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to field*

Working together for a resilient rotation

There’s a new AHDB-funded programme of soil research that’s literally ground-breaking in its approach. CPM assesses what it hopes to achieve.

By Tom Allen-Stevens

Do you ever get the feeling that work you do to maintain or enhance your soil in one crop is slightly undone by another in the rotation? It’s not that practice under any particular cropping regime is necessarily wrong, just that all crops are working in isolation, and perhaps there ought to be something that wraps around them and delivers a rotation that’s reliably resilient as a whole.

An ambitious new AHDB-funded research partnership has now set out to address this. Four new projects have been awarded a total of £1.2M, but there’s one aspect about this that’s remarkable in itself, notes Dr Mike Storey, head of the AHDB’s new resource management team. “This is the first example of a new functional approach AHDB is taking to commissioning and managing research.

“A lot of research has been carried out in the past, funded by individual AHDB crop sectors, looking at soil

management in a single season. This new programme considers practice in a rotational context — it brings funding from AHDB Potatoes, Cereals and Oilseeds and Horticulture into one, coordinated body of work.”

It’s also a five-year programme, he continues, rather than the usual three. “This will allow us to really pull out the practical outcomes and test them for robustness within the time frame of the programme.”

As well as different AHDB sectors working together, the programme involves a number of research partners. “It’s led by NIAB CUF, and brings in some really exciting work from the James Hutton Institute, Rothamsted Research and Lancaster University. So there are different skills involved across a number of disciplines and it’s a real opportunity for synergies and for some ground-breaking developments,” enthuses Mike Storey.

But a core element of the programme is the practical application. “A significant part of the funding has been allocated to develop a grower platform. It builds on the experience of Strategic Potato (SPot) and Monitor farms. We’ll be taking the research into a field-scale context and growers will get the opportunity to see it in practice,” he notes.

“Importantly, this is a two-way interaction — we want to encourage discussion, and the feedback will help develop the programme. This is far more actively managed than a traditional research programme.”

The grower platform is one aspect of the programme in particular highlighted by Dr David Firman, of NIAB CUF, who leads the research. “It’s the opportunity to put soil data into context and look at the economic

consequences that will be really valuable,” he says.

“What’s more, there’s continuity in taking those measurements through the rotation and monitoring the effects on the growing crop through the life of the project. And it’s a fantastic opportunity for knowledge exchange over other areas of research that haven’t yet made it into the field.”

The plan is to involve around 75 sites in total, focusing on farms that have good crop records to provide a few years’ management history to work with. “These will include SPot and Monitor farms, but we’re looking for a broad geographic spread, including Scotland and Wales.



Mike Storey is heading up a new team that works across the AHDB sectors, heralding a new functional approach to commissioning and managing research.

Opportunity to collaborate on key soil issues

One of the main concerns for Robert Lockhart is the long term effect across the rotation of different management practices. "There's a lot of fashion in farming," he says.

"How we crop our land has developed relatively quickly, with tighter rotations and often a quick succession of crops within that rotation. Then there are developments such as cover crops, and challenges such as potato cyst nematode. These all need to be documented and evaluated and the techniques refined so we know we're heading in the right direction."

With 140ha of arable crops on the South Staffs, Warwicks border, his light, stony soils include 31ha of potatoes, grown for McCain. He also represents

the NFU on the AHDB Cereals and Oilseeds Knowledge Transfer committee, and highlights this new programme as a different body of research to those that have gone before.

"The grower platform will be a critical part of it, and it's important we get a good spread of sites, both geographically and across soil types and cropping mixes — we don't want to end up with all the sites in East Anglia," he points out.

"We also need growers with good historical information — even though it's a relatively long research programme, it only covers just over one rotation on the average field, so having good information on what's been before will be vital."

He's also keen to see how some of the emerging

research plays out on farm. "Some of these lab techniques look very interesting. They could just be academic, but we won't know until we try them out. Then there's organic matter and work that suggests its make-up varies over different soil types — that looks very interesting."

But the priority is to develop practices that have real value on farm, he reiterates. "It's what the levy payer has been asking for and what growers pay for, and this is a real opportunity to deliver. The focus on soils, where so much is unknown, is a good thing, and it's also heartening to see productive collaboration across the AHDB sectors — it's been a long time in its gestation, so it's good that growers will now be reaping the benefits."



It's a fantastic opportunity for knowledge exchange over areas of research that haven't yet made it into the field, notes David Firman.

We also want to draw on a broad base of soil types and rotations."

The project looking at the application of new technology will bring onto farm some cutting-edge work developed by James Hutton Institute, as well as evaluate existing practices. "The commercial application of procedures such as electromagnetic induction (EMI) scans have run ahead of research. We want to take a step back and look critically at the practical application.

"We also want to understand the effects of sequential cultivations on the rotation as a whole. So for example, where a field has been deep-cultivated and prepared for potatoes, how does that interact with later trafficking of spraying and harvesting operations? We'll be looking at the effect of these on soil conditions across the bed module in relation to different tyre widths and pressures."

The third project applies research carried out mainly at Rothamsted Research into soil organic matter (SOM) and applied amendments aimed at improving this. "There'll be experiments to explore the response of key soil indicators across the rotation to SOM," continues David Firman.

"We want to investigate rotational links to crop performance, and in particular crop amendments — whether it's best to apply manures in one go before a particular crop, or regular, smaller amounts across the rotation." Researchers will also adapt the Terranimo model for soil compaction, developed by Aarhus University in Denmark, for UK soil conditions.

The final project explores root growth, harnessing work undertaken mainly at Lancaster University. "We'll be looking to develop a system that uses DNA to quantify root growth and inform a better way of scheduling irrigation. It investigates links between soil geophysical characteristics, irrigation and root-shoot signalling. A hypothesis is that plants send a signal from roots to canopy which, if better understood, could refine irrigation scheduling to maximise growth."

But it's the sum of the parts of the programme that will add up to more than their individual components, reckons David Firman. "Working with growers to get a good handle on what practices are going on within rotations and the impact on long-term fertility is probably the most exciting element of this research. The programme will



One project will look critically at procedures such as EMI scans, where the commercial application has run ahead of research.

bring a lot of information together and give us a very valuable insight into the very complex area of soil fertility." ■

Research round-up

The AHDB soil and water research partnership is a five-year programme that combines investment from AHDB's Potatoes, Cereals and Oilseeds and Horticulture sectors. Led by NIAB CUF, with Rothamsted Research, the James Hutton Institute and Lancaster University as core research partners, industry partners include Cambridge University Potato Growers Research Association, Frontier, Grimme, Kettle Produce, Spearhead Marketing, B&C Farming, Greenvale AP, Farm Care, J & AE Montgomery, WB Daw & Son, Frederick Hiam. The programme comprises four projects:

AHDB project 110002101, Grower Platform to support resilient rotations, underpins the new soil programme as a whole. It draws on historic data and current rotations to quantify links between rotational management and soil physical conditions with gross output, yield stability and economic margins. Bringing together researchers, growers, grower groups and supply chain partners, AHDB funding amounts to £329,000.

AHDB project 110002102, Applications of new technologies to enhance rotations, critically assesses existing precision farming technologies — including EMI soil scanning, GPS-enabled yield

monitoring and infra-red spectroscopy — and investigates the practical benefits of managing fields in zones. Involving mainly field-based research, and aiming to develop a tool for growers to assess the risk to soil structure of sequential cultivations, AHDB funding amounts £354,000.

AHDB project 110002103, Enhancing rotational productivity and resilience, addresses concerns around the detrimental effect on subsequent crops of incorporating root crops into rotations, quantifying the physical and economic cost of soil damage. Based on field trials with potatoes in the rotation and aiming to develop a ranking system for soils to highlight areas with a need for remedial intervention as well as a model for optimising organic amendments, AHDB funding amounts to £325,000.

AHDB project 110002104, Linking soils, water and roots with crop productivity, seeks to gain a better understanding of how changes in soil conditions affect root growth, water uptake, canopy growth and yield potential in potatoes and other crops. Aiming to develop a cost-effective method for quantifying root length in field-grown potato, carrot and parsnip crops to improve irrigation scheduling, AHDB funding amounts to £195,155.