

Disarm the weed's defences



“ Sorrento will help get the best out of the available herbicide chemistry. ”

Technical Pushing performance

Left unchecked, weeds can soon outcompete a maize crop during its early growth stages. CPM finds out how an adjuvant can complement post-emergence weed control programmes.

By Lucy de la Pasture

Think of maize and a tall, fast-growing crop comes to mind. But early in their life maize plants are the exact opposite, leaving them vulnerable to competition from weeds until warmer conditions in late spring kick-start their rapid growth.

That means weed control is the number one priority in the first few weeks after planting, says Stuart Sutherland, technical manager at Interagro.

“Keeping the maize crop free from early weed competition is crucial to protect yield in the first month or so after emergence. Weeds can easily smother the crop, competing for light, water and nutrients.”

According to the Maize Growers Associations, yields losses of up to 65% are possible where weed control is left until late

in the season. “Weed competition not only leads to weak, shallow rooted plants susceptible to lodging, it can also result in stressed crops and a yield penalty — resulting in inconsistent cob size and fewer kernels. Ultimately that’s reduced energy for either animal feed or for AD plants.

Every opportunity

“Spring germinating weeds, particularly the polygonums (red shank, black bindweed, pale persicaria and knotgrass) take every opportunity to germinate between the rows after maize is planted. Grassweeds such as couch grass, barnyard grass (cockspur), wild oats, ryegrass and annual meadow-grass can also be problematic.

“Key broadleaf weeds to keep a keen eye on include fat-hen, charlock, cleavers and black nightshade,” he says.

The loss of pre-emergence herbicides in recent years that had long-lasting residual activity has put more emphasis on following-up weed control with a post-emergence spray but even here, the toolbox has been diminishing.

2019 was the last season for Calaris (mesotrione+ terbuthylazine). It was considered the gold standard post-em herbicide, notes Stuart, because its good

control of a wide range of broadleaf weeds and some grassweeds.

“Calaris was often used in tank-mix with Samson Extra (nicosulfuron) as a one-hit post-em spray or, in the absence of a pre-em, an application of Calaris would generally be followed by Samson,” he explains.

“Now it has been lost from the post-em herbicide toolkit, it makes it even more important to optimise herbicide performance heading into the spring this year.”

He believes Interagro’s spreading and penetrant adjuvant, Sorrento, could offer growers a useful insurance policy at the post-em timing and aid weed control, particularly when conditions turn dry. “Sorrento will help get the best out of the available herbicide chemistry and therefore minimise weed competition, which translates into better yields.

“This spring it will be vital to achieve good crop establishment by paying attention to seedbed preparation and drilling at the right depth so that crops get up and away as quickly as possible. It will also now be important to consider applying a pre-em herbicide and crucial to maximise the performance of any post-em herbicides being used,” he suggests.

In reality, getting the best out of post-em treatments can be hard to achieve in practice. For best results, post-em herbicide treatments should be applied when weeds are small and actively growing. Research shows that weeds left in the crop for longer



The addition of Sorrento to post-emergence herbicides can help achieve early removal of competitive weed species, particularly when conditions turn dry, says Stuart Sutherland.

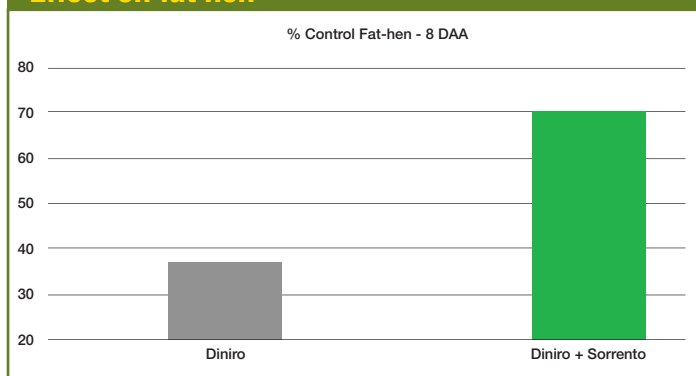
Effect in dry conditions



Maize cv P9074 in Slovakia. Nicosulfuron+ Sorrento applied on 12 June 2017 in dry soil conditions at crop GS15. Crop harvested on 17 Oct 2017. P = 0.05

Source: Interagro 2017

Effect on fat hen



The addition of Sorrento to Diniro (proflufenoxon+ nicosulfuron) speeds up the kill of fat hen with no phytotoxicity nor loss of vigour recorded.

Source: Agrii, Peterborough 2020

than 10 days after crop emergence will begin to reduce yields. More yield will be lost for each day that the weeds remain.

“As maize plants increase in size, the delivery of post-em herbicides to weeds can become trickier. Weeds can become shaded, with herbicide intercepted by the crop, and this leads to poor coverage and a significant reduction in the control of target weeds — which may also now be larger and more difficult to control by this stage.

“Weed control can also be particularly challenging with spring germinating weeds such as fat-hen and sowthistle. Their hairy/waxy leaves reduce the herbicide-to-leaf contact required for effective coverage across the whole leaf. This is because both hairy and waxy leaves reduce the ability of the herbicide to spread out and be retained on

the leaf,” explains Stuart.

“Weeds which are particularly waxy, such as fat-hen, are also more hardened to herbicide so uptake can be slow. With the resulting poor coverage and uptake by weeds, a significant reduction in weed control can be a real threat to the crop.

“It’s also worth noting that herbicide actives with high water solubility, such as nicosulfuron, are the ones likely to struggle the most to penetrate the leaf cuticle,” he highlights.

This is where the adjuvant Sorrento can really help enhance herbicide coverage so that herbicide performance is optimised in the field, says Stuart. “Sorrento is perfectly suited to help post-em herbicides overcome challenging application conditions in maize, resulting in faster uptake and higher overall weed control, which in turn can benefit yield.” ▶



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Barnyard grass isn't well-controlled with Callisto plus Samson Extra in tramline trials at a farm in Dorset. Sorrento makes a difference.

► How does the adjuvant do this? By altering the physical properties of the spray so that spray coverage is better, and more herbicide is retained on the weeds, he explains.

"This results in higher uptake through the waxy weed cuticles. Sorrento lowers surface tension, allowing the herbicide droplets to spread out uniformly and cover the leaf. Increasing herbicide contact across the leaf surface of weeds is critical for the good coverage needed for their effective control."

One of the most notable benefits of

Sorrento is its binding properties, which increase herbicide "pinning" to the leaf surface. "This leads to improved herbicide retention across the leaf surface, increasing herbicide activity and is particularly useful with hard-to-control grassweeds," says Stuart.

Once on the leaf, getting the herbicide into the plant is another challenge where Sorrento offers a helping hand. "The ability to penetrate the cuticle is determined by a herbicide active's chemical make-up. Herbicides are either predominantly water

Sorrento key points

- **Enhances speed of kill and control** – Sorrento helps herbicides with moderate-high water solubility (such as nicosulfuron) to penetrate leaf cuticles, which together with its spreading ability facilitates faster uptake by weeds, particularly grassweeds and waxy/hairy broadleaf species.
- **Flexible post-emergence timing** – approved for use in forage maize up to and including tip of tassel visible or the latest timing of the herbicide.
- **Boosts herbicide efficacy** – particularly under dry conditions.
- **Low inclusion rate** – recommended at 0.1% of the total spray volume.
- **Wide label approval** – recommended for use in cereals and maize. For more information www.interagro.co.uk/sorrento

soluble (hydrophilic) or predominantly oil soluble (lipophilic)," he explains.

"Herbicides which are more lipophilic are able to penetrate the cuticle barrier by simple diffusion through the waxy components of the leaf. The rate of

Enhanced grassweed control seen in forage maize



George Fraser trialled Sorrento in forage maize last year on a farm in Dorset.

The Fraser family have built up their farming enterprise (A & R Fraser) near Shaftesbury in Dorset to over 1200ha in recent years, with contract farming forming a large percentage of the business alongside their beef and arable mixed farm.

George Fraser doesn't grow forage maize on his own farm but is responsible for maize ground preparation and spraying operations under the business' contact farming agreements. It was on one of these that a tramline trial was set up to assess weed control with and without the

addition of Interagro's adjuvant, Sorrento, with the help of Agrii agronomist Todd Jex.

"The weed profile in the field was mostly broadleaf weeds, including black bindweed and field speedwell, with annual meadow grass, wild oats and barnyard grass also present," explains Todd.

The trial was set up to include an area of the field where barnyard grass was most prolific. A pre-em was applied and followed by 0.75l/ha Samson Extra plus 0.5 l/ha Callisto at around the six-leaf stage of the maize crop. Sorrento was added to the tank at a 0.1% inclusion rate (120ml/ha) in the treated tramline.

"There was very little difference to be seen on the broadleaf weeds where Sorrento was added to the mix. What was noticeable was an increased speed of effect on the barnyard grass. At four weeks post-application this difference was significant."

George notes that the barnyard grass was the worst he'd seen in the continuous maize field last year, so the additional level of control achieved with the Sorrento was very valuable.

From one trial in one season, what was Todd able to conclude from the results? "I believe the adjuvant could be useful where difficult to control grassweeds are present, particularly barnyard and



Todd Jex says that Sorrento really increased the herbicide's speed of kill on barnyard grass in a tramline trial.

bristle grasses. In this trial there were no real effects on the broadleaf weeds present," he says.

The trial has led Todd to wonder whether Sorrento could be useful to help control grassweeds such as brome in the spring when using Palio (pyroxulam+ florasulam).

Previous work carried out by Interagro and Agrii have found Sorrento enhances the speed of kill of other grassweeds, such as ryegrass and wild oats when used in tank-mix with Axial Pro (pinoxaden) and also works well with ALS chemistry, with positive outcomes in 51 of 52 replicated field trials.

movement of the more water-soluble herbicides (and a lot of post-em herbicides fall into this category) is much less, because of their low solubility in the waxy cuticle of the leaf, and this results in less herbicide being absorbed by the weed.”

Because of this, herbicides with a moderate to high solubility in water need a more hydrophilic surfactant to help them penetrate the waxy cuticle and thereby increase the flow rate of herbicide into the leaf, explains Stuart.

Sorrento is able to help herbicides with moderate to high water solubility (such as nicosulfuron) penetrate leaf cuticles because it has the right hydrophilic/lipophilic balance to achieve this. This ability to penetrate waxy leaf surfaces increases both the speed and overall uptake of the herbicide, resulting in faster weed kill.

The effect of Sorrento has been studied in replicated field trials, which have shown significant improvements in weed control with nicosulfuron-containing herbicides. What’s more, these improvements have translated into benefits in yield at harvest, he explains.

“In ideal application conditions, Sorrento increased fat-hen control significantly by the first assessment, 13 days after application

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.

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Sorrento is the latest innovation in adjuvant technology from Interagro offering significant improvements in post-emergence weed control, particularly in dry conditions. Low dose, with excellent tank-mix ability and a good environmental profile, Sorrento is approved for use in a wide range of crops and is available to purchase through Agrii.



(DAA), and this was maintained at the final assessment, 110 DAA. In a separate trial, in dry application conditions the addition of the adjuvant also had a significant effect on all the weeds present in the trial 14 DAA and this was still found to be the case at the final assessment, 127 DAA. Overall yield showed an increase of 1.4t/ha.”

Stuart notes that the most substantial improvements seen where Sorrento was added to the spray tank were faster control

and higher overall levels of control, especially with the more difficult to control weeds such as fat-hen, creeping thistle and barny ard grass.

“In 2020 trials, Sorrento also helped improve blackgrass control when used with Diniro (proflufenoxon+ dicamba+ nicosulfuron) and helped take back control of fat-hen much faster — with 70% fat-hen plants controlled at 8DAA, compared with 37% when Diniro was used alone.” ■

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