



Eye in the sky

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locations, says Thomas.

“We can now set out a map for the field or plot and can go back to that location knowing that the drone will take the same amount of imagery at the same resolution, height and speed, so we can build an accurate assessment of changes along a specific timeline.

“We can, for example, use a specific drone equipped with a multispectral lens so we can put that into software and look at the canopy coverage of spring barley plots to see the rate of establishment by the density of the canopy.

“We can then utilise a wide range of visual filters and select the one that gives us the most information,” he says.

“In other crops, such as spring beans or maize, we might want to count the number of plants because that will give an overall performance of establishment by providing actual quantitative data.

“We can then use a different drone using a standard lens to collect red, green and blue (RGB) maps to analyse. It could be we see a particular treatment producing better germination than another and this can be demonstrated as a visual journey as the crop develops.”

Several field-scale trials can also be run on-farm simultaneously to establish the best combination of inputs and management for that particular location, adds Thomas.

“We can run varietal plots in one area, have fungicide trials on the other side of the field, and then in the middle we’ll often have nutrition plots. We can collect a huge amount of data in each flight and this builds over the season. ▶



Andrew Lowe has already seen savings in fertiliser of over 30% on high-yielding crops of Group 4 wheat at White House Farm, Bozeat, Northamptonshire.

Drone technology

Drones may not be new to the industry but they are becoming increasingly sophisticated and are being utilised for more and more operations as the technology improves. CPM investigates.

John Swire

New aerial assessment techniques being rolled out by Agrii using image capture from drones can help growers significantly increase productivity and optimise input use, says the company’s crop input specialist Thomas Perrott.

Achieving better nitrogen use efficiency, controlling weeds more effectively, identifying the extent of disease problems and quantifying the yield impact of different weather conditions, are just some of the wins now being achieved, he says.

“Drones in themselves are no longer new, but what is changing rapidly is the accuracy of imagery collected and the software around this that enables data to be visualised and analysed in completely new ways.”

Significant equality

Agrii has invested significant equity into Drone Ag, Jack Wrangham, Drone Ag’s CEO, says: “Agrii’s investment in Drone Ag will not only help us accelerate the development of our technology but will also enable us to provide even greater value to our customers. Agrii will be able to leverage our technology to deliver more accurate, efficient, and sustainable crop management services to its customers.

“With Agrii’s support, we can continue to develop our technology and help farmers improve their productivity and profitability. The investment from Agrii is a significant milestone for Drone Ag, and we look forward to collaborating with Agrii to create innovative solutions that will shape the future of agriculture.”

The biggest advantage drones provide is the consistency and continuity of data, achieved through the growing season by facilitating accurate assessments on a regular basis at precise, repeatable



"Drones are set to be a transformational technology in agriculture over the next few years," says Jonathan Trotter.

► "We can then discuss with growers how they can achieve a really strong crop as quickly as possible with the least number of inputs, so they know they have the best foundation for yield as the season progresses."

A lot of the work now being carried with drones at a farm level is, in fact, around crop nutrition, he points out.

"We know that placement fertilisers are a good way of laying down a sound foundation for growing crops, but there is now a new research journey emerging around this," explains Thomas.

"What are the best options, where's the best placement, what else can we put down the spout these placement fertilisers and is there a benefit of adding micronutrients such as zinc, boron and molybdenum to the base fertiliser?"

With so many new products coming onto the market, Thomas believes there's still a huge amount to learn about whether they live up to their claims and how they can be fine-tuned.

"Products can be nutritional biostimulants, or they can be 'soil amendments' of some description. These have an effect on how the soil's biology reacts to the nutrition applied, as well as how nutrients get into the plant," he says.

"One of the most promising of these, and one where drones are playing a key role in evaluating, is a new sustainable organo-mineral fertiliser called Fortis OMF, which looks like it could be a real alternative to traditional NPKS compounds.

"It's a 12-4-4 organic pellet that is broadcast ahead of the drill and contains 70% mineralised N, which is available to plants as soon as they emerge."

Thomas believes it's a 'best of both worlds' product that has a benefit to soil

health because it delivers such a high amount of organic matter, as well as delivering nutrition. Every 1t/ha applied provides the equivalent organic matter as 4t/ha of FYM.

"The drones are allowing us to conduct full-scale field trials on this instead of the micro-plot analysis we traditionally would have undertaken, so we are really excited about this and confident some really meaningful results will be forthcoming shortly."

According to Agrii's lead pilot and technology trial manager Jonathan Trotter, drones are set to be a transformational technology in agriculture over the next few years.

"The potential is huge. We are already starting to use drones with our customers to effectively identify early indications of potential localised problems, such as nutrient deficiency or pest infestations, before they become a major problem.

"As well as leading to more precise applications of fertilisers and pesticides, these are saving growers' time, money and labour, as well as delivering significant environmental benefits. But it really is just the tip of the iceberg," says Jonathan.

Larger payloads

"There are so many possibilities including swarms of drones applying specific agrochemicals to crops, as well larger individual machines capable of carrying larger payloads, all controlled remotely and working with real-time data at an individual plant resolution.

"The issue moving forward is not really the potential of the technology, but ensuring it aligns with the legislation surrounding it and, to a degree, helping shape this."

Which is precisely why Agrii is putting itself at the very centre of this process and working closely with the Civil Aviation Authority (CAA) and other key bodies to establish safe working practices and operational strategies for the future, he says.

"We want to explore what is going to be possible and make sure it complies with all guidelines and legislation so growers and the wider industry can get the most benefit out of it."

Northamptonshire grower Will Green believes drones could be the most important piece of technology he has seen in his near 40 years of farming.

Working with Agrii agronomist Andrew Lowe, he has already seen savings in fertiliser of over 30% on high-yielding crops of Group 4 wheat at his White House Farm, Bozeat, near Wellingborough.

"We would normally stick pretty much

to RB209 recommendations for fertiliser applications, which said we would need to apply 220kgN/ha to achieve our target yield in 2022," he explains.

"Using the drones estimate of GAI and linking this back to our SMN tests, the Agrii system said we should need a total of 150.75kgN/ha in one particular field, so this is what we applied over three splits in March, April and May 2022.

"On two other fields, the recommendations came out at 152.43kgN/ha and 162kgN/ha. So the average savings ranged from 57.5kgN/ha to 69.25kgN/ha, which is pretty sizeable considering the cost of nitrogen at that time.

"Highest yield came in at 9.4t/ha, pretty much the best we ever get here, with an average of 8.25t/ha which, considering the massive savings we saw in fertiliser costs, was a great result."

The previous year saw fertiliser savings of up to 50kgN/ha, so Will is pretty convinced of the robustness of the system.

"It's really useful for giving an overview of your crops, too. You can spot where drainage issues might be starting and be able to do something about it, as well as maybe paying particular attention to soil structure in those areas.

"Weed mapping is something we would like to get into eventually and the drones are also really useful in checking out dense crops, such as oilseed rape and beans, as they develop."

But the best is yet to come, he believes.

"I keep thinking about the evolution of the tractor from an engine on wheels to the computer-controlled, auto-steering and highly sophisticated machines they have become.

"I don't think anybody at the time of their introduction would have any idea of how much impact they would have on how we farm and I feel drones are in the same category.

"We're only just starting the journey with them, and the next 20 years will see a revolution in their use." ■



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