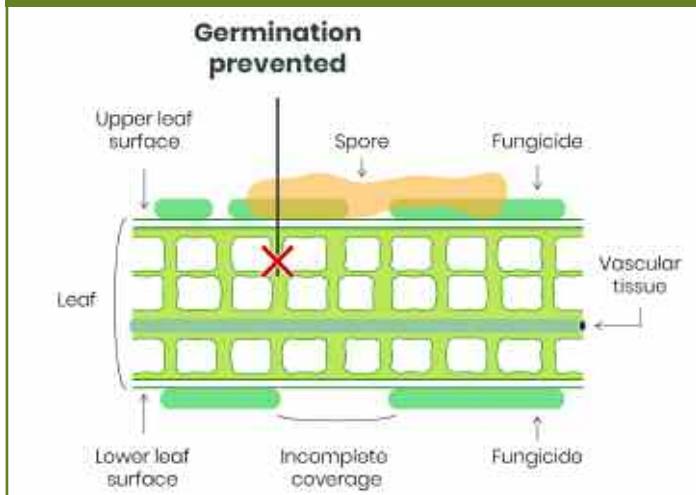
“After a couple of relatively low disease years, 2019 saw the return of wetter weather in May and June. This put cereal crops under considerable septoria pressure where fungicide programmes had been scaled back earlier in the season — on the premise that the early spring was very dry and disease would never come in.

“Firefighting later and relying on the limited curative activity of SDHIs and azoles was too late for some, leading to high disease pressure at the critical yield-building phase,” she recalls. ▶



Optimising the coverage on the leaf can play an essential role in increasing biological efficacy, says Stuart Sutherland.

**Good coverage is essential for a protectant, contact fungicide.**



► “Where a protectant multisite fungicide had been used early to keep inoculum low, the benefit was all too clear to see. Replicated trials in wheat and barley also demonstrated additional benefits where Kantor was added.”

After the very wet winter some varieties of wheat have significant septoria on their lower leaves coming into spring and in these crops there's particular value in keeping inoculum low and protecting the vital yield-building leaves as they emerge. And the most effective way to control disease is to prevent infection establishing in the first place.

“Alongside the selection of varieties with more durable disease resistance from the outset, multisite fungicides form the foundation of any disease control programme and help prevent septoria from establishing. This means ensuring each newly emerged leaf from T0 is protected before septoria spores land on the leaf and germinate.

“The combination of reduced performance from SDHIs and azole chemistries with the weather extremes we're routinely experiencing, means this spring we can't be complacent and rely on a curative approach to disease control,” says Sarah.

“Despite the exciting new launch of BASF's Revystar XE (mefentrifluconazole+

fluxapyroxad), a fungicide that's promising to reset the clock on curative activity, we shouldn't underestimate the importance of stewarding and preserving fungicide performance by continuing the use of other modes of action to limit selection pressure, and keeping disease at bay early in the programme.”

The protectant activity of CTL had become a key component of fungicide programmes, particularly since the shift in efficacy of SDHIs. Adama believes folpet can take on the main multisite mantle and fill the boots of CTL.

“Folpet acts on multiple bio-chemical pathways within a pathogen and is therefore less susceptible to disease resistance,” explains Melanie Wardle, fungicide product manager for Adama. “It remains unaffected by sensitivity shifts and continues to provide good levels of efficacy.

“Modelling work carried out by ADAS in 2019 also shows that the inclusion of folpet as a mixture partner significantly prolongs the effective life of prothioconazole and doubles the life expectancy of the SDHI fluxapyroxad.

“As a multisite, folpet works on the leaf surface by inhibiting spore germination, it impedes cell division and reduces energy production in the mitochondria of the pathogen. It's therefore recognised by the Fungicides

Resistance Action Group (FRAG) as a valuable tool for managing resistance and for its ability to protect and prolong the lifespan of medium to high resistance risk fungicides — like SDHIs,” she explains.

And this is where Kantor's adjuvant properties can help achieve good protection by enhancing fungicide coverage on cereal leaves and improving uptake of fungicide, explains Stuart.

“Keeping disease out of the crop not only relies on fungicides with good potency and persistence, it also relies on good coverage to ensure the whole crop is fully protected. The addition of Kantor can ensure fungicide coverage is optimised,” he says.

So how does it do this? The answer lies in understanding why coverage is particularly important for protectant fungicides such as folpet.

## Optimal distribution

“As protectant fungicides have no mobility, they offer zero protection to the parts of the leaf not covered by spray droplets. Optimal distribution across the whole leaf is crucial to avoid exposure to infection and they must be applied before spores germinate,” explains Stuart.

Challenging application conditions can stand in the way of active ingredients reaching their target site, which may be either on or inside leaf targets, he adds.

“If you think about the canopy structure of a wheat or barley plant, it's not an easy target to coat. The spreading and retention of fungicide is critical to distribute it across the leaf



*Folpet offers the advantage of not interfering with the curative kickback activity of azoles, says Melanie Wardle.*

surface, but water (95% of the spray solution) beads on waxy surfaces and is prevented from spreading out due to high surface tension.

“This not only leads to poor coverage across the leaf surface, particularly on hairy leaves, but it's also a challenge with ear sprays — where spikelets can suspend spray droplets above the surface, preventing the contact critical for an effective fungicide application at T3.”

The adjuvant properties of Kantor can help achieve better spray distribution, says Stuart. “By fully optimising the coverage on leaf or ear surfaces, it can play an essential role in increasing biological efficacy, he claims.

“While in-can adjuvancy can help, it's often insufficient as the rate of adjuvant in the formulation is fixed by the fungicide rate per hectare. Tank-mixed adjuvants can be adjusted to fit the water volume being used, reducing surface tension sufficiently for optimum spreading and

## Kantor recommendations

- Add Kantor at 0.15% of the total spray volume.
- Add to the spray tank first.
- Compatible with all crop protection products.
- Can be used throughout the programme to optimise fungicide performance.
- Kantor is approved for use in cereals up to GS52 and beyond with all azole and morpholine fungicides, up to the growth stage cut off of the fungicide.

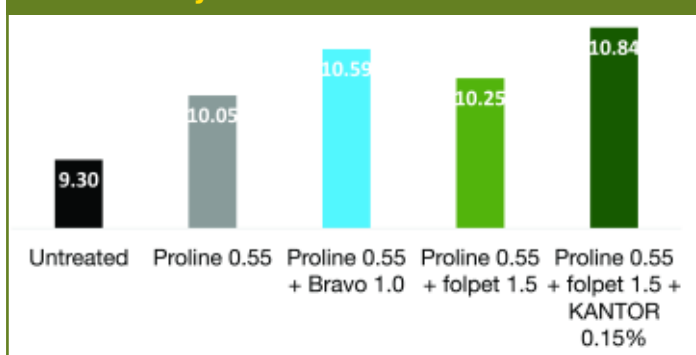
## Effect of Kantor on septoria control



East Anglia – winter wheat, cultivar Basset. Assessed July 7 2019 - untreated septoria infection: leaf two 91%; leaf one 84%.

Source: Prime Crop Research 2019.

## Yield in barley



Fife - winter barley, cultivar Cassia. All Treatments applied T1 and T2 and disease was low disease, with untreated < 2% rhynchosporium.

Source: Scottish Agronomy 2019.

coverage to occur.”

Where growers do find themselves in a curative situation, fast penetration of an appropriate fungicide through leaf cuticles and into leaf tissue will be crucial so it gets working as quickly as possible, points out Stuart.

“The leaf cuticle, on the upper and underneath sides of the leaf is the biggest barrier to the entry to water soluble compounds. Most fungicides have a low water solubility and are able to penetrate leaf cuticles by simple diffusion through the waxy components of the cuticle, which make up the most part.

“Kantor can speed up entry by increasing fluidity of waxes in the cuticle — in essence, it’s like doubling the lanes on a motorway increases the flow of traffic. In curative situations where speed of entry is key, Kantor is particularly useful,” he comments.

Interagro and Adama have

been assessing the performance of Kantor with folpet in fungicide trials.

In 2019, trials looking at the benefits of adding Kantor to Aviator (bixafen+ prothioconazole) plus Arizona (folpet) at T1, followed by Elatus Era (benzovindiflupyr+ prothioconazole) at T2. The results showed significant improvement in septoria control on leaves one and two (+20%) when Kantor was added.

“This also translated into a yield benefit of 0.19t/ha. In winter barley (variety Cassia), the addition of Kantor to Proline (prothioconazole) plus Arizona added 0.59t/ha and surpassed control achieved by Proline plus Bravo (chlorothalonil),” says Sarah.

Adama’s Andy Bailey concurs that because folpet is a contact/protectant fungicide, ensuring good leaf coverage is an important part of application.

“In the trials conducted by

Interagro in 2019, there’s evidence to show that the addition of Kantor can add to the overall septoria control of folpet, translating through to a positive effect on yield. Maintaining label rate of folpet at 1.5 l/ha at T1 and T2 is important not only for the best disease control but also resistance management,” he says.

Melanie suggests T1 is the priority timing for folpet inclusion in wheat. “Additional sprays up to the maximum 3.0 l/ha total dose can be applied at T0 or T2, depending on the season, and will aid green leaf retention and increase the potential for improved yields.

“Folpet also offers the additional advantage of not interfering with the curative kickback activity of azoles; an important factor where active rust is present because it’s important to maximise the speed of activity and the curative effect of the azole in order to combat infections effectively.”

In barley she recommends a well-timed T1 spray (typically GS 30-32 in winter barley or GS 25-30 in spring barley) to protect the crop at tillering. This should be followed by a subsequent treatment at T2 (typically



*Multisite fungicides form the foundation of any disease control programme and help prevent septoria from establishing.*

GS 39-49) to provide continued protection.

“Folpet is also flexible enough to be used at T0 (GS 25-30) and T3 (GS 49-59) where a three-spray programme is adopted in some winter barley crops, taking care not to exceed the total dose allowed in a year,” says Melanie.

While the addition of an adjuvant may seem a belt and braces approach, the sums do add up, adds Sarah. “Kantor can more than pay for itself, having produced an average yield response worth £41/ha across all trials, and it’s particularly beneficial in sub-optimal conditions,” she concludes. ■

## Pushing performance

At the heart of good crop production lies careful use of chemistry to protect the plant and maintain performance, right through the season. But optimising the efficacy of plant protection products can be challenging, while increasingly restrictive regulations limit just how far you can go.

This series of articles explores the science behind the use of adjuvant and biostimulant tools to help power both chemistry and crop performance, as well as increase understanding of why they’re needed and what they do. We’re setting out to empower growers and drive crops to reach their full potential.

CPM would like to thank Interagro for kindly sponsoring this

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Kantor is a unique activator adjuvant based on the active alkoxyated triglyceride, offering improved weed and disease control in a wide range of crops. Kantor is the only adjuvant with corrective action at every step of the application process, delivering greater freedom for plant protection products to perform to their potential. Kantor improves tank-mix compatibility, buffers spray water to pH6, reduces drift, improves coverage and improves the speed of uptake.

