Difficult season shows benefits of biostimulant and foliar feeds

2025 was a challenging season for most potato growers, particularly in terms of weather, and so it was perhaps natural that Emerald Research would end the year with a webinar reviewing some of the difficulties and looking at how its own OptiYield system of analysis and nutrition has benefited users.

Presented by former Defra minister George Eustice, who is now an advisor to Emerald Crop Science, the event featured discussions between Emerald's founder and CEO Simon Fox and agronomist Chris Gamble of BioYieldCare.

Setting the context, Simon explained; "It's been a challenging year for farmers and growers out there. There have been some absolute horror stories, but for our growers, despite the extreme conditions of very hot weather and some having no rain to speak of for four or five months, in general they've had very good yields. We've had consistent yields and good quality."

Chris added that a season like this, where crops are particularly stressed, can really show the benefits of using biostimulants and foliar feeds as part of the crop nutrition programme. "There's been a lack of rain, so the nutrients coming through the soil have been a lot more limited and we have seen deficiencies," he explained. "So, a system like OptiYield, which allows you to look in the crop, find out what the crop needs for its stage, and put that in in a foliar and safe way, has been critical this year."

"The systems that have been used for the last 40 or 50 years aren't really delivering and aren't able to support resilience, which is why we developed the OptiYield system, starting with soil analysis so we really understand what the soil can deliver to the crop. That gives us the basis from which to create a platform for the rest of the crop."

As a result, he believes farmers are able to deliver consistent yields no matter what the weather conditions in hot, wet or dry years for example, while "at the same time reducing inputs quite dramatically". The driving principle is to feed the crop directly, rather than putting nutrients into the soil and hoping the crop can find them.

George Eustice.

Simon Fox, founder and CEO of Emerald Research.

"I think resilience is going to become an increasingly important issue for farms," said George Eustice. "I have a view that over the next few years building resilience into some of those support schemes that government have, and approaches that give them more financial resilience as well is going to become increasingly important."

He continued that customers such as supermarkets are increasingly concerned about their Scope 3 emissions in their supply chains, and that reducing carbon intensive inputs such as fertiliser, is therefore more important than ever, particularly given the importance of nitrous oxide from fertiliser applications in potato production.

"Anything you can do to reduce the amount of nitrogen you're putting on, because that's one of the biggest elements – as is phosphate – and anything you can do to improve that so the crop is assimilating nitrogen or phosphate is being mined out of the soil by microbes, make a real difference to the crop and to the farmer's profitability and sustainability of the crop," stressed Chris.

Emerald Research is part of the TRIP (Transformative Reduced Input Potatoes) programme – which includes partners such as Dyson Farming Research, the James Hutton Institute, Light Science Technologies and Bangor University – who are working to integrate regenerative agriculture and novel nutrient and breeding technologies in potato production. "Our part is centred on our OptiYield approach, and has essentially demonstrated that this approach works," explained Simon. "It is based on a holistic system with a programmatic approach, based on crop demands which are variety specific, and that really makes the difference."

Patrick Elliot of Cresswell Barn Farm in Pembrokeshire has been using the OptiYield system for the last ten years and has increased its use from five hectares to cover most of the farm's 200 hectares. "The last large trial we did was in 2022 on a field of whites and we saw a 3t/ha yield difference," he explained, and believes that his yields are now 15-25 per cent higher than he achieved under his previous fertiliser regime.

"The Symposium biostimulant is definitely a big positive. After seeing a difference in emergence and when digging in the ground you see a mass of roots compared to our standard programme back then using Amistar, and we want to continue doing something right. It is a lot kinder to the soil, and we have never looked back." As the farm also grows salad potatoes for Puffin Produce, earlier emergence of up to ten days compared to untreated crops is another benefit, as is the evenness of tuber size across crops.

Simon points out that the farm has also reduced applications of both nitrogen and phosphorus as part of the OptiYield programme, which is delivering both economic and environmental benefits to Cresswell Barn Farm, with Patrick favouring smaller

Chris Gamble of BioYieldCare.

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year-on-year reductions rather than a single big drop in nutrient use. "I'd like to think we can cut it a bit more next year, but we need to sit down and look at where we can make improvements," he said.

"Making sure you've got the soil structure underneath to support the crop you are trying to grow on top, particularly in with a crop that is as poor rooting as potatoes is vital," added Simon. "Products like Symposium [which is applied to the seed] will really invigorate root growth and root exploration, but if it's hitting a pan, it's not going to go anywhere, so having that soil structure is key. Symposium is a synergistic mix of bacteria, fungi (mycorrhizal fungi in particular), and matching biostimulants designed to improve growth from planting."

Chris explained that getting good root establishment is fundamental to improving crop yield and resilience, particularly in a challenging year such as 2026. "It is about laying a very good foundation for a very good crop and taking out a lot of stress," he emphasised. "It's enabling the plant to have the best response to subsequent treatment, so when you go in with those subsequent treatments they are building on that really good foundation within the knowledge of the system, and that's what makes it unique." A better rooted crop not only improves water availability but also increases the crop's ability to extract mineral nutrition from the soil.

"Because we are not using other chemicals in the soil, in a sense it is allowed to recover," added Simon. "So, you will see quite a lot of earthworm activity, and other biotic activity in the soil leading to better structure, and therefore a healthier, more vigorous crop... The early emergence is down to the Symposium, but also due to the fact we haven't been applying fungicides which tend to actually check early growth and vigour in the absence of disease." He also explained that as the system favours foliar nutrient applications over base dressings, the formulation of those foliar nutrients is "absolutely critical".

Once again, there is a focus on improving resilience by improving the crop's ability to cope with stress, an area where biostimulants really come into their own. "Abiotic stress and heat stress is something that we haven't really been challenged with in this country, so it's quite often difficult to get a good response to biostimulants," stressed Chris Gamble. "But this year is different. This year, because of the abiotic stress mitigation in some of the components of Symposium we are able to change emphasis slightly which has built yield which is critical. It is a managed system. It is not gambling; it's science and looking at nutrient use efficiency in these formulations."

"It is a programmed approached," emphasised Simon Fox. "It's that balance of nutrients, with the input of biostimulants for a specific purpose at specific timings, which is endemic to the programme. It's not a product-based approach... The use of specific foliar nutrients at specific timings means we can essentially programme into the crop the tuber size distribution. It's not just about [tuber] numbers, it's about evenness."

This is possible because the OptiYield system models crop growth through the season. "The weather is unpredictable, so we include our monitoring systems which include day degrees, and variety-specific characteristics and tissue analysis, so that we can monitor the changes in the crop and respond accordingly in virtual real time, whereas to many standard programmes are too reactive," he continued. "After the event it is already too late to do much to correct things." ◆

One benefit of the system is improved crop uniformity.