More than muck and magic?

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Technical
Biostimulants survey

With a much more holistic view on crop protection in vogue, there's a rising case for the use of biostimulants within the agronomic programme. *CPM* explores the potential.

By Charlotte Cunningham

As the industry focuses more and more on the "bigger picture" surrounding crop growth and protection, biostimulants look like they could become an important part of the strategy.

When used in the right situations, it's claimed biostimulants bring a whole host of benefits — from protecting crops against stress events, to boosting yields — backed up by in-field trial data.

But has the proof been enough to shake off the 'muck and magic' postulations?

In a recent survey carried out by *CPM* and Interagro, just 27% of growers said they remain unconvinced by the claims, whereas 57% revealed that they believe biostimulants have a place in the agronomic programme, in the right situation.

Delving deeper into the stats, 24% noted that biostimulants are a good insurance to help protect crops against abiotic stress. So just how beneficial can they really be?

To know where and how a biostimulant could be effective, the first step is to think about what is stopping your crops reaching their full potential, says Stuart Sutherland, technical manager at Interagro.

Limiting factors

According to the survey, more than half of growers (51%) cited lack of rain at the right time as the main factor limiting yield on farm, while 23% said it comes down to increasing weed, disease and pest pressures. "Generally speaking, weather is the most influential factor when it comes to yield potential," says Dr Syed Shah, NIAB. "As well as crop stress, it can also jeopardise the efficacy of fungicides which, as we know, can lead to yield penalties."

And though while there's not much that can stand in the way of Mother Nature, biostimulants could help prepare crops for stress periods and improve plant health which could help protect them better against other limiting factors, says Stuart. "The weather over the past few years has become more volatile and growers are feeling the brunt of it. There's also a desire to help fill the void of active ingredient loss with biostimulants — more natural non-synthetic green agri-inputs to reduce reliance on pesticides — and this comes through in the data with 29% noting loss of active ingredients as a key limitation."

Syed adds that while chemical options for plant protection are good, there have been sensitivity shifts, which he believes is a driver behind farmers looking into alternative options. "Practices like regenerative agriculture and biological solutions — including biostimulants — have grown in popularity as a result."

The survey highlighted that 35% of growers have seen a benefit when biostimulants were applied at establishment to improve root and shoot growth, with a further 32% stating that they think the products have helped the crop access ▸

Biostimulants can be a valuable insurance policy when the season goes against you, says Stuart Sutherland.

Trials carried out by Syed Shah have shown biostimulants work best when used in a low/no fungicide programme.

▸ nutrition more effectively. Others noted benefits at T0, and for helping to protect the crop from abiotic stress.

From their own trials, Stuart says that preventing abiotic stress is what they perceive as the biggest benefit of amino acid biostimulants. "This is where we have found the greatest gains — by taking a preventative approach. As soon as the crop goes in the ground you are fighting to protect the seed potential. You have to hang on to it and so optimising plant fitness early on is key."

NIAB has also been running trials on a variety of biostimulants, which has produced some interesting results regarding where growers are likely to see an advantage — or not.

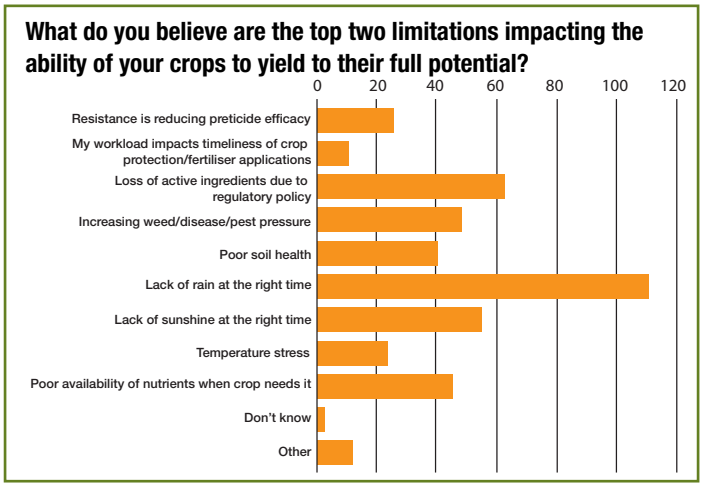
Trials were conducted at sites in East Malling, Hereford and Cirencester, explains Syed.

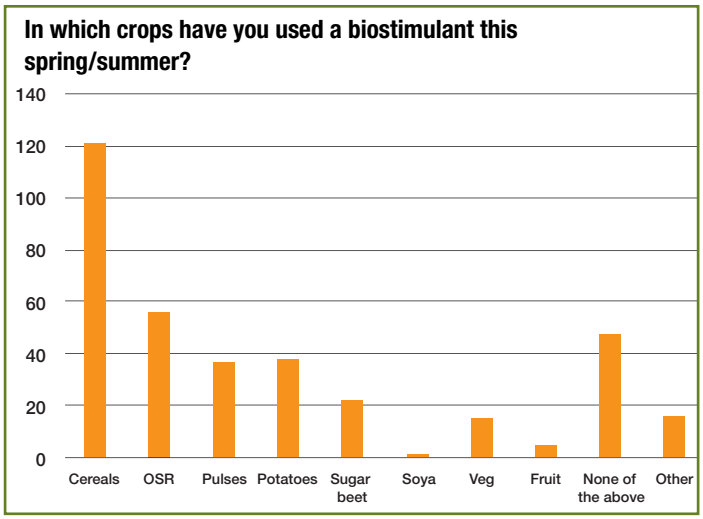
Significant effect

On crops given a robust fungicide programme he found little benefit — but where fungicides were reduced the biostimulants had significant positive effects, seen as a reduction in disease levels and increased yield.

Crops on the drought-prone Cirencester soils responded particularly well, he notes. "Biostimulant treatments with lower fungicide inputs had significantly higher green flag leaf area compared with reduced fungicide plots.

"In a high disease pressure year, fungicides will perform better, but based on these trials, it can be concluded that biostimulants have a place under low or zero-fungicide input systems. Soil bacteria and mycorrhizal fungi have also proven to have a significant effect on yield, but we do need to do further research and trials to identify when and how to use biostimulants for maximum effect."





When it comes to the ingredients list, biostimulants can be derived from a number of sources, with 36% of growers stating that they're using phosphites and other inorganic

Product selection

Though the market is currently awash with biostimulant options, 19% of growers said that a proven return on investment is the most important factor for them when it comes to choosing a product, and similarly, 17% believe it's crucial for their product of choice to have been proven in independent/distributor trials.

"As an agronomist, it's really important to have independent data," says Syed. "When I'm looking at trials and figures, I want to be able to see whether the trends and results have been cherry-picked data, or if it they are based on real facts and behaviour."

What's more, 29% of growers said a biostimulant had been an additional expense, while just 6% said it replaced something else — so what's the best approach to make decisions stack up financially?

"What is important to remember is that there is a cost involved with biostimulants, and a lot of the time, they aren't cheap. To get a tangible benefit, I believe you have to use around 2 l/ha of Bridgeway. If we look at the costs, this will cost you between £15-20/ha. So it's really important to weigh up the options.

"For example, if we look at T0 and controlling yellow rust, at this stage, it will cost me around £4/ha with tebuconazole.

"Am I going to use biostimulants to provide activity against yellow rust? No, that's not the job of biostimulants. So there's a risk that I could just be making it an unnecessarily costly timing."

That said, Syed says there is the potential that a biostimulant at this stage could delay the onset of disease in the crop, giving growers a little bit more flexibility to get a spray on. "But eventually, tebuconazole will be the only course of action."

He adds that to make the most cost-effective decision, it all comes back to thinking about those yield-limiting factors.

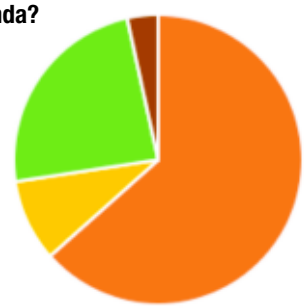
"These yield limiting factors are incredibly important when it comes to deciding whether or not to use a biostimulant and a decision must be based on what's in front of you at the time. If conditions are dry around T1 ask yourself — do I really need a full-rate fungicide?

"Here, it's important to think about what the yield limiting factor is — is it moisture or is it disease?

"In this situation, it's most likely to be moisture, so instead of using a robust fungicide I would recommend perhaps straight tebuconazole with a 1.0 l/ha of Bridgeway. This means saving money on fungicides and spending on a biostimulants, which will have additional benefits on plant rooting."

If growers are unsure whether or not biostimulants could work for them, Jackie recommends setting up a trial on their own farm. "You don't need to do a huge area and in fact, I've seen good results on just tramline trials. But it's a really useful way of getting to grips with the realistic performance you can expect to get from these products."

Have you ever used Interagro's amino acid based biostimulants Bridgeway or Zonda?



- Not used, no experience but interested to know more
- Not used, no experience and not interested
- Used it
- Other

How do you envisage your use of biostimulants will change moving forward?

- Likely to replace other inputs
- Likely to use a lot more
- Will use if the season requires it
- Don't know
- Likely to use less
- Won't use any
- Stay the same

salts this season, while 32% have opted for amino acid/protein hydrolysate products.

"It's not surprising that the majority of people are using phosphites because this has been proven to have a specific benefit when it comes to downy mildew in oilseed rape and legumes, and there's good evidence to support this," explains Syed.

"Over the past six/seven years, I've done a lot of work on amino acid-based biostimulants and what I have found is that they tend to improve rooting and above ground biomass. However, under normal fertiliser regimes and fungicide input systems, their effects on yield can be quite unpredictable and inconsistent, as explained earlier.

"If you want to see a consistent benefit, from my experience it's essential to apply the amino acids earlier during the season. When I say early, I mean GS25 (winter wheat) and pre-T0."

But does this performance and efficacy vary between crop types?

According to the survey 56% of growers have used biostimulants in cereals this year, with a further 26% including them within their OSR programme.

Beet benefits

The winner of the *CPM*/Interagro tie-breaker question was Jackie Cotton from Northumberland, and after finding out she is an independent crop consultant, she was invited to give her views on biostimulants.

Jackie says a crop she has seen particular benefits in is fodder beet. "I've tried a number of different products, but the best results I've seen so far have been from using amino acids in fodder beet. Specifically, I used Bridgeway and saw a 7% yield increase. For me, this is a must-have in all fodder beet recommendations from now on."

However, she says she has seen less consistent results in cereals. "I'm less convinced about its abilities in cereals as the results have been much more variable. However, I'm going to trial it in some OSR in the autumn. To get the best out of biostimulants in cereals, I think you have to be really specific with the timing of application.

Jackie Cotton says she has seen real benefits when using biostimulants in fodder beet.

Syed echoes this view. "In potatoes, sugar beet and fodder beet, the benefits of using biostimulants are much more obvious and I have seen some benefits first-hand in potatoes and fodder beet. In cereals, this can be much more hit and miss."

Stuart adds: "Biostimulants can be a valuable insurance policy when the season goes against you — sometimes they will pay out, and sometimes not. We have found cereals to be less consistent but the key is to go early, from crop establishment onwards." ■

Bridgeway benefits

The survey revealed that 64% of growers had never used Interagro's amino acid-based biostimulants Bridgeway/Zonda, but they were interested to know more.

Marketed with the tagline 'reduce risk and release potential', Bridgeway, has the capability to increase the resilience of crops to climate change and unlock their genetic potential, believes Stuart. "These two factors are what we perceive to be the biggest challenges facing profitable crop production at the moment. However, by feeding a crop a product like Bridgeway helps to ensure a good supply of amino acids — the building block for protein which is a critical element in crop health."

So where can it be used?

"Bridgeway can be used from two true leaves (GS12) in cereals and OSR to aid crop establishment and build resilience, as well as at the key stages of crop development to help crops reach their genetic yield and quality potential," explains Stuart. "It can also help the crop resist/recover from stress, and also increase the metabolic efficiency of the crop.

"Where crops are struggling to access water and micronutrients, Bridgeway could be a useful aid. And in organic systems, Bridgeway's organic certification means it's a helpful tool in the armoury for improving plant health and maximising yield and quality."

And how does it work? "Bridgeway contains high levels of L-Proline which helps counteract the effects of abiotic stress, and L-Serine which increases resistance to stress. If the crop has all the amino acids it needs from Bridgeway, it will not need to self-destruct by breaking down the proteins (it has made for other important processes in the plant) to produce the amino acids required to aid stress recovery and repair."