Toolbox gets a tech boost

Innovation Meeting tomorrow's challenge

Digital agriculture is shaping arable systems across the globe, redefining the effectiveness and efficiency of what can be achieved. *CPM* explores what's in store for UK growers with some major releases planned for 2021.

By Tom Allen-Stevens

While most growers will be glad to see the back of 2020, one thing our experiences may have brought to light is the value of digital tools when movements are limited and interaction restricted.

Looking ahead to 2021 and beyond, these tools are also set to be increasingly significant solutions in agriculture as farmers seek innovative ways to produce food more sustainably, but at little or no additional cost to consumers, believes Greg Meyers, Syngenta's global chief digital officer.

"Breakthroughs in biology and chemistry have delivered 150% greater food production from only 12% more land area over the past 50 years," he notes. "But as global demand for food continues to grow, amidst climate change, we know that natural science alone cannot continue exclusively to fill the gap."

Greg's driven digital revolutions in industries from pharma and biomed to mobile phones, and has brought his background in computer and data science to agriculture and food production.

"Digital ag is going to be the next breakthrough in farming. This time, however, rather than looking exclusively at yield, or the amount of food a crop can produce, digital tools will focus on different traits consumers and regulators are looking for, such as lower water use, fewer inputs used by a farmer or a lower carbon footprint."

Technology innovations

It's a belief he shares with some of the sharpest technology innovators across the globe. Funding for agtech has more than tripled over the past five years, according to venture capital firm Agfunder, bringing new people with fresh ideas into agriculture.

"Syngenta is the world's largest agricultural innovator and sits at the forefront in bringing digital technology to life to help meet the needs of consumers and at the same time improve growers' profitability," adds Greg.

And that's no mean challenge in an increasingly volatile climate. He points to projections published in *Science* that suggest for each 2°C rise in global temperature, yield decreases by 31% in maize corn and 46% in wheat. "In Europe, farmers face increasing regulation of what and of how much chemical can be used. Managing this complexity with fewer options in the toolbox is hard enough, but to do so with wheat prices at the same level they were 30 years ago puts tremendous economic pressure on UK farmers."

Syngenta is the only company to have industry-leading digital farming platforms in all the leading four agricultural markets, he claims. This puts algorithms and tools at the fingertips of tens of thousands of growers in more than 20 countries — 63% of sugar mills in Brazil and 1 in 3 mega farms in Ukraine are already using them and Syngenta expects to increase this coverage to more than 40 million ha by the end of this year.

Here in the UK, farmers will be the first in Europe to benefit from Syngenta's flagship tool, Protector, due to be launched next year. This is a scouting tool used by farmers and agri-businesses in Brazil, with algorithms that convert pest pressure scouting events to localised spray maps. "What Protector does is take your observations and turn them into actions," notes Sam Grimsdell, digital agricultural manager for UK and Ireland.

Protector has come from Strider, an agtech startup that launched its new tablet-based tool to Brazilian farmers in 2014 and quickly gathered a customer base of the country's larger arable farmers. The tool

Greg Meyers believes digital tools will focus on different traits consumers and regulators are looking for.

Problems pinpointed by Protector's precision

Spotting a problem in time to deal with it can be tough on any farm. When you have 450,000 ha spread over 16 farm units it can be logistical nightmare.

Soybean, maize and cotton growers, SLC Agricola, monitors pests and diseases across a vast spread of Brazil using the Syngenta Protector scouting and recording system. This helped the business reduce inputs and logistics by 37% last season, primarily through precision application only onto specific targeted areas where pest activity had been pinpointed, and at the optimum timing to enhance product performance.

With most of the reductions achieved by Protector in insecticide treatments, further savings have also been found with herbicide applications. The company is now in its fifth season of investing in digital agriculture tools, focused on optimising efficiencies across the business. Drones, satellite imagery and harvesters that can feed back real-time information to digital decision support tools are

SLC Agricola monitors pests and diseases across a vast spread of Brazil using the Syngenta Protector scouting and recording system.

among SLC's connected equipment. New developments are looking at matching the best varieties of different crops to the farms' soil and growing conditions.

Climate management is set to be the next focus of attention for the company's digital agriculture coordinator, Ronei Sana. "It's not just about reducing costs and increasing productivity, what we implement also seeks to reduce the environmental impact," she says.

The strengths of the tools lie in the quality of the data pulled in, says Sam Grimsdell, presented through a clear, easy-to-use interface.

the field you can not only drop a pin to geolocate it, but quantify the scale of the problem, and the tool then paints in a heat map."

But that won't just be a pretty picture. The maps can be exported to create a variable rate application map, and there's already data integration with MyJohnDeere. "We're currently piloting the tool with 150 growers across the UK and using their feedback to refine it for the UK market. The plan is to launch it in the spring and what we'll be doing over time is to integrate all of our agronomy tools into Protector."

It's the sum of its parts that could make this a very interesting development for UK growers. Syngenta has a history of bringing ▶

gathers together information drawn from crop-monitoring in the field with satellite, weather and other data to create heat maps and infographics.

Strider was acquired by Syngenta in 2018 and the tool has gone from strength to strength since, seeing a 400% increase in

use of applications between May 2019 and May 2020. "It's currently used across five million ha of US and South American farms, and we're bringing it to the UK next year," says Sam.

"Protector is really quite unrivalled as a scouting tool — if you observe a problem in

Spray assistance at your fingertips

Any spray operator who's visited the Syngenta stand at an event or brought a query to the spray application team would likely have gained some valuable tips. Much of that know-how has now been distilled into a useful app.

Launched at Cereals Live this year, Spray Assist now has around 900 users, who have helped shape the user interface and functions ever since it was first released at LAMMA, reports new farming technologies lead Harry Fordham.

"The question we're asked most often is which nozzle is best to use, and that's the job it's

The app brings in detailed localised weather data and gives you a tailored spraying forecast for the next five days.

designed to do. But it does so much more besides," he enthuses.

The app brings in detailed localised weather data and gives you a tailored spraying forecast for the next five days. This includes temperature, rainfall, wind speed and leaf wetness to help select your spraying window. "Those operators working over a wide area can save different locations, while you can set up your sprayer with your selection of nozzles — Spray Assist will advise on the best nozzle for the job and the pressure to put through it to ensure you minimise drift."

Harry's favourite feature is the Pre-em Predictor. "You tell the app what day you drilled, or when it's planned, and your soil type, and it gives you best weather, soil conditions, crop emergence and weed germination information. That's handy in catchy years like this one, but in dry years it gives really good guidance on when's best to go."

Free to download, Spray Assist is available for both Android and iOS smartphones. "The information we give out is based on 25 years of thorough application trials, along with cutting-edge research carried out at Syngenta's centre at

Spray Assist now does so much more than just choose which nozzle is best to use, says Harry Fordham.

Jealott's Hill in Berks. That's a massive database and ensures you can be confident in any advice you receive. The beauty of the app is that it puts all that at your fingertips," says Harry.

● Look out for the new 3D90 nozzle, due to be launched in early 2021. A step-up on the award-winning Defy 3D, it's angled just right for maximum spray efficacy at the T0 and T3 spray timings, says Harry. Drift reduction is built in and trials have also shown unrivalled penetration of the potato canopy, he adds.

Blightcast includes a forecast using the Hutton Criteria to model more aggressive strains of blight.

▶ tools to the market that help with thresholds and decision-making. "Globally, Syngenta is a market leader in digital agriculture. Although growers in the UK may not recognise this, many hundreds already use our tools.

"Our strengths lie in the quality of the data we pull in, presented through a clear, easy-to-use interface. Growers get plenty of functionality and the ability to tailor tools through apps that are simple to set up and intuitive to use."

Blightcast, for example, is now established as a tool trusted by around 1000 potato growers and agronomists to help cope with more aggressive blight strains. It includes a forecast using the Hutton Criteria to model strains of blight capable of developing at shorter periods of 90% relative humidity. local weather forecasts are incorporated with sophisticated disease-modelling algorithms, to predict blight risk for up to five days ahead.

BYDV Assist is now in its second year with more than 700 users, who rely on the tool as part of their integrated pest management strategy against aphids following the loss of neonicotinoid seed treatments in cereals. The tool can be used to optimise spray timing to target the second generation of aphids, based on a model

using the T-sum 170 day-degrees threshold. "It's a very quick and easy solution for quite a difficult risk assessment growers and agronomists now have to make, so we've had some favourable feedback," reports Sam.

Nearing its commercial UK launch, set for early 2021, is Syngenta's new disease-scouting tool. Known as Avizio in France, where it was developed over 10 years, it's helped over 1000 users refine their treatment decisions, he reports. "The tool has delivered very reliable forecasts for septoria and brown rust and also delivers good information on yellow rust and powdery mildew. Overall, it's given an 85% confidence level.

Discuss models

"We've spent some time validating the disease models under UK conditions. The app uses weather forecast and agronomic data to predict risk of infection, giving you a prediction up to 10 days in advance of the need to spray. The main benefit is that you can now accurately tailor applications to actual risk.

"The beauty of the tool is that it refines its approach as more and more growers use it, so could completely redefine how we manage disease."

Due for launch in the UK in mid-2021 will be Seed Selector, branded as E-Luminate in the US. "This is a tool that's evolved from one used by seed sales advisors in the US, to help growers choose from the mesmerising array of corn hybrids and soybean varieties," explains Sam.

"It takes publicly available data, such as weather and soil maps, and uses these to drill down through varieties and pick out those most suited to your situation." This wouldn't be a replacement for the AHDB Recommended Lists, however, which themselves are now available through an

app. Rather it's a tool to build on other forms of information which can be imported without the need for double entry.

And Sam recognises this is a challenge for UK growers, especially when it comes to legacy farm management software. All Syngenta tools have been designed to be open and transparent, to export and transfer data seamlessly, he says.

It's an open-source approach Sam believes is set to become more important as growers move towards carbon-footprinting and monitoring their environmental delivery. "We've accrued a lot of experience and data in this area through Operation Pollinator and similar initiatives. We're collaborating with the Cool Farm Tool and believe there's real value in a tool that works with other partners to help growers meet environmental targets," he says.

"Farmers know their own fields, but choices are currently largely based on granular experience and intuition. We have an absolute desire to make it easier for them to augment this with a data-driven approach, making use of the vast array of information they already possess," notes Sam.

"But it's not just about more targeted use of pesticides. Ultimately growers want to deliver secure food supplies in tune with public consumer demand for produce with lower impact on climate and global resources. Syngenta has a powerful global digital resource well placed to help them attain that objective." ■

BYDV Assist can be used to optimise spray timing to target the second generation of aphids.