



Dr Syed Shah

Evaluating the impact of bio-stimulants on crop growth

The bio-stimulant market has exploded in recent years, offering an answer to reduced chemical inputs and big healthy crops, but do they actually do what it says on the container?

Dr Syed Shah, regional agronomist for NIAB, the National Institute of Agricultural Botany in the UK, has made it his mission to get under the skin of these purportedly natural enhancers. Having undertaken a number of research trials for NIAB he has written three papers on the subject which he will be sharing in the AHDB Theatre at the Cereals Event in Lincolnshire, UK on June 30, 2021.

Established in 1919 to assess the merits of varieties and seed quality, NIAB has grown in size, expanding its cropping and research expertise to the extent that it is now a major international research organisation in plant science, crop evaluation and agronomy.

“Bio-stimulants tend to work in controlled environments, but does that translate in field conditions?” he asks.

To answer this question, Dr Syed Shah carried out trials in winter wheat and spring barley on different soil types from 2018 to 2020, with mixed results – sparking interest in further scientific research.

So what exactly are bio-stimulants? According to the European Biostimulants Industry Council (EBIC) they are materials whose function is to stimulate the plant’s natural processes to benefit nutrient uptake, efficiency, stress tolerance and yield.

They may contain seaweed extracts to promote root growth, humic substances, or chitosan to improve the plant’s defence responses. Anti-transpirants reduce water loss, while amino acids and growth-promoting bacteria stimulate root and leaf biomass. There are also non-pathogenic fungi and mycorrhizal fungi soil improvers. Bio-stimulants can be applied as seed, soil or foliar treatments and there is reasonable evidence that they improve plant growth and yield.

The biggest issue is that they are currently unregulated in the UK, so as long as manufacturers don’t claim to have any direct impact on pests or diseases, effects don’t have to be independently trialled, explains Dr Shah.

“There are no specific guidelines in the EU or UK and there are significant differences across Europe about how they are authorised.”

However, this is due to change: From July 2022 bio-stimulants will fall under the same regulatory framework as all other types of fertiliser and manufacturers will need to prove the effects claimed on the label. The supporting data can be based on glasshouse or controlled lab conditions, but that data might not be relevant or repeatable in the field conditions.

“Some bio-stimulants have shown to improve crop colour (dark green), above ground biomass and root growth, but will this translate into yield? Companies may show data that demonstrates an effect which may not be repeatable in independent trials – so ask for independent data.”

This is where NIAB’s trials come in.

Dr Shah has conducted trials at East Malling, Hereford and Cirencester. On crops given a robust fungicide programme he found little benefit – but where fungicides were reduced the bio-stimulants had significant positive effects in reducing disease levels and increased yield.

Crops on the drought-prone Cirencester soils responded particularly well.

“Bio-stimulant treatments with lower fungicide inputs had significantly higher green flag leaf area compared with reduced fungicide plots,” he explains.

“In a high disease pressure year, fungicide will perform better, but based on these trials, it can be concluded that bio-stimulants 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 bio-stimulants for maximum effect.”

Visitors to Cereals, which takes place from June 30-July 1, 2021 in Lincolnshire, will also be able to speak with exhibitors specialising in bio-stimulants, to find out what’s new to the market. These include UPL’s new bio-fungicides Iodus and Thiopron, the bio-stimulant Vitalroot and bio-seed treatment Sylas.

“Sustainability is clearly on the agenda,” says Vaughn Stansfield, UK manager at UPL.

“As an industry, we are looking to move forward in a sustainable manner, but it needs to be done profitably and these two things aren’t mutually exclusive.”