

## Results of competition: Agri-Tech Catalyst - Early stage - round 3

Total available funding for this competition was £2.13m from Innovate UK/Department of Business, Innovation and Skills, the Biotechnology and Biological Sciences Research Council and the Department for International Development.

**Note: These proposals have succeeded in the assessment stage of this competition. All are subject to grant offer and conditions being met.**

Participant organisation names	Project title	Proposed project costs	Proposed project grant
AgSpace Agriculture Ltd; The Satellite Applications Catapult	Investigating crop DNA: Using free Sentinel 1 RADAR data to study crop growth	£186,077	£127,930
<b>Project description - provided by applicants</b>			
<p>This feasibility project will consider the use of Sentinel 1 synthetic aperture radar (SAR) data to aid the arable food production system. The current use of crop biomass imagery from optical imagery (NDVI) is popular with farmers but is reliant upon clear, cloud-free skies. SAR will provide data in all conditions, day and night thus providing a detailed and reliable source of crop growth data for farmers. This project could present a huge breakthrough in non-space related satellite applications. Previous study suggests that SAR data is capable of pinpointing different growth stages which is critical in arable farming for delivering treatments and fertiliser at the right time. This study will use existing NDVI imagery along with detailed SAR data and field data to help model a new crop growth index. Not viable previously, due to the restrictively high cost, Sentinel SAR data is now freely available allowing the development of new applications that could make a real difference to farmers.</p>			

Participant organisation names	Project title	Proposed project costs	Proposed project grant
Alpha BioPesticides Limited; 13ApresLabs; Food and Environment Research Agency	Novel natural synergistic compounds for the enhancement of insecticide activity	£306,279	£221,870
<b>Project description - provided by applicants</b>			
<p>The project aims to develop a product that can be used in conjunction with insecticides to enhance their effectiveness. Through improving the activity of insecticides, the product will facilitate reduced application rates in the field and contribute to the aim of lowering the quantities of synthetic insecticides used in agriculture and horticulture. The product will be made from materials extracted from non-crop plant sources and synergism of insecticides will derive from the inhibition of the enzymes responsible for their detoxification. This synergism will not only enhance insecticide activity in the field, it will also uncouple metabolic resistance in populations of pests that have developed tolerance to a given insecticidal compound. The innovation will have various benefits, including abrogating resistance, enabling more efficient pest control and reducing the environmental impact that insecticide applications currently have.</p>			

Participant organisation names	Project title	Proposed project costs	Proposed project grant
Asymptote Ltd; CABI; University of Ghana	Improved methods for freeze drying of entomopathogenic fungi	£368,441	£274,497
<b>Project description - provided by applicants</b>			
<p>The project brings together the technological expertise to develop a cost effective mass production and delivery a more effective biological solution to control pests with expertise in fungal cell processes and whole organism survival to ensure product long term shelf life whilst retaining organism function. It combines improved product formulation with effectiveness to reduce crop losses and chemical pollution causing soil quality deterioration. The project will: Apply advanced technology to biological product development with the potential for transfer to other biological applications; Take improved laboratory knowledge to improve the cost effectiveness and efficacy to a product in the field; Develop formulations increase shelf life and confidence in the use of biological solutions to replace chemical pesticides; Produce a product appropriate for storage and use in developing economy countries; Reduce crop losses by utilisation of organisms that previously could not applied in the field.</p>			

Participant organisation names	Project title	Proposed project costs	Proposed project grant
Duraweld Limited; Nonwovens Innovation and Research Institute; Aberystwyth University; National Institute of Agricultural Botany	Improved crop breeding programmes through advanced Pollination Control Bag materials technology	£340,432	£239,512
<b>Project description - provided by applicants</b>			
<p>The project will investigate the technical and commercial feasibility of developing an innovative pollination control bag to improve crop breeding programmes used for three important agricultural crops: sugar beet, wheat and Miscanthus. Existing technologies are unfit for purpose and their use can be detrimental to plant health and seed yield, and increase disease incidence and expense. A range of materials (films and nonwoven), fibre technologies and techniques will be investigated and trialled with academic and commercial breeders with the aim of developing the next generation of pollination control bags to improve breeding outcomes, reduce losses caused by poor temperature and humidity control within the bag, and increase seed yield. This will reduce costs for plant breeders and accelerate the rate at which new commercial crop varieties (with improved yields, drought, disease or pest resistance, and higher crop quality), can be discovered and brought to market.</p>			

Participant organisation names	Project title	Proposed project costs	Proposed project grant
Gnosys Global Ltd; National Institute of Agricultural Botany; Frontier Agriculture Ltd; G's Fresh Ltd	CAPSEED - A New Seed Conditioning Process for Arable and Horticultural Crops	£413,133	£276,624
<b>Project description - provided by applicants</b>			
<p>The objective is to determine whether plasma treatments, particularly those using cold atmospheric plasma, can improve the health and quality of crops by improving seedling emergence, vigour, disease control, as well as biochemical reactivity. If successful, this would lead to healthier crops whilst reducing the chemical burden on the environment. Manipulating the properties of seeds with a non-invasive, physical process could have far-reaching effects on crop production. More vigorous seedlings, able to withstand biotic and abiotic stresses such as disease, pests and drought, could reduce risk in crop production and result in increased productivity and resilience.</p>			

Participant organisation names	Project title	Proposed project costs	Proposed project grant
Mylnefield Research Services; James Hutton Institute; Totalworldfresh; S&A Produce (UK) Ltd; AHDB	Developing genetic resources in blueberries	£222,219	£158,580
<b>Project description - provided by applicants</b>			
<p>There has been increased demand for blueberries in recent years fuelled in part because of their many recognised health benefits. Development of new blueberry cultivars with high fruit and nutritional quality combined with early and late ripening and appropriate climatic adaptation is needed. With the availability of more genomic resources, marker-assisted breeding could be used in cultivar development to more efficiently combine traits for fruit and nutritional quality specific to UK climatic adaptation. This project would therefore develop pre-breeding populations and a high resolution GbS linkage map to allow the UK to develop adapted blueberry cultivars efficiently, cost effectively and in a shorter time frame than would be feasible by traditional breeding means. This would allow the UK to produce more home grown fruit for consumption to increase from the 5% UK fruit currently available.</p>			

Participant organisation names	Project title	Proposed project costs	Proposed project grant
Mylnefield Research Services; James Hutton Institute; Totalworldfresh; Thomas Thomson Ltd; M&S plc; S&A Produce (UK) Ltd; AHDB; Berry Gardens Ltd	Using genomics technologies to determine the mechanism of resistance to phytophthora root rot in raspberry for future breeding applications to raspberry and other crops.	£284,682	£197,265
<b>Project description - provided by applicants</b>			
<p>In the Northern Hemisphere with damper conditions, Phytophthora root rot is causing a rapid decline in raspberry plantations grown in soil and also greatly decreasing the life span of production of raspberries grown in substrate with negative environmental consequences.</p> <p>Plant based resistance is the only way forward and limited material exists that consistently withstands infection with little/no symptom production. The development of gene based techniques offers an opportunity to identify genes that have a significant role in this plant-pathogen interaction to determine the mechanisms of resistance and develop novel strategies of protection including breeding. How both resistant and susceptible varieties respond at the level of gene expression and how the pathogen responds to the differing phenotypes will identify gene markers and allow strategies for control to be developed.</p>			

Participant organisation names	Project title	Proposed project costs	Proposed project grant
SRUC; Aberdeen-Angus Cattle Society	Evaluating a potential proxy test for Feed Conversion Efficiency in beef cattle.	£158,768	£119,207
<b>Project description - provided by applicants</b>			
<p>The aim of this project is to explore options for implementing a new approach to assess feed conversion efficiency (FCE) in UK beef cattle. The longer-term aim is to use the new approach to breed for cattle with high FCE. It is important to maximize FCE because feed is the largest production cost in beef production and breeding for high FCE is a good long-term strategy that has worked well in the pig and poultry industries. The traditional approach to breed for FCE has been to measure feed intake and weight gain over long periods of time, but this is expensive for beef cattle and so has only been implemented for a few breeds in other countries. The project is based on testing for a novel biomarker and we will explore the practicalities of implementing this method alongside other on-farm testing of beef cattle and use the results to define options for future sampling and testing protocols.</p>			



Participant organisation names	Project title	Proposed project costs	Proposed project grant
University of Lincoln; R Fountain and Son	3D Vision Assisted Robotic Harvesting of Broccoli	£177,736	£137,538
<b>Project description - provided by applicants</b>			
<p>There is an urgent need to reduce the costs of production of field brassica crops, in particular broccoli. Labour costs are a significant proportion of overall production costs. High labour usage also drives complex management and potentially social issues. In this project we will test whether low-cost commercial 3D camera technology can be used to identify and select broccoli which are ready to harvest within commercial crops. This will provide a key underpinning step towards the development of a fully automatic and camera guided robotic harvesting system for broccoli. The commercial benefits are highly significant, as the broccoli crop is one of the worlds largest vegetable crops, and almost all of it is manually harvested.</p>			

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The University of Nottingham; John Bowler Pullets and Feeds LLP; P.A.K Engineering Ltd; Geo Green Power Ltd; Environmental Process System (EPS) Ltd	WelChic – Welfare Enhanced Living Conditions for healthier Chickens.	£495,112	£381,848
<b>Project description - provided by applicants</b>			
<p>The overall aim of the project is to develop and test an efficient and environmentally-friendly, precision engineering solution for cooling/heating to improve indoor air quality and thermal comfort to promote better animal welfare and productivity in poultry houses. The system will use a novel membrane -based dew point evaporative technology using water and air as the working fluids to provide thermal regulation and improved air quality in the summer period. In addition, a low-cost poly heat exchanger ready loop integrated solar roof collector will be used to harness solar energy to heat working fluid to drive a heat pump. This is an efficient method for providing heating requirements in poultry houses. The solar collector has a simple design with direct integration in the poultry house roof. The project will involve the design, construction and testing of a prototype cooling/heating system. The new system will provide an environmentally friendly and economic solution to compete with traditional HVAC systems.</p>			