

Why is green leaf area so important to monitor in cereal crops?

Product Update
02.02.2017



Building a technical understanding of the science behind the active ingredient within a fungicide, and how it can deliver the disease control that growers require, is fundamental to the development of any new crop protection product.

This is exactly what Dave Bartlett, principal technical specialist at Syngenta, and his team, work on daily. They develop a comprehensive understanding of what a product is doing from the time it is sprayed onto the leaf, through to the time where it's exerting disease control in the plant.

"Biokinetic work is something we've done at Syngenta since the 90's when we first launched AMISTAR. Most recently we've used it extensively for the development of our new SDHI fungicide," says Mr Bartlett.

The science

"We've specifically carried out biokinetic studies in semi-field and field conditions, to gain an understanding of how this new active performs at a commercial level which is very important for our growers to see evidence of," he says.

From the biokinetic work undertaken, Mr Bartlett explains the properties of this new fungicide and how it results in persistent disease control.

"After application, the active moves into the leaf and accumulates within the wax layer which subsequently provides a reservoir of the product.

“This reservoir is then maintained over a prolonged period of time, where it is slowly metered into the cells of the leaf.

“This measured rate of uptake of the active into the plant tissue, combined with the acropetal movement within the xylem system, from the base to the tip of the leaf, combined with a slow rate of degradation, is what provides persistent disease control. In this case, we’ve seen an excellent broad spectrum of activity against both *Septoria* and rust pathogens.

“It’s all about protecting the leaf from fungal pathogens for a significant period of time. If you can achieve this, leaves will stay greener for longer, more photosynthesis can occur, and this directly relates to yield benefits. And, this is even more significant when you’re protecting the yield bearing flag leaf at T2,” he adds.

The trials

Jason Tatnell, technical manager at Syngenta explains how the biokinetic work underpins the results seen in field trials, on a commercial scale.

“It all starts with the biokinetics. By understanding the mode of action and speed of movement, and knowing it’s a stable molecule which stays evenly spread on the leaf, you can intuitively see how it’s going to provide long-lasting disease control, and therefore help maintain green leaf area (GLA).”

Mr Tatnell explains that there is already a well-known link between GLA and yield, illustrated by the Gompertz curves. “It’s scientifically proven that extending the duration of GLA from the point of flag leaf emergence can equate to an additional yield of 0.15t/ha/day.

“What we’ve seen in multiple trials carried out across Europe, and most importantly in the UK, is the ability of ELATUS™ ERA to control key cereal diseases and extend the amount of time the leaf is green before senescence, when applied at T2 to the flag leaf. And this is all without necessarily affecting the harvest date.

“So rather than senescence being elongated over four or five days, we’ve been able to keep the crop fully functioning very close to the day of harvest. Senescence is more condensed towards the end of the plant life cycle.

“This has ultimately resulted in significant yield benefits. In recent wheat trials for example, ELATUS™ ERA maintained an average green leaf area of 65% up to 56 days after application equating to an average total yield of 9.8t/ha, which was far greater than other SDHI fungicides used for comparison within these trials.

“What we’re consistently seeing is the product's ability to maintain a yield building level of GLA for a longer time, but without affecting the end harvest date,” adds Mr Tatnell.

Last season Syngenta also conducted an additional in-field trial to measure disease control and GLA through time-lapse photography. “We wanted to see if technology could capture and record what a trials officer can see day in day out when it comes to GLA.

“So, at our Newark Innovation Centre, we set up two comparison wheat trial plots, spraying one with

ELATUS™ ERA and the other with a comparative SDHI fungicide, at the end of May. We then monitored crop progress, and specifically GLA percentage via a predefined algorithm with the ability to generate black and white computer imagery, until senescence at the end of July.

“By analysing the images produced during the time lapse trial, we were able to assess the proportion of green matter, represented by the black area pictorially, to dead matter, with ELATUS™ ERA retaining a GLA percentage of 87% 10 weeks after application, with the comparative SDHI fungicide maintaining 57%.

“GLA is something that is visible to growers, but often overlooked as a means to measure the potential success of a crop. Yield is king, and comes from maintaining green leaf area. By timing applications right, particularly at T2, and using a fungicide with proven persistency, top yields can be realised,” says Mr Tatnell.

Tags:

Cereal Fungicides