

Results of competition: Agri-Tech Catalyst - Early stage feasibility - round 2

Total available funding for this competition was £3.5m 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
Aberystwyth University (lead) Unilever Research and Development Colworth: Hindustan Unilever Ltd	Development of pearl millet for health benefits for type-2 diabetes – feasibility study of physicochemical properties and genetic enhancement	£499,896	£412,407
Project description - provided by applicants			
<p>Pearl millet is a drought hardy and sustainable cereal with superior glycaemic control over wheat and rice. The number of (type 2) mainly non-insulin dependent diabetics in India is currently estimated at 40 million and rising while in the UK it is estimated that 5 million people will have diabetes by 2025.</p> <p>This project will explore variations in pearl millet to understand how this sustainable crop can be developed further to ultimately produce improved bread products for glycaemic control. Such variations will then be deployed in future breeding programmes to develop pearl millet cultivars that will be optimised for both agricultural sustainability and glycaemic control. These lines will be made available as both improved food crops for direct growth and consumption by smallholder farmers and also as a valuable raw material for bread products.</p>			

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Acidophil (lead) Isomerase Therapeutics Limited	Novel macrocyclic lactone compounds for crop and livestock protection	£494,235	£370,676
Project description - provided by applicants			
<p>Worldwide, £100s of billions of crops and livestock are lost annually to pests and disease. Population growth and global improvements in standards of living mean that even more productivity must be gained from limited arable land. Unfortunately, some existing crop and livestock protection agents are losing effectiveness due to pest resistance and fewer novel agents are entering the market.</p> <p>Macrocyclic lactone compounds represent over a £1 billion annual market share, but existing products have significant shortcomings. Acidophil's innovation, to be evaluated in this early stage feasibility study, consists of combining synthetic biology and chemistry to generate novel and improved versions of these compounds addressing the shortcomings of existing products.</p>			

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Adas UK Limited (lead) University of Nottingham	Vaccination based control of fasciolosis in farmed ruminants	£379,175	£299,246
Project description - provided by applicants			
<p>Fasciola hepatica, (liver fluke) is a common pathogen of sheep, goats and cattle and the causal agent of a disease known as fasciolosis. This is the cause of serious financial losses within the agricultural sector in terms of animal production resulting from poor growth and fitness to even loss of animals.</p> <p>The control of F. hepatica has been through the use of anthelmintic drugs, however widespread drug resistance means that these are now much less effective. An alternative treatment could be vaccination which would either prevent infection or reduce worm burden in the animal, both would prevent disease transmission. No vaccine to F. hepatica has been successfully brought to market.</p> <p>This Agri-Tech catalyst project will use a range of novel in vitro and in silico strategies to identify panels of F. hepatica components for potential multi-subunit vaccine design. This could lead to the development of effective vaccines for the control of fasciolosis, improving both animal performance and health and welfare.</p>			

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Bangor University (lead) Anamolbiu (APL) Nepal Agriculture Research Council: SKUAST	KASP™ technology to improve new rice varieties and farmers' livelihoods. New rice varieties developed in DFID-funded research have been widely adopted in Nepal, India, and Bangladesh.	£319,673	£279,708
Project description - provided by applicants			
<p>Bangor University (BU) will manage this project to address the international challenge of increased rice production in selected countries across Asia for the alleviation of poverty. The project will apply KASP technology to conventional marker-assisted selection protocols that will accelerate breeding efficiencies for resistance to the two most serious diseases of rice - blast and BLB.</p> <p>LGC Genomics (UK private-sector) will develop novel KASP markers that can be exploited in marker-assisted backcrossing for disease resistance. They will be validated using mapping populations generated in a breeding programme to transfer these resistance targets to novel rice varieties (produced from 20 years of DFID funding).</p> <p>The breeding programme will be led by Anamolbiu Pvt Co. Ltd (Nepalese SME set up with some DFID assistance) supported by phenotyping and genotyping by the Nepal Agriculture Research Council (NARC). A KASP toolkit will be commercialised globally by LGC for rice breeders.</p>			

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Berry Gardens Growers Ltd (lead) East Malling Research Meteor Communications Limited Russell IPM Limited	Feasibility of developing autonomous SmartTraps for remote monitoring Spotted Wing Drosophila in soft and stone fruit	£220,095	£190,472
Project description - provided by applicants			
<p>This project will investigate the feasibility of developing an autonomous SmartTraps system for remotely monitoring adult Spotted Wing Drosophila (SWD), an invasive fruit pest. The feasibility of rapidly and accurately identifying the near microscopic Spotted Wing Drosophila males and females by image analysis in a compact, autonomous, non-saturating trap will be determined as the key preliminary step and technological challenge.</p> <p>Other key processes that will need to be developed for a full system beyond a successful outcome of this feasibility study include between trap communications, cloud based data aggregation and analysis, and web and app-based tools to integrate summary data from traps in order to provide decision support for growers. The trap will allow much closer and more reliable monitoring of SWD, and will be a significant advancement in pest specific monitoring technology which will have wide application for numerous pests globally.</p>			

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East Malling Research (lead) Marlow Foods Limited	Maximising mycoprotein substrate utilisation and nutrition	£388,724	£320,467
Project description - provided by applicants			
<p>The production of high quality protein with a low carbon footprint is essential to the future global food security. Mycoprotein is a healthy alternative to meat and has a lower carbon footprint than chicken production. Through this project, this will be improved still further, by reducing the dependence on a single type of sugar, utilised during the production process. Ultimately this may allow the production of mycoprotein to be carried out using other types of sugars, that the naturally occurring fungus used for the production of Quorn can utilise for production of high quality protein. This means that the production of Quorn will be less affected by price-spikes on global food markets and also will allow Quorn production to further reduce carbon emissions during production, by creating better supply chains leading up to production.</p>			

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Hunshelf Hall Farm (lead) Digital Concepts Engineering Limited G32 Technologies Limited	IBEX2: Autonomous robot weed sprayer for less favoured areas	£254,179	£182,414
Project description - provided by applicants			
<p>IBEX2 is an extreme mobility autonomous weed spraying system. Unlike most previous agribots it operates on Less Favoured Areas of farm land, i.e. sheep and dairy, undulating and hilly farms, and bracken-covered moorland. IBEX2 is a self-driving tracked vehicle approximately 1m long, based on bomb disposal robots. Its software performs weed recognition from on-board cameras and terrain navigation using a suite of on-board range sensors coupled with prior knowledge from OS maps and satellite images.</p> <p>Software is based entirely on existing, now-standard approaches as found in commercial autonomous systems. A user group of 40 real farmers feeds back continually into the design via a series of demos and discussions. The project has no academic partners and its approach is to focus purely on producing commercial and technical feasibility studies of existing, off-the-shelf research and components as quickly and simply as possible.</p>			

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Pangaea Agrochemicals Limited (lead) Agrosmart Limited The University of Birmingham	Overcoming glyphosate resistance	£427,311	£351,285
Project description - provided by applicants			
<p>Glyphosate resistant weeds are a critical issue for worldwide food production. Pangaea Agrochemicals together with their collaborating partners at AgroSmart and the University of Birmingham have come together to develop a piece of patented herbicide technology that addresses this problem into a commercial product. The technology relies on the use of a formulation containing micro-encapsulated glyphosate to provide a herbicide which is capable of controlling many different glyphosate resistant weed strains.</p> <p>The project is focussed around the transfer of existing micro-encapsulation technology from other sectors into agrochemicals and the subsequent development of a small pilot plant to develop the initial manufacturing process. The product of both the lab scale development and the pilot plant will be tested for efficacy at trials centres in Australia and South Africa.</p>			

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Texel Sheep Society (lead) SRUC	Using genomic technologies to reduce mastitis in meat sheep.	£451,006	£371,505
Project description - provided by applicants			
<p>This project addresses the sustainable intensification of sheep meat through the exploration of genomic selection for disease resistance. With pure- and crossbred Texel sheep, genome-screening technology and bioinformatic procedures will be used to identify genomic regions and bloodlines of sheep that are more resistant to mastitis.</p> <p>The project will put in place the computational and data recording protocol infrastructures so that farmers can include new measures of mastitis alongside their other breeding goals (such as aspects of lamb growth and meat quality) in the future. The project will also investigate if cheaper alternatives to the new genomic technology can provide similar information without losing accuracy, to identify the more resistant animals for breeding. New methods for identifying animals with clinical or subclinical mastitis will combine farmer records with on-farm milk testing and lab test indicators of disease to determine which method is most likely to be used routinely in the future.</p>			

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University of Edinburgh (lead) Genus Plc University of Cambridge	Engineering resistance to disease into pigs	£440,155	£362,840
Project description - provided by applicants			
<p>This project addresses food security and environmental sustainability by increasing the efficiency and decreasing the carbon footprint of pork production. Specifically, we target the significant impact of influenza virus on one of the UK core livestock industries.</p> <p>Swine influenza ranks consistently among the top 3 economic diseases affecting breeding, nursery, and finishing herds. Second among viral diseases only to PRRS, influenza is the top zoonotic viral disease of swine. Using new technology we will produce GM pigs expressing decoy RNAs to prevent replication and propagation of virus.</p> <p>The aim is to mitigate if not eliminate mortality and morbidity due to influenza infections of pigs, while additionally protecting human health by reducing the zoonotic flu pandemic potential. The strategy is based on the recent validation of a novel RNA decoy approach in chickens. This project will produce a 'prototype' study and, if successful, further method refinement required to develop a commercial product.</p>			

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University of Nottingham (lead) Cambridge Glasshouse Company Ltd Geo Green Power Limited Kevothermal Limited Micropropagation Services (E.M.) Limited TerOpta Ltd	Innovative Energy Saving and Climate Control System for Greenhouses	£498,768	£436,076
Project description - provided by applicants			
<p>The project main aim is to provide a sustainable solution to the inherent problems of the greenhouse protected cropping industry through proposing a low-cost energy saving and climate control system. The project presents an innovative integrated approach to enhance the energetic performance of greenhouses and improve the yield of various protected crops through employing a seasonal underground thermal energy store with an innovative vacuum insulation panels in addition to utilizing heat insulation solar glass as the greenhouse glazing, natural ventilation windcatchers and innovative LED lights.</p> <p>The proposed solution enhances the glasshouse indoor conditions, improves the productivity and reduces the reliance on conventional fuels to provide energy needs and thus reducing the carbon emissions and the high running costs. Successful project implementation will benefit the whole community including the protected cropping growers and industry, the customers and the UK economy.</p>			