First published in HDC News April 2015

If you've got a great idea that will make a difference to your business or a problem that you want to research yourself, there are public funding bodies that want to hear from you, writes Claire Shaddick

Bringing any crop to the market on schedule is challenging, but especially so for field vegetables when unseasonal weather starts to intervene.

That was the reason why 2012 saw broccoli make national headlines, home-grown crops having been subjected to unusually hot weather, bringing some plantings on a month early and leading to a marked gap in supplies.

While growers can't do anything to change the weather, better crop forecasting could at least give a more accurate picture of when heads will be ready to cut. So vegetable grower Produce World has this year embarked on a new knowledge transfer partnership (KTP) with Cranfield University, to develop a computer model that can better match supply to demand, improve the efficiency of harvesting and reduce wastage.

Produce World is not new to these partnerships. It's how its Soil-for-Life database project started out in 2010, when graduate Guy Thallon was employed to bring together information about the soils on sites that it or its supplier network use, together with records of cropping history, fertiliser applications, irrigation regimes and yields. The idea is to be able to interrogate the database to find how best to manage the land. "It allows us to ask questions such as what's driving differences in product quality across our supply base," says Thallon, now Produce World's group sustainability and research manager. "From a grower perspective, it's all about how to drive improvements; from an academic and scientific perspective, there's the opportunity to ask some big fundamental questions, such as how do we respond to climate change, how do we achieve sustainable agriculture, and how will soil health promote it."

Now the initiative is being developed further with Cranfield, via support from an industrial research grant from the Agri-Tech Catalyst, where the focus is on minimising field losses by managing soil more sustainably. As more data is collected, the researchers are expecting the system to have some capability to predict how a crop will respond to environmental variables, for instance to forecast yield or harvest date more accurately.

Berry Gardens Growers has long been a supporter of such collaborative research projects, too. "The opportunities for co-funded research in the UK have never been better," says director of research Richard Harnden. "Soft fruit growers have lots of challenges to overcome, many revolving around pest and disease control and growing more for less. Most, if not all, will be solved through innovative research."

There are various routes to accessing such funding yourself, depending on what form your idea takes, how advanced it has already got and the complexity of research needed to take it to the next stage.

Agri-Tech Catalyst

Three types of grant are available for crop production research from the Agri-Tech Catalyst, set up by the Biotechnology and Biological Sciences Research Council (BBSRC), Innovate UK and the Department for International Development: early-stage, to explore the commercial potential of a scientific idea through feasibility studies; industrial research, by way of developing and testing new technology; and late-stage, to evaluate or trial a new concept.

Half of the £70 million fund has already been awarded since it was launched last year and such has been the demand that rates of funding to the business partner have been reduced. They now range from 20% to 55% of project costs depending on the type of award and the size of the business.

UK growers and grower groups who are involved so far via the early-stage award include Berry Gardens, which is leading a project on developing autonomous traps for remote monitoring of the soft and stone fruit pest spotted wing drosophila; and Micropropagation Services, on studies on a low-cost energy-saving climate control system for greenhouses. A new award announced last month is for a project by the University of Lincoln and brassica propagators and growers R Fountain & Son on 3D camera technology to identify broccoli heads that are ready to harvest.

The industrial research awards have been the most popular. For instance, tomato growers North Bank Growers and Wight Salads Group are both working on two projects, one looking to use UV light to induce natural plant resistance and to remove ethylene (UV light acts as a catalyst in the oxidisation of ethylene) to prevent botrytis infection in tomato and cut flower crops; the other, in which Stubbins is also a partner, on using UV light to remove ethylene from storage environments to control produce ripening.

Berry Gardens is involved in a project on using mycorrhizal fungi and rhizobacteria in substrate strawberry production in an attempt to improve fruit quality and tolerance to powdery mildew, and is leading another on developing a decision-support system to improve crop management and yield forecasting. Meanwhile, Asplins Producer Organisation and grower Michael H Keene & Son are taking part in a project on ways to break dormancy in blackcurrants in the face of warmer winters which are failing to give bushes the degree of winter chilling they need. Newly announced awards have been made to Monaghan Mushrooms, who is to investigate further innovative control of mushroom blotch diease, and to tree fruit grower AC Goatham & Son who is involved in a consortium to test the SafePod, kit which checks on fruit during storage in a controlled atmosphere.

Industrial Partnership Awards

This BBSRC scheme encourages scientists to engage one or more industry partners in their proposals for pre-competitive research, so there’s a ready-made avenue for the knowledge gained to get out to business. While the projects are science-led, the industry partner has to find 10% of the costs in cash.

Salad leaves grower Vitacress and the University of Southampton used an IPA to pinpoint the plant characteristics that could extend the shelf-life of baby leaves, and the genetic basis of these traits, findings that were useful to plant breeders. At the same time, the researchers were able to show how irrigating crops less during the course of production could also have an impact on shelf-life.

Knowledge transfer partnerships

KTPs started out 40 years ago as the Teaching Companies Scheme, replacing it in 2003. Since 2007, the programme has been managed by the Technology Strategy Board, itself now known as Innovate UK.

The idea behind KTPs is to support businesses wanting to improve their competitiveness or productivity by accessing the expertise of UK universities and colleges. The business would take on one or more newly qualified people (known as an associate) to work on a project of strategic importance to it – so the project doesn't have to be connected to the science of crop production – while under supervision by an academic institution. Each partnership is part-funded by government, via one of 15 agencies, with the company meeting the remaining costs. The Produce World broccoli KTP, for instance, is sponsored by BBSRC and Innovate UK.

Projects vary in length between six months and three years. The associates have to be qualified to at least NVQ Level 4 or equivalent and can be university graduates or post-graduate researchers.

Growers who have benefited from such partnerships include Cantelo Nurseries, David Austin Roses, Riverford Organic Vegetables and pinks breeder HR Whetman & Son. Current projects include a partnership between G's and Cranfield University on remote sensing for field vegetable crops, and one between soft fruit growers S&A Produce and the James Hutton Institute on strawberry fertigation.

S&A Produce initially wanted KTP associate Daniel Smith to assess the mineral nutrition needed to maximise growth, flavour and shelf-life but changes to growing practices that he has instigated, such as improved monitoring, precision irrigation and reuse of substrate, have increased strawberry yields by 32%, exceeding expectations, and found annual savings of £24,000.

LINK projects

BBSRC's 'stand-alone' LINK scheme is similar to the Defra-led LINK programme, which it had supported and of which Horticulture LINK was one strand – the last HortLINK projects started in 2010. The BBSRC scheme sponsors collaborative pre-competitive research between at least one company and one academic partner but projects are expected to have greater industry involvement than those funded as an IPA. Industry's contribution to the cost of the project is a minimum 50% in cash or 'in kind'.

The IDRIS strawberry breeding project (see *HDC News* April 2015, p12) is funded under this scheme and includes HDC and Berry Gardens in its industry consortium.

EIP-Agri grant

Applications for a new grant for collaborative research will be invited this summer when the EIP-Agri scheme is launched. This scheme is actively looking for partnerships, or 'operational groups', between farmers and growers, agricultural or food researchers, agri-food businesses and non-governmental organisations to work on projects that solve recognised industry problems or test out new approaches. This is likely to involve ways to apply new research or technology or to use equipment in a new way, says Defra. Grants will be worth between £5,000 and £150,000 for projects running up to three years. For more details, see www.gov.uk/prepare-for-the-eip-agri-grant-countryside-productivity-scheme.

Guy Thallon and Richard Harnden were speaking at a meeting in February on collaborative research opportunities, organised by BBSRC, NERC, and the Horticulture Innovation Partnership in its role as horticulture co-ordinator for BBSRC.

The HAPI projects

The Horticulture and Potato Initiative, or HAPI, was a specific funding programme set up by BBSRC, along with the Natural Environment Research Council (NERC) and the Scottish government, to help improve food security by supporting research on, for instance, seed quality and vigour, soil health, pests and pathogens, and crop maturity and spoilage. A total of £7 million was allocated to the initiative and the first four projects to be funded were announced in August 2013. Details of six further, and final, projects will be released shortly.

HDC is a partner on two of the projects. One, led by Peter Urwin, professor of plant nematology at University of Leeds, is looking to fill the gaps in what we know about biofumigation – the use of green manure brassica crops such as mustards that produce chemicals known to control pests and pathogens when they break down – and how best to exploit the technique in potato and field vegetable cropping.

The second, which also involves the Potato Council and is led by University of Warwick plant pathologist John Clarkson, is using advanced DNA analysis to understand the genetic basis both for the pathogenicity of the fungus that causes basal rot in onions, *Fusarium oxysporum* f.sp. *cepae*, and for onion's resistance to the disease.

A third project, again supported by the Potato Council, aims to understand better the genetic, biochemical and physiological regulation behind dormancy and sprouting in onion and potato, which will inform strategies for storing these crops without the aid of sprout suppressants. Based at the James Hutton Institute under head of the potato genetics and breeding group Glenn Bryan, its industry partners are PepsiCo, who make Walkers crisps, and potato growers and packers Albert Bartlett.

Fellowships to see if research made a difference

BBSRC calculates it alone has spent around £8.5 million on grants for horticultural and potato research annually over the last six years, and that even excludes expenditure in the HAPI programme and on studentships. That's a lot of investment, the results of which can sometimes take too long to filter down to growers.

In an effort to help accelerate the uptake of results, and encourage further collaboration, East Malling Research entomologist Chantelle Jay and Cranfield University soil scientist Lynda Deeks have been awarded a knowledge exchange fellowship by NERC with support from BBSRC and the Horticulture Innovation Partnership (HIP). Over the next three years they will look at publicly funded projects on fresh produce to see where findings have been put into practice and publicising those where the advances made could benefit the wider industry.

"We are particularly interested in the gaps in knowledge that might be a barrier to uptake and opportunities for further research," says Jay. "We're also interested in finding out where growers have made changes to practices as a result of a research project."

Harper Adams University lecturer Laura Vickers has been awarded a similar fellowship to focus on research funded on ornamental production.

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