



Quantifying the benefits

**Bioscience
in practice**

Biostimulants are currently being pushed to help facilitate a reduction in fertiliser inputs as well as to offset the impact of pest and disease pressure, but do they actually deliver? *CPM* learns how two products can unlock tangible results for growers.

By Janine Adamson

Trial data, hard evidence, seeing is believing — essentially proof that a product or concept works and does what it promises it will. This couldn't be more the case than for biostimulants, a segment of crop inputs which can sometimes come under heavy scrutiny.

To help to debunk such doubts, Unium's Andrew Cromie has been focusing on ways to quantify the benefits of the company's product range, translating scientific theories into practical results. "It's easy to hide behind scientific jargon and complicated language, but what growers really want to know is 'what does it mean for me'? From a practical on-farm perspective," he explains.

"Usually that's yield related but it could also mean a percentage reduction in applied fertiliser, for example. It's ok to measure root biomass increase, but so what? How does this offset the problems which growers face on a daily basis?" asks Andrew.

On-farm trials

Noting that more growers and agronomists were becoming interested in how to reduce the reliance on applied fertilisers, Andrew instigated a trial with one of Agrovista's customers — Dennington Hall Farms in mid-Suffolk. The work would centre around two foliar biostimulant products from Unium's range — Calife Extra (calcium+ phosphite+ pyroglutamic acid) and Luxor (a nutrient blend+ humic acid+ fulvic acid+ L-PGA).

Andrew says Calife Extra acts as a 'scavenging stimulant' designed to improve crop rooting and maximise nutrient uptake, whereas Luxor provides phosphate supply through maximising availability and reducing adsorption in the soil.

Agronomist Hollie Hunter agrees that reducing conventional inputs is a priority for many of her cereal crop growers. "Often the request is to find alternatives to synthetic inputs without compromising yield — this is becoming an integral part of modern agronomic practice.

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To conduct the field-scale trial at Dennington Hall Farms, Calfite Extra and Luxor were applied to winter wheat (Gleam and Extase) in autumn 2022. The aim was to compare the impact of each product alone, as well as when used together. This was layered with and without the use of Tiros (endophytes) seed treatment, and compared with a control plot which received farm-standard inputs.

Farm manager Ryan McCormack says it was on Hollie's recommendation that he decided to give the products a go. "We're moving towards a more regenerative-type farming system but the changes we make have to incur improvements whether that's related to margin, sustainability or quality. We'd seen that the Unium products tick a lot of boxes, but this is the first time we've trialled them on the farm," he explains.

"I'm looking to measure both yield and crop quality before calculating the return on investment. The uplift has to be significant enough to make it worthwhile."

With the products promising to improve crop establishment and overall plant health, did Ryan observe visual improvements during the season? He believes so. "Anecdotally, you could see

more biomass and a deeper chlorophyll content especially in the plots treated with Luxor. This was improved further by the use of Tiros," he says. "But I'm looking for more than that to base my decisions on."

As the season progressed, like many, the 1200ha farm encountered high septoria pressure due to wet weather conditions, as well as increased blackgrass populations. But as the combine heads back into the shed, yields suggest that Calfite Extra and Luxor could indeed be a worthy investment.

The results, which were collated to produce an average across all varieties whether a first, second or third wheat, came in at 10.15t/ha for Luxor alone whereas Tiros plus Luxor yielded 10.32t/ha. This was compared with the average farm standard control of 9.6t/ha.

Extase

Of particular highlight was 10ha of Extase second wheat which was treated with both Calfite Extra and Luxor. This came in at 10.56t/ha, compared with the farm standard Extase which yielded 10.14t/ha — a 0.42t/ha improvement.

Ryan says these are positive results. "Because the products aren't overly expensive, that should be enough of an uplift to make it worthwhile. Plus they were easy to work with, mixed and sprayed



Hollie Hunter says reducing conventional inputs is a priority for many of her cereal crop growers.

well, with a clean tank afterwards.

"The next step is to trial the products again but with different nutritional regimes to see if we can achieve our goal of decreasing conventional fertiliser use. We'd also like to repeat the Extase element of the trial on a larger scale."

According to Hollie, potential lies in using the products in other crops too. "For oilseed rape, there's a real benefit to be had in using biostimulants to increase vigour prior to cabbage stem flea beetle ►

Taking hold of take-all

Even with the best intentions in mind it can prove difficult to balance an optimal cropping rotation with farm profitability, as experienced by Geoff Warrener at his Cambridgeshire farm.

Geoff says OSR has become increasingly difficult to produce and as a result he won't be growing any this coming season, leaving only one non-cereal crop in the rotation. "Rotation planning has become a real challenge — break crops that can provide consistent gross margins and acceptable levels of blackgrass control are few and far between.

"We seem to be growing more cereals each year and that's having a negative effect on average yields. Closer inspection confirms that take-all is affecting our second wheats and winter barley," he explains.

In a bid to explore other break crops, Geoff is trying beans, although due to fusarium build-up, can only do so on 20% of his 400ha cropping area. Winter oats is another option as well as growing spring oats where blackgrass is an issue.

"Ultimately, we have to accept that the

rotation will feature more take-all hosting cereals so this is where we've started to look at alternative product options to help overcome some of our problems."

After trying Tiros seed treatment on milling wheat, Geoff spoke to Unium's Andrew Cromie about whether foliar biostimulants might help to off-set the farm's take-all pressure. Having confirmed IPM techniques such as delayed drilling were already being implemented, the suggestion was to focus on rooting.

"Andrew explained that take-all has a root pruning effect, limiting the efficiency of the crop's nutrient and water uptake," says Geoff. "Therefore we tried a calcium phosphite-based programme to help the crop to push out more roots — 0.5 l/ha of Calfite Extra in the autumn with the BYDV spray, and then again at T0. Average wheat yields were up last year but that was after a good season, so we'll review again this harvest."

Geoff admits he still hasn't found the perfect rotation. "We'll continue to explore options for break crops, but for now, it's good to see that



After trying Tiros seed treatment on milling wheat, Geoff Warrener wanted to explore whether foliar biostimulants might help to off-set the farm's take-all pressure.

research is investigating novel solutions. We plan to continue with the calcium phosphite programme on all of our second cereals in the rotation."



Ryan McCormack says Dennington Hall Farms is moving towards a more regenerative-type system, but change has to incur improvement whether related to margin, sustainability or quality.

► feeding. It's giving OSR a better chance of growing through the pressure.

"Needless to say, solid establishment in the autumn is important for all crops especially when they can face challenges such as sub-optimal seedbeds and pest damage," she comments.

Bioscience in practice

As the chemistry toolbox continues to shrink, an array of new biosolutions are coming to market, offering a range of benefits and complementary additions. Evaluating just how effective they are, and where they're best placed can be tricky, however.

This series of articles opens a window on the science behind these innovations. CPM has teamed up with Unium BioScience to explore the background, unravel the physiological processes and provide analysis on trial results. Above all, these articles give the grower an insider's view on some of the exciting opportunities biosolutions

offer in the field. This includes Calfite Extra and Luxor.

Calfite Extra is a foliar nutrient complex designed to improve crop rooting and maximise nutrient uptake from the soil. Luxor is a soil- or foliar-applied fertiliser based on two forms of available phosphorus, which aim to maximise availability and reduce adsorption in the soil.

Learn more by joining the Unium Bioscience technical group <https://www.uniumbioscience.com/unium-technical-group>



Unium's John Haywood says although the company is focusing on tangible results for their product range, it remains backed by robust science. "The most important aspect to consider with nutrients such as phosphorus, is availability. For phosphate, it exists in three pools in the soil but only the inorganic form dissolved in soil water is readily available to the plant," he explains.

"The calcium phosphite in Calfite Extra is a unique formulation which works by 'tricking' the plant into thinking it's in a

P-deficient state, and the subsequent response is improved root depth, biomass and exudation to scavenge the soil-P.

"Luxor is an excellent partner, as along with two forms of phosphorus complexed with humic and fulvic acids to maintain availability, it also contains pidolic acid (L-PGA), which can increase root production and enhance nitrogen assimilation. This is critical for the first 30-35 days in the life of a crop to optimise establishment and set potential," he concludes. ■

Preserving genetic potential

Utilising IPM techniques to preserve the power of genetic resistance is key to the future of oilseed rape, says LSPB's Chris Guest. And although plant breeders have been toiling to develop new protection mechanisms, he believes it doesn't take much to undo the hard work.

"Review, rotate and resist — it's about firstly assessing the disease pressure, adjusting the rotation accordingly, and then utilising genetic resistance as the last port of call. Past experience has shown that you can't keep relying on genetics within tight rotations and high disease pressure scenarios without there being consequences," he says.

According to Chris, the best way to relieve the pressure on genetic resistance is to support it with the principles of IPM, including rotation, managing soil pH and ensuring good drainage, but also a key point is prioritising plant health. For a disease such as clubroot, this means focusing on root development and nutrient uptake.

"There's no silver bullet. However, a nutritional biostimulant such as Calfite can help

OSR to push down a healthy root structure, as research shows calcium aids the reduction of severity of clubroot gall formation.

"It's also producing a more robust crop during establishment, which stands a better chance of surviving the winter and potential frost damage," says Chris. "Pairing the best genetics with quality products will always be our recommendation, along with using the right genetics in the right place at the right time."

From an on-farm perspective, Agrovista agronomist, Linda Sheppard, agrees that biostimulants play a valuable role in OSR crops. Although Calfite and Luxor were applied to a number of her farmers' different crops last season, she says it was in OSR where the products came into their own.

"The results from application to OSR during early autumn establishment were remarkable on one farm — the crop grew rapidly during the following week, putting on substantial growth. It never looked back and yielded 4.5t/ha with good oil content," she says.

According to Linda, because the majority of soils in the south east are calcium-dominant, as



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confirmed by soil health analyses, there's little point in applying phosphate granules due to lock-up. "Some customers were also taking phosphate 'holidays' due to cost, but the crops still required an available source of P to meet plant requirements."