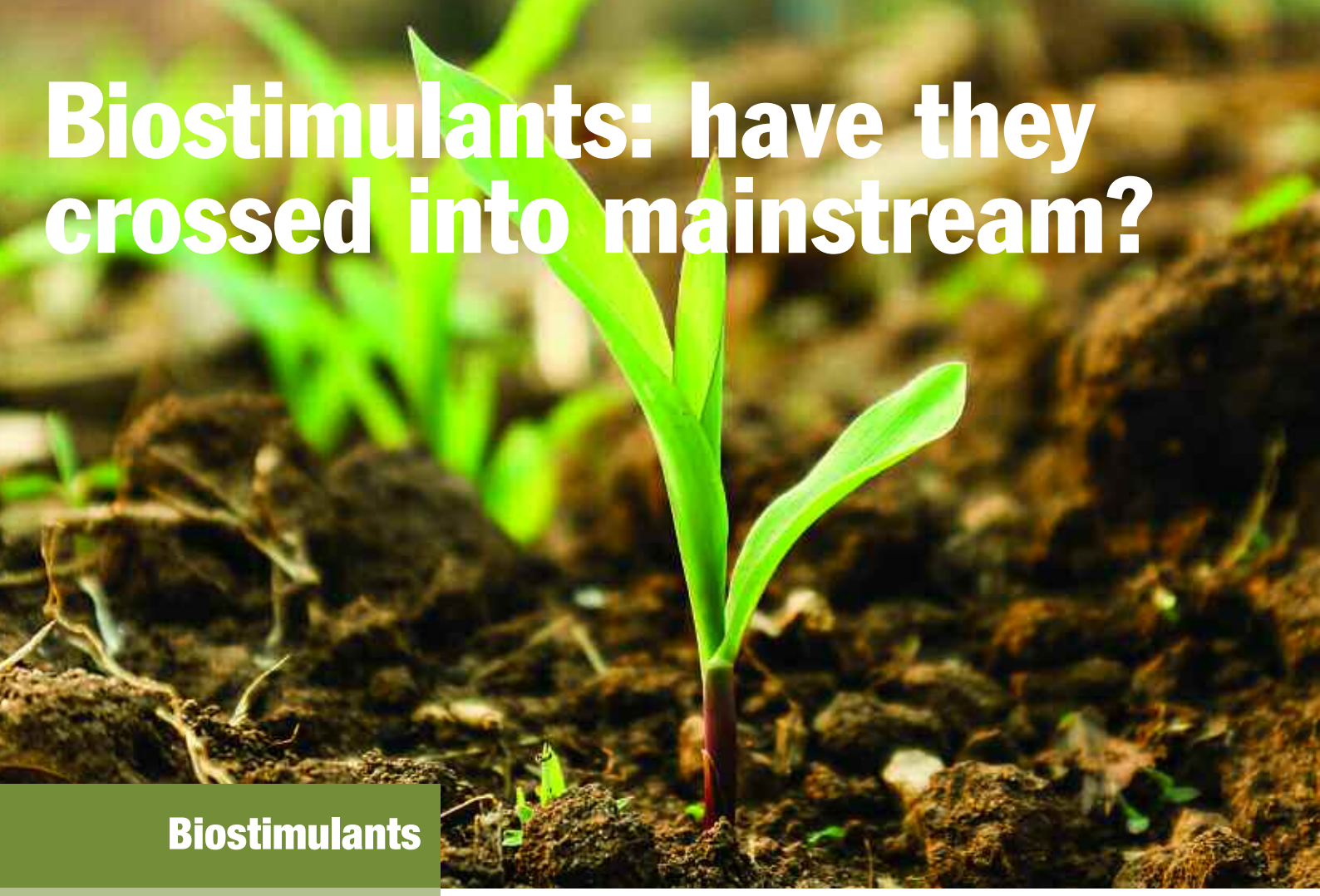
Biostimulants: have they crossed into mainstream?



Biostimulants

Biostimulants are increasingly entering the vernacular of farmers and agronomists as the solution to anything from plant establishment to off-setting disease pressure. *CPM* details some of the current options to canvas user opinions.

By Will Charlton

Business theorists will tell you any new technology goes through a journey before it's fully embraced — from innovators to early adopters, then the majority, and finally, the laggards. Whereas some farmers have used biostimulants for decades, they've only recently entered the conversation as a viable solution for most.

But have they indeed entered the mainstream and become as accepted as a fungicide or hybrid variety is?

"While it's really important that we take an evidence-based approach, the reality is the current industry standard of small plot trial work is unlikely to detect the benefits of using some biostimulants," says Nick Anderson, head of crop technology for Velcourt.

"The benefits may be smaller than the differences that can be identified with statistical confidence. The industry should think about how it works to address this, perhaps by collaborating to aggregate larger datasets."

Trial data

As with other crop inputs, Velcourt aims to be evidence-led with trial data to support decision making, as shown through their work with one particular biostimulant. "We've conducted six trials on Ilex Crop Rooter Plus over three years and are confident that it delivers an average yield benefit of 4.4% over untreated.

"Of the 47 fair comparisons in these trials, nine were statistically significant. This means the probability of the yield increase being due to Ilex Crop Rooter Plus is more than 95%. Equally compellingly, though, of the 47, 41 of these showed a positive yield response.

"Velcourt continues to work with industry partners and invest in trial work in this

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Another approach to examining biostimulants is split-field testing. This may not have the statistical rigour of replicated plot trials, but some argue that it better reflects the conditions that biostimulants are used commercially. The theory being that biostimulants upregulate several parameters in a farming system, providing too many variables to accurately reflect their yield benefit in traditional trials.

Russell McKenzie farms 160ha in Cambridgeshire and has been trialling biostimulants for several years. "The biostimulant market reminds me of when cover crops became a part of many farms' rotations," says Russell. "They've always been used on some farms, but their widescale adoption has led to a flood of products offered in the market.

"There are so many products, and everyone has a solution that they claim works. I feel to have confidence, I must test it myself. The biostimulants that Unium promotes always come with robust scientific data to back them up, so I've focused on investigating them in my system."

Last season, Russell trialled 1 l/ ha of Luxor against 200kg/ha DAP and an untreated for reference on his winter wheat. In the spring, he investigated Twoxo applied at T1 and 3 ALO T6P at T3. His usual nutritional programme was applied to the treated and untreated parts of the field.

Phosphate uptake

Luxor is a blend of nutrients, humic and fulvic acid, and pidolic acid. Russell hoped to aid phosphate uptake using Luxor, boosting crop establishment. He has a typical phosphate index of one, but by understanding his soils, Russell hopes to demonstrate that high yields are still possible.

"We did the trial in four fields and the average response to the Luxor and DAP was 1.1 to 1.2t/ha. When you account for the cost of Luxor as opposed to DAP, the margin over input cost is significantly in Luxor's favour. This is the most impressive response from the products I've tried," explains Russell.

The combination of Twoxo and T6P is intended to maximise nutrient utilisation through the spring growing season. Twoxo contains a plant metabolite which increases carbon fixation and nitrogen assimilation. Russell applied it at GS32, hoping to improve nitrogen use efficiency at a critical time for building crop biomass.

This was followed by an application of T6P (trehalose-6-phosphate) — a signalling molecule which balances carbohydrate concentrations in a plant. It's used at flowering to aid the relocation of carbon at the grain filling period.

"The combination of Twoxo and T6P increased yields between 0.75 and 1t/ha, which is an excellent response. I've ▸

More technical detail is required for a biostimulant to find its place, says Hugo Rowland.

▸ used T6P for several years but was trying to isolate its value in the trials. This gives me the confidence to continue using the product."

Although it could be said that sustainability has become a buzzword in farming over recent years, for many growers, making strategic decisions across their operations to promote long-term viability is an integral part of their ethos. To some, this has meant replacing traditional pesticide solutions with biostimulants.

This is the case for David Fuller-Shapcott, who's using biological seed treatments as part of a move away from chemical alternatives to help secure long-term business sustainability, and improve soil health. Farming 369ha in the Scottish Borders near Roxburghshire, David has spent the past few years examining how to refine and improve his business.

He's part of the YEN network, which saw him win the bronze award for the best percentage of potential yield in oilseed rape in 2019, and another OSR bronze award for yield in 2022.

"We're farming mostly heavy clay, high magnesium soils which are sticky when wet but like concrete when dry," says David. "I've been focusing on soil health for a while, but now we're trying to refine that to improve the proportion of soil fungi, which is one of the main reasons I'm not keen on using fungicidal seed dressings on the crop. Though I've been told they have no effect, I have difficulty believing that a fungicide in the soil doesn't influence fungi populations."

Biostimulant seed treatment

This is where biostimulants have proved to be an alternative option, with David finding particular success using Newton, an organic plant-based biostimulant treatment from Interagro. Among its claims are to aid crop establishment and build healthier, more resilient plants in the face of stress factors such as drought.

"One of the main ingredients within Newton is signalling peptides," explains Interagro's technical manager, Stuart Sutherland. "These peptides are essentially signalling messengers for plants. By managing the balance of growth-promoting versus growth-inhibiting hormones, Newton triggers faster germination, signals exceptional root and shoot growth, and plants' defence systems."

He adds that several independent trials have proven this in recent years. "These trials have shown that by using Newton, it not only speeds up crop emergence by several days, but can also help build tolerance against stress by

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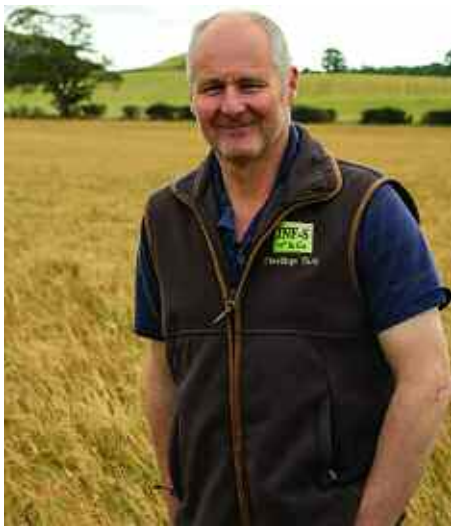


Using biological seed treatments has helped David Fuller-Shapcott move away from chemical alternatives to help secure long-term business sustainability and improve soil health.

triggering key defence mechanisms and even reduce the reliance on synthetic fertilisers by increasing rooting ability."

David tested Newton for the first time two years ago — comparing it with a phosphate-based seed treatment designed to help boost rooting, which was incorporated with a fungicide. "I trialled it in a field of spring barley, sowing 56m wide strips and comparing the tramlines of Newton with those of the competitor and a single-purpose dressing (SPD).

"I then asked the agronomist to see if he could find any difference," recalls David. "I told him where the breaks were in the tramlines but not what the products were, and he couldn't find a single difference between the fungicide and competitor tramlines, and where Newton was used alone.

"What we took from that is Newton was bringing a fair bit to the party in terms of how it benefited crop performance and reduced seed costs as a consequence. We took this through to combine yield at harvest over a weighbridge and found no statistical difference either, so now I use Newton alone. I don't bother with the competitor or SPDs in the spring; Newton does it all."

This season, all of David's spring barley was sown with Newton only, and he's looking to do some Newton-only autumn planting later this year. "My spring barley has all been direct drilled for the first time this year with the Newton, and it grew away fine. Generally speaking, it looks well.

"With my YEN hat on, it's evident that we have to enhance rooting to maximise output — it's imperative to both water and nutrient capture. As a seed treatment, Newton ticks that box well. Using it means my nitrogen use efficiency has improved because of greater rooting and water capture, therefore, I haven't been suffering in these dry springs we've been having recently."

One of the most common areas where biostimulants start to be used on a farm is as a 'pick-me-up' when a crop is struggling. Hugo Rowland, an agronomist working for Spunhill, had a farmer with a field of late drilled winter wheat, which they debated whether to pull up and sow maize instead. They decided to use UPL's Vitalroot as a last roll of the dice.

"The farmer sowed Extase into the field at the end of January following stubble turnips, which were grazed by his flock of sheep over the winter," says Hugo. "Even though the seed rate was high to account for the late drilling, the crows didn't leave the field alone. Bangers were out for weeks after it was sown.

"We reviewed the field in the middle of April and it was only at two tillers with a low plant population because of what was lost to crows. The spring had been exceptionally wet and we seriously considered giving up on the crop while there was still time to plant maize in May," he explains.

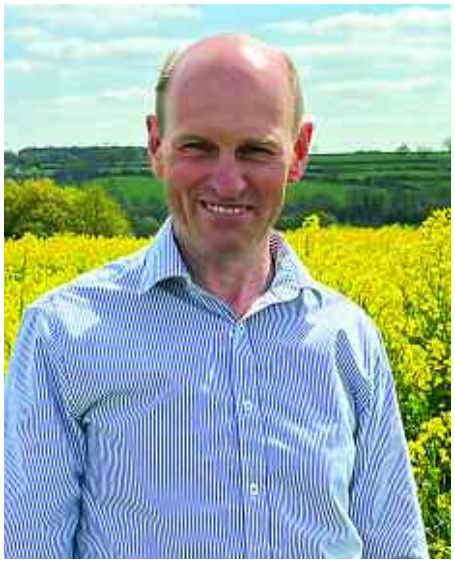
Recovery

"Spunhill had been evaluating the performance of Vitalroot and we decided to try it in this situation. I recommended 1.3 l/ha mixed with a foliar N, P & K product. Ten days after it was applied the turnaround in the crop was astonishing. The crop eventually yielded over 8t/ha which was an incredible result considering we were thinking of giving up on it; the farmer was delighted."

The main active ingredient in Vitalroot is GA142, which is an oligosaccharide isolated from seaweed extract, says UPL's Stuart Jackson. "It's filtered to produce a high concentration in the formulation, with added potassium and phosphate.

"The oligosaccharide kick-starts enzyme activity producing more amino acids for the plant's metabolic pathways, which has a snowball effect on the plant. More extensive rooting and greener leaves enhance nutrient uptake and energy conversion for further growth," says Stuart.

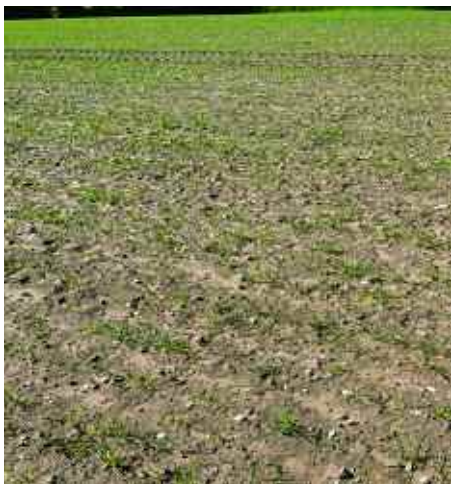
"We saw this effect in trials at our research farm at Shray Hill, very close to Hugo's customer. An autumn application of Vitalroot at 1 l/ha tank-mixed with the herbicide gave a yield increase of 0.7t/ha in the Theodore winter wheat, and 2t/ha in the SY Thunderbolt hybrid barley. We believe the yield advantage came from the treated plots being able to hold onto more tillers as well as a boost to overall crop health."



Stuart Jackson believes the yield increases in UPL's trials have come from increased tillers and a boost to overall crop health.

Hugo has seen biostimulants being used a lot more on farms, however, he believes technical detail is required for them to find their place. "Charts and data are useful to know that a product works, but you have to do your own trials and see the effects for yourself to have the confidence to recommend it on a farm," explains Hugo.

"In this case, the farmer was happy to give it a go because there was no alternative. I would use Vitalroot in more instances from the results I've seen this season," he concludes. ■



Vitalroot was recommended when a crop of winter wheat was still struggling come mid-April.