

Helix Live

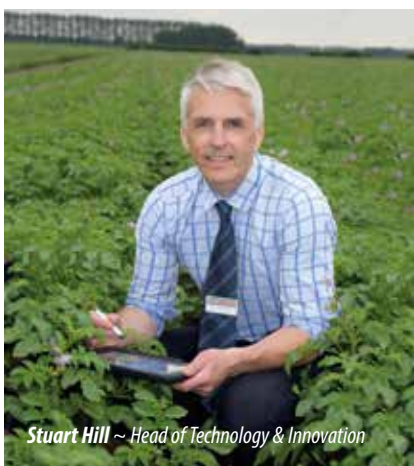
Profiting from Technology

– sharing groundbreaking research and opinion



During the first week of November over 600 growers, agronomists and industry representatives logged on and participated in Hutchinsons' virtual "Helix Live" initiative.

Fieldwise ViewPoint



Stuart Hill ~ Head of Technology & Innovation

Helix Live was a series of virtual seminars where Hutchinsons technical experts, as well as Helix farm hosts and their agronomists, shared their experiences of how new and evolving technologies are delivering value and benefits to their

individual farm businesses - in a live and interactive way.

"We were absolutely delighted that so many were able to join us for the event and found the seminars useful and informative – the feedback has been tremendous," explains Stuart Hill, Head of Technology & Innovation.

"This is just the beginning, we plan to roll out the initiative across more UK farms and as project areas produce results, we will continue to share these throughout the season and going forward."

Hutchinsons Helix farms are proofing grounds where enquiring and practical farmers and their agronomists work alongside new and developing technologies, to assess their impact on their farm businesses.



2020

2020 has been a most extraordinary and uncertain year for everyone. A combination of adverse weather, the global pandemic, concerns about the post Brexit outlook, volatile commodity markets and ongoing amendments to the draft Agriculture Bill, which is now the Agriculture Act 2020.



> With such a difficult cropping year, the like of which many have (fortunately) never experienced, 2020 has also been a clear reminder of the adaptability and sheer resilience of British Agriculture. Despite national lock-downs, farmers, together with their advisors and suppliers, have adapted to an evolving 'new normal' and continued to produce first class British food for our nation. This is a great achievement and reflects the "can do – will do" approach that UK agriculture has always shown.

2021 does look more promising

Crop drilling this autumn has not been straightforward but the crop areas established to date are much improved on last year and forward prices are encouraging. With around 1.8 million ha of wheat crop projected and positive news about a Covid vaccine breakthrough at the time of writing, we look forward cautiously to a rather better New Year.

Looking to the future, we at Hutchinsons fully realise the need to remain at the cutting edge of agronomic expertise, helping our customers to continue to grow crops in a practical, financially profitable and environmentally sustainable manner.

By supporting and developing ongoing research and development, such as our Helix Farms project, we broaden our outlook and knowledge to encompass long term soil health, environmental sustainability, evolving precision technology and operational efficiencies. All of this in addition to our long-established crop production agronomy expertise. At all times, the aim is to maintain effective partnerships with our customers and to ensure the profitability of their businesses in both the short and longer term.

We greatly appreciate the support that our business is given by our customers and colleagues, particularly in such a year as we have just experienced. Thank you. We look forward to continuing to work together in the years ahead.

Finally, I would like to wish you and your families a very Happy Christmas and a more positive and successful 2021.

David Hutchinson



> "The aims of Helix are to develop practices from technologies that will add value financially and environmentally to the farm business, and this is fundamental to the premise of the initiative and differentiates Helix from other farm scale trials," explained Mr Hill.

"This means looking at how technologies that have already been future proofed will have a positive impact on farm business costs, productivity and profits for both the short and long term."

Following on from the success of the Helix national farm launched back in 2019, Hutchinsons has begun rolling out regional Helix farms, reflecting and recognising the different farming challenges that growers face in particular locations.

"However, what is fundamental and underlines everything that we do at the Helix farms is that the success of any technology on farm is the way in which the data provided by the technology is interpreted, and this is

where the involvement of the grower and agronomist is key to the success of a particular technology."

Helix Live seminars

Across the three live seminars, Helix host farmers and their agronomists came together to talk about their involvement and experiences of the Helix approach.

This was backed up by presentations from a range of industry technical experts covering topics such as:

- How data can improve farm profitability and the environment
- How to improve soils and soil health
- How to manage crop nutrition more effectively
- How crop genetics can benefit your productivity
- How can ICM be more closely aligned with more effective crop management

TerraMap on the national Helix development farm

As agronomists, we are already collecting data every day when field walking, so any technology that adds to this information helps us to make more accurate and improved decisions for our clients, explained Michael Shemilt, Hutchinsons agronomist working on the national Helix farm.

It was at this Helix site that the ground-breaking soil scanning system, TerraMap was tested before its nationwide launch last year.

"The host farmer Andrew Pitts, was keen to look at variable rate





> lime applications, as there were some inconsistencies in yields in some fields, so the whole farm was scanned using TerraMap to see if we could iron out what the underlying issue could be - and it did just that.

The pH map layer confirmed what we already suspected using Andrew's knowledge of the farm and my boots on the ground - that this was in fact the limiting factor and was extremely varied across fields.

Using this information a variable rate application plan was generated within Omnia, allowing us to take a targeted approach, avoiding the costs and waste of a blanket approach."

Other technologies already being trialled at the national Helix Farm

Using historic yield maps to generate yield performance mapping and cost of production maps within Omnia will become increasingly important as growers can decide what land to enter into the future ELM scheme.

Variable rate fungicide applications are also being trialled - using biomass maps generated through Omnia's Plant vision which were overlaid with historic yield maps, along with Michael's input, an accurate and appropriate variable rate fungicide application map was generated.

Michael also uses a **Climate prediction tool** within Omnia that was developed at the Helix farm, which provides accurate and site specific weather data, such as soil

temperature and moisture, which helps in terms of recommending certain products that are suited to the particular conditions.

For example, a **virtual rain gauge** providing accurate forecasting over a 10 day period allows him to better determine the risk between T1 and T2, and to make recommendations on product and rates based on this information.

A **BYDV forecasting tool** has also been developed at the Helix farm. Hosted within the Climate prediction module of Omnia, this tool uses necessary information such as drill information, growth stage, past and predicted weather to alert T-sum timings, prompting Michael to get out into the field to confirm threshold levels for treatment.

Technology of soil

An integral area of focus across all of the Helix farms is the **'technology of soil'**, led by Hutchinsons soils expert Dick Neale. His presentation at Helix Live covered:

- Crop establishment processes
- Soil amendments
- Nutrients and application
- Plant, roots and biology
- Measuring what is already in the soils using TerraMap

Dick's message was clear:

"Our approach to soil must encompass all of these elements, but most important is soil biology, as it is the biology that drives structure and chemistry. It is important to accept and move on with this thinking, to make the necessary changes to the way we manage soils."

It is all about how we impact the bottom line on farm, so our three areas of focus across all of the Helix farms are:

- **Crop yield** - water and nutrient management and availability, reduced disease, pest and weed pressure
- **Growing costs** - labour, depreciation, fuel and time, recognise that moving soil is the single biggest cost on farm
- **Carbon sequestration** - improves soil performance, reduces costs, potential income

Cover cropping is a significant part of this, and Dick sees them as being fundamental going forward.

*Dick Neale
Hutchinsons
Soil Expert*



"Cover Crops are not currently being talked about as part of a rotation, but they really should be," he said. "How do we replace or reduce areas of crops that make poor GM's, or areas suffering from pest and disease issues? Cover crops can really fill those gaps.

It's all about growing the right one in the right place to do a specific job, in a particular field. So we are measuring a range of parameters of cover crops, not least the financial return over time."

"It's not all about reinventing the wheel, we also use relevant research that is already available." He referred to work done by Rothamsted Research, that clearly shows the impact of two levels of organic matter (OM) in the soil on the amount of Olsen P required for 95% yield optimisation in a range of crops.

"Higher OM needs a much reduced amount of Olsen P, as higher OM is giving us better soil function and biology – and a better flow of released P to the crop."

So what is the value of this?

This research shows that increasing OM in the soil by 1% in a typical crop of wheat within RB209 reduces application of P by 85kg/ha, equivalent to £48/ha.

"So we can already put some cost benefits on why we should increase the levels of OM in the soil."

This is a clear example of the approach that we are taking at Helix – taking both historic and current research and combining it with the very latest measuring and diagnostic techniques to improve farm profitability in a sustainable way.

For more information on Helix or to view the seminar sessions please visit: <https://helixfarm.co.uk/events>



> Summary of Helix Project Farms

	Helix National Technology Development Farm Launched 2019	Helix East Launched summer 2020	Helix North Launched autumn 2020
Who and where	 <p>Andrew Pitts, of J W Pitts, Whiston, Northants.</p>	 <p>Tom Jewers of G D Jewers, Woodhall, Rattlesden, Bury St Edmunds.</p>	 <p>Nick Wilson, Hundayfield Farm, York.</p>
Farm characteristics /cropping	<ul style="list-style-type: none"> • 800ha; 712 cropped • Cropping - seed wheat, seed barley, winter beans, winter rye, spring beans, spring peas • 1 man, 1 combine, 1 sprayer • ELS/HLS 	<ul style="list-style-type: none"> • 385ha; 260 owned, 125 contract farmed • Family partnership • Labour – student at harvest • Cropping – winter wheat, winter barley, spring barley, oilseed rape, linseed and winter beans • ELS/HLS 	<ul style="list-style-type: none"> • 260ha mainly arable unit • Family farm • No additional labour most operations carried out ‘in-house’ • Cropping – winter wheat, winter barley, spring barley, oats, peas, fodder beet, grass, cover crops • Land let out for potatoes and winter sheep grazing on stubble turnips • Bed & breakfast cattle
Technologies being tested/ areas of focus	<ul style="list-style-type: none"> • TerraMap – optimisation of nutrition • Omnia yield performance/COP • Project Pollinator • Rotational Planning tool • Cover cropping • Carbon – audit & how to get to net zero • Hybrid wheats 	<ul style="list-style-type: none"> • TerraMap - optimisation of nutrition • Omnia yield performance/COP • Carbon –audit & how to get to net zero • Hybrid wheats • Seed treatments –phosphate and nitrogen focus • Cover cropping – species mixtures, NDVI scanning, soil testing for microbial activity & OM • Robotic weed destructor 	<ul style="list-style-type: none"> • TerraMap linked to variable rate nutrient applications • Carbon audit to establish baseline and improve understanding of sequestration standards • Omnia yield mapping cost of production • Hybrid wheats • Cover cropping – species mixtures, NDVI scanning, soil testing for microbial activity & OM
Why Helix?	<p><i>“There is so much technology coming through, so it’s important to know that what we take on has already been ground-truthed. In this way it reduces our risk and we know that we are only taking on technologies that are appropriate and relevant and will enhance our profit and sustainability as a farm business, now and for the next ten years.”</i></p>	<p><i>“I got involved in Helix because as we had changed our farming system in a bid to cut production costs, we had raised many questions about what technologies can help us reduce costs, and which just increase cost for no benefit. Helix provides me the platform to try technologies on our own farm and assess them within our farming system. I’m hoping to sort the ‘wood from the trees’ and come out with higher farm margins.”</i></p>	<p><i>“We are delighted to be involved in the Hutchinsons Helix project. As hosts we are in the invaluable position to see first-hand how technologies are working at a field level that will benefit our business. I also believe that we have a commitment as farmers to look at how technologies can help us to be more efficient and sustainable – for the good of the farming industry – and Helix is offering us this unique opportunity.”</i></p>



Learning cover cropping lessons

Last season saw a surge in cover cropping following the disruption to drilling schedules, and highlighted their vital function as natural 'water pumps', providing invaluable experience to help inform future decisions.

Moisture management is an established benefit of cover crops, but 2019-20's weather challenges clearly demonstrated the limitations of growing mixes based on just one or two species, says Hutchinsons Technical Manager Dick Neale.

Cover crops can greatly improve water distribution through the soil profile and condition soils to become more resilient during wet and dry periods, but only if the appropriate mix is sown, he says.

Single or two-way mixes based on oats plus vetch or linseed, or oat or barley regrowth, for example, offer limited, shallow, root architecture that holds moisture at that level, he explains. "All Hutchinsons mixes contain multiple species that give a much greater variety of rooting characteristics and depths, which we've seen is vital for managing moisture more evenly throughout the soil profile."

Brassicas, mustard, radish and some legumes are great for penetrating soil to draw water from depth, whereas linseed, phacelia and clover have shallower, fibrous roots that help reduce surface moisture through transpiration.

"We've noticed growers who've used cover crops for several years got on to ground earlier last season," Lincolnshire agronomist Alice Cannon agrees.

Together with utilising soil moisture in wet periods, the organic matter additions and structural benefits of

regular cover cropping condition soils to become "water reservoirs" during dry periods, such as last spring, she adds.

Lincolnshire client Andrew Harker of H R Bourn & Sons agrees, but recognises it takes time for benefits to develop. He grows around 800 ha of overwinter cover crops, which have played an important role in the transition from a maximum-cultivation system, to controlled traffic with minimal cultivations and direct drilling over the past five years.

"We've definitely seen easier-working soils with less waterlogging and drainage problems where historically we would have had issues.

"Cover crops helped this transition as part of a whole-farm approach that includes rotation, cultivations, and drainage works."

Bespoke multi-species mixes are tailored to soil type and cropping, although Mr Harker acknowledges cover cropping on heavy ground

is more challenging. He generally opts for slightly wider 30cm rows to allow more weathering of the soil surface and let black-grass germinate, favouring multiple species to maximise different rooting characteristics.

"What's best for soil conditioning isn't always best for establishing the following crop though, especially as it is not always possible to travel on land to spray cover off in December or January."

Having the right drill to sow following crops is essential. For him, that means a disc-based machine rather than tines, to cut through surface residues and disturb minimal soil, allowing better moisture conservation in spring.

Termination timing is everything

Termination timing greatly affects moisture management and following crop establishment. >



Helix North, Nick Wilson (right) with agronomist Sam Hugill

> “Many growers leave it too late,” says Mr Neale. This can leave less time for surface layers to dry out before drilling and increases risks of nutrient deficiency in following crops, especially spring cereals after oats or rye cover, as nutrients are only released slowly by decaying cover. Allelopathy can also be an issue with oats in particular, reducing germination of a following cereal if sown too soon after termination.

Growers on heavier land (>20% clay) wanting to sow spring barley in late February or early March should ideally have sprayed cover off around late November to allow time for material to die back and start breaking down before drilling, he advises.

In contrast, on lighter soils sown later (e.g. peas or linseed in mid-April), cover could be left growing into February or early March. “If it’s a wet winter, growing cover draws moisture up, helping dry soil to depth.”

Again, time is needed for material to die back and the surface to dry out before drilling, especially if equipment cannot effectively drill through large amounts of surface material. In dry springs, there could be an advantage from leaving termination until closer to drilling as the extra surface moisture may benefit following crop establishment, if drills can cope with this, he notes.

In all cases, Mr Neale recommends test digs in the cover crop before termination to identify what’s happening in the soil, which species are doing well, how roots are growing and where moisture is within the profile.

Cover crops on trial at Helix farms

Cover crops are an essential part of the crop rotation at the two new regional Helix demonstration farms in Suffolk and North Yorkshire, and their application is being developed in farm-scale trials this season.

At Helix East, Tom Jewers has spent 10 years fine-tuning cover cropping on the 385 ha farm, where cover, catch and companion crops are vital for improving soil health and resilience in the direct drilling system. They proved invaluable



Helix East - Tom Jewers (left) with agronomist Mike Greener

for facilitating autumn and spring drilling in wet seasons like 2019/20, he says.

Mr Jewers uses several species in his cover crop mix, built around four core ingredients of oil radish for its strong rooting that opens soil structure, vetch (nitrogen fixation), buckwheat (mobilises soil phosphorus) and phacelia (fibrous rooting). Additions this season include berseem clover as another nitrogen-fixer and mustard for its rapid growth.

Helix trials are comparing the farm standard against the new Hutchinsons mixes, MaxiRooter and MaxiN, in a 6 ha field split into three treatments.

MaxiRooter includes species designed to maximise rooting, biomass growth, and nutrient capture, whereas MaxiN contains more leguminous species to fix atmospheric nitrogen, explains Hutchinsons’ Rob Jewers.

Biomass assessments done using satellite imagery in late September confirm higher biomass in the farm standard and MaxiRooter mixes, however this may be partly due to clover in the MaxiN mix being slower to establish, he notes.

Plots will be assessed throughout the season, to evaluate biomass growth, soil health, fertility (particularly soil mineral nitrogen) and any effects on the establishment, growth, nutrition and final yield/quality of the following spring barley crop.

Helix North

– Nick & Liz Wilson

At Helix North, host farmer Nick Wilson has been using overwinter cover crops ahead of spring drilling for five-six years, as they have been a vital soil management tool in the transition from a plough-based to

strip tillage system on the 260ha farm.

Cover is sown into stubble straight after harvest using a Mzuri drill, with mixes tailored to local growing conditions and field requirements. Generally the focus is on building biomass and nutrient capture on lighter soils, while species with stronger, deeper rooting (e.g. radish) are preferred on heavier ground to open structure, improve drainage and build organic matter.

This year’s Helix trials, managed by agronomist Sam Hugill, are comparing a farm mix of peas, oats and white mustard against five new Hutchinsons cover crop mixes in an 8ha field trial. Three establishment techniques have been used, including the farm’s Mzuri, a JD 750 A direct disc drill and a Kuhn powerharrow combination drill following a Sumo Trio.

Fields are due to go into peas, so cover can be sprayed off slightly later than if going into spring barley, Mr Hugill notes. “It’s usually the first job in the New Year.”

A range of termination techniques, including grazing and a crimping roller will be tried, and the impact on following crops will also be monitored.

Mr Wilson concludes: “I know we’re doing the right thing sowing cover crops, as they’re absorbing carbon and improving the soil. But through Helix we will gain much more detail about exactly what different species are doing, the benefits possible and how to achieve these.

“It’s not just about our farm. Improving our understanding will also help the wider industry.”

Discover more at helixfarm.co.uk