Innovate UK
Technology Strategy Board

Results of competition: Crop and livestock disease challenges - Collaborative R&D

Total available funding for this competition was £16.5m from the Biotechnology and Biological Sciences Research Council, the Department for Environment, Food & Rural Affairs and Innovate UK.

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
Analox Limited (lead) Camgrain Stores Limited Cranfield University	Decision support systems for minimising mould spoilage and mycotoxins in stored cereals	£1,029,135	£729,621
Project description - provided by applicants			
Cereals are traded on a wet weight basis. Thus post-harvest thresholds for safe storage can be exceeded when batches of different moisture contents of grain are placed in silos. This can result in initiation of mould growth and contamination with mycotoxins. The objectives of this project are to devise a robust integrated sensor system to monitor CO2, temperature and RH in different positions within grain silos and combine this with biological information on boundary conditions for growth of spoilage and mycotoxigenic fungi relevant to the EU legislative limits. This will provide an effective real time Decision Support System (DSS) tool for grain silo managers to control and minimise potential for spoilage and mycotoxin contamination post-harvest. The DSS system will have wide applications in the food and feed chains post-harvest in the UK, the EU and globally, for grain silo manufacturers, and for transport of grain, especially via shipping. This will provide a significant niche market for a powerful new DSS tool in the agrifood market.			

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Results of competition: Crop and livestock disease challenges - Collaborative R&D

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
British Beet Research Organisation (lead) SESVanderHave Syngenta Seeds Ltd	A novel pre-breeding strategy to reduce dependence on insecticides for virus yellows control in sugar beet	£1,127,448	£646,126

Project description - provided by applicants

Virus yellows in sugar beet is a greater problem in the UK than anywhere else in Europe because of our maritime climate, which favours the aphid vector. The UK beet industry invests up to £7M annually on insecticides (seed treatments and foliar sprays) for aphid control, without which virus yellows could cause losses of up to £10million/year.

Recent EU restrictions on neonicotinoid use and the development of insecticide resistance in aphids in Europe, threatens to significantly increase virus yellows in UK-grown sugar beet, making the UK crop less competitive in world markets. Development of sugar beet resistant to virus yellows is therefore critical.

We have identified wild beet that are resistant to the effects of virus yellows and have crossed this trait into sugar beet. We propose to develop this resistance further by crossing our resistant lines with modern breeding varieties and carry out rigorous testing of our new varieties for virus yellows resistance, plant vigour and sugar yield. This 5yr pre-breeding project will accelerate the production of new virus yellows resistant sugar beet varieties, bringing significant economic and environmental benefits to the UK and Europe.

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Participant organisation names	Project title	Proposed project costs	Proposed project grant
British Beet Research Organisation (lead) AB Sugar Burkard Manufacturing Co Ltd Crop Performance Limited Rothamsted Research University of Nottingham	SporeID (Innovative disease monitoring and diagnostics for improved efficiency of crop production)	£1,407,345	£955,473
Project description - provided by applicants			
The aim of this project is to minimise the impact of disease on yield of the UK sugar beet crop which is worth approximately £240M per year. Yield potential of the UK sugar beet crop is c.130 t/ha compared to an average yield of 70t/ha. One of the factors responsible for this yield gap is foliar diseases which can reduce yield by more than 50% and, whilst current practices prevent yield losses of this magnitude, it is estimated that 10% yield is lost to foliar diseases, representing £24M per year. Climate change may lead to increasing pressure from existing diseases and 'new' emerging diseases, which require increased crop protection. This project will bring together novel diagnostic tools, crop disease modelling and yield forecasting to underpin grower decision making and investigate the potential impact of emerging diseases on the crop.			

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Participant organisation names	Project title	Proposed project costs	Proposed project grant
Clarity Biosolutions Limited (lead) Sarum Hydraulics Limited The Genome Analysis Centre Tulip Limited University of the West of England	Development of magnetometer immunoassay (MIA) technology to improve screening accuracy and on-farm user friendliness together with sequencing and resistance information.	£1,152,927	£816,206
Project description - provided by applicants			
This application is for funding to support the development of a novel, portable and cost effective system for the detection of animal diseases pigs. These diseases have a significant impact on animal health and represent a financial burden to countries worldwide. If funded, this project will deliver a magnetic sensor-based device and surveillance system which would provide early detection of disease and enable quick action in order to reduce the risk of disease spread, with economic benefits to farmers and food producers and welfare benefits to farm animals.			

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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
Crop Performance Limited (lead) Burkard Manufacturing Company Limited Frontier Agriculture Limited G's Fresh Ltd Mylnefield Research Services Limited Rothamsted Research spearhead international Ltd The James Hutton Institute Velcourt Limited	Optimised Detection and Control of Potato Blight: Sensing Pathogens to Inform Smart Spray Decisions	£1,036,533	£706,657

Project description - provided by applicants

The maintenance of global food security, mediated by sustainable intensification of agriculture, is a recognised global issue and the effective management of plant disease is critical to productive cropping of agricultural land. Potato is the third most important food crop globally, with late blight control being a major challenge estimated to cost £3.5billion in losses per annum. In the UK, disease control alone costs £55M per annum on average to the industry.

This project seeks to demonstrate a new prototype device that will sample airborne spores of P. infestans (the cause of late blight) and Alternaria species (the cause of early blight) in the field, automatically process the sample, quantify DNA by fluorescence and relay results by mobile phone text message. The aim is to improve current weather-based disease risk models and predictions for late blight, resulting in enhanced decision making ability for growers with respect to fungicide choice and application and therefore more efficient resource use.

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Participant organisation names	Project title	Proposed project costs	Proposed project grant
DUNBIA (WALES) (lead) FARMWIZARD University of Nottingham	SPILaMM-Sheep Performance Improvement through Lameness Monitoring and Management	£856,869	£565,108
Project description - provided by applicants			
This project seeks to address the challenge of sheep lameness, a predominant cause of both poor productive and reproductive performance causing a reduction in product value to the farmer, processor, retailer and consumer. By researching the primary contributing factors and assessing the effectiveness of the proposed lameness data collection and feedback systems (using innovative hardware and software) in facilitating a targeted risk based control strategy, our consortium intends to reduce lameness to an acceptable level; from 10% to 2%.			

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Participant organisation names	Project title	Proposed project costs	Proposed project grant
Epistem Limited (lead) CEFAS	UK technology and advice for Point of Need Diagnostic testing in Shrimp aquaculture (POND-SHRIMP)	£1,226,442	£936,860
Project description - provided by applicants			
Disease associated with White Spot Syndrome Virus (WSSV) and Early Mortality Synrdome (EMS) together cause over $3bn annual losses to the global farmed shrimp industry. Current losses from these pathogens alone far exceed all shrimp products imported to the EU each year. Accurate detection and management of disease is central to poverty alleviation in producer nations and food security in net importing countries. A recent UKTI funded workshop on Disease in Aquaculture highlighted how so-called 'decentralised' testing (i.e. on farm) and reporting of data via smartphones has potential to dramatically improve health status of aquatic farms in Asia. Here, we will validate and apply a cutting edge UK-based technology (Genedrive) and a novel smartphone app to collect and transmit disease data from remote farms to centralised reference laboratories. By bringing together UK experts in diagnosis, pathology and epidemiology of WSD, with industry specialists, the aim is to drastically improve detection and management of economically damaging diseases in global aquaculture. We will contribute to poverty alleviation and food security agendas using UK-based technologies and expertise.			

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Participant organisation names	Project title	Proposed project costs	Proposed project grant
Frontier Agriculture Limited (lead) Biogene Ltd De Sangosse Ltd Food and Environment Research Agency (FERA)	Molecular diagnostic soil testing platform as a decision making tool for agronomists	£982,725	£613,572
Project description - provided by applicants			
This project will generate a rapid diagnostic instrument for the detection of soil-borne pathogens. The instrument will eventually be able to test for a range of economically important diseases of animal and plants but the initial proof of principle will be the detection of Verticillium longisporum. The disease verticillium wilt has spread to the UK and can cause yield losses of over 20% in economically important crops such as oilseed rape. This consortium brings a wide range of skills to solving this problem and will generate a diagnostic test and investigate intervention methods to manage the impact of the disease. The outcome will be increased agricultural output, management of this and other soil-borne diseases, and generation of UK employment, exports and revenues.			

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Results of competition: Crop and livestock disease challenges - Collaborative R&D

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
Genus Plc (lead) University of Edinburgh	Validation of Genome Edited Disease Resistant Pigs	£504,000	£312,000
Project description - provided by applicants			
Infectious disease is the biggest threat to global animal protein food security. As production intensifies the livestock industry becomes more vulnerable to devastating disease outbreaks affecting millions of animals. In this project, we target three viral diseases of pigs for which no effective vaccination or other mitigating strategy is available. We are using extremely precise genome editing technology in domestic pigs to introduce new versions of an important immune function gene, based on the gene of a wild pig species, which we hypothesise could improve the resistance/resilience of such pigs to three specific viruses (African Swine Fever Virus, Swine Influenza Virus and Porcine Reproductive and Respiratory Syndrome Virus). This project will enable us to validate if any of these new gene versions confer improved viral resistance/resilience through disease challenge experiments. This project is an essential step towards commercialisation of virus resistant pigs and if successful, could result in PIC, a global UK-based breeding company, leading the world in supplying pigs with an enhanced ability to fight viral disease and contribute significantly to nourishing the world's growing population.			

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Results of competition: Crop and livestock disease challenges - Collaborative R&D

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Participant organisation names	Project title	Proposed project costs	Proposed project grant
Germinal Holdings Limited (lead) Environmental & Rural Sciences Institute of Biological	Novel strategies for genetic improvement of disease resistance in perennial ryegrass	£785,394	£510,249
Project description - provided by applicants			
Perennial ryegrass (PRG) provides the majority of forage for livestock in the UK, and delivers commercial returns to Germinal Holdings (GHL) through seed sales. Drechslera andersonii or net blotch is a serious fungal disease of PRG, and the UK is at high or medium risk. Biomass yield decreases can be more than 1t DM per hectare in the first cut. Few current varieties have good resistance, and the UK bred high sugar grass (HSG) varieties show poor resistance. Fungicide use is not a viable option. Reduction in the use of HSG varieties will lead to decreasing sales and increased imported varieties with higher resistance, but without the high sugar content, which improves ruminant nutrition efficiency and reduce GHG emissions from them. A 20% reduction in HSG seed sales for example would have serious commercial implications for GHL. IBERS, Aberystwyth University will collaborate with GHL to breed net blotch resistant HSG varieties using a novel backcross strategy aided by genomic selection. This will increase the speed and reliability with which disease resistant hybrids recover previous values of agronomic and HSG traits, and thus help GHL maintain or increase market share.			

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Participant organisation names	Project title	Proposed project costs	Proposed project grant
Harbro Limited (lead) Agricultural Contract and Marketing Company Ltd A.M. WARKUP LIMITED Dunbia (Ballymena) Newcastle University Innovent Technology Ltd	Automated detection and prediction of lameness in pigs	£1,430,269	£982,665
Project description - provided by applicants			
Lameness can affect up to 20% of pigs in the UK and is one of the major welfare issues across the livestock industry. Animals which are lame may be in pain, require veterinary treatment and may not reach their full production potential. This project seeks to develop a pig management tool which will help identify pigs which are currently lame, or which are likely to become lame in the future and therefore should not be used for breeding. By utilising of recent advances in imaging technology, the consortium will be able to develop and exploit an affordable technological solution. Based on deviations from normal movement patterns, the technology will be able to flag up affected individuals to the farmer or his advisors e.g. veterinarians. It will also help genetic companies select for animals which are less susceptible to lameness to breed from. This will help reduce the costly impact of lameness on the industry, improving efficiencies and pig welfare, and promoting sustainable food the benefit of all.			

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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
HL Hutchinson Limited (lead) Grainseed Ltd Limagrain UK Limited LS Plant Breeding Ltd Pioneer Hi-Bred Northern Europe Sales Division G M B H University of Hertfordshire Woodhall Estate	Strategies to increase durability of host resistance for effective control of phoma stem canker on oilseed rape	£426,966	£285,580

Project description - provided by applicants

Phoma stem canker, caused by the fungal pathogen Leptosphaeria maculans, is a damaging disease on oilseed rape in the UK, causing annual yield losses > £100M despite use of fungicides. With recent loss of the most effective fungicides through EU legislation and predicted global warming, potential yield losses will increase. Use of host resistance to control this disease is becoming ever more important. However, new sources of resistance are often rendered ineffective due to pathogen population changes.

This project will monitor emergence of new virulent races of L. maculans and prevent them from spreading into new regions; investigate molecular mechanisms of mutation from avirulent to virulence in L. maculans populations; understand effects of environmental factors (e.g. temperature) on durability of host resistance. New knowledge will be used to develop new control strategies by optimising deployment of host resistance and targeted fungicide application.

This project will bring together a consortium with breeders, distributor, farmer and scientists to ensure effective control of phoma stem canker by directly applying knowledge from research into farming practice.

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Participant organisation names	Project title	Proposed project costs	Proposed project grant
JAS Biologicals Ltd (lead) Ridgeway Biologicals Ltd Tethys Aquaculture Ltd	Validation of PCR technology for the development of autogenous vaccines for the control of viral diseases	£711,300	£426,779

Project description - provided by applicants

The ability to rapidly produce vaccines in response to bacterial and viral disease outbreaks in livestock is of significant economic benefit to the farming industry. The UK regulatory framework for vaccine production dictates that rapid response vaccines can only be manufactured as farm-specific (autogenous) vaccines (AVs). AVs can be produced cost-effectively against bacterial pathogens, but not viral disease. Consequently, no licensed AV production is available in the UK. The primary constraints to cost-reduction are: a) high cost of safety testing; b) time required to conduct such tests.

This project will address these constraints by developing safety tests based on PCR technology. For such testing to be accepted by Regulatory Authorities, protocols will need to be validated and production of effective viral AVs demonstrated. To address these requirements, this project will develop cost-effective PCR-based QA tests for the detection of listed viral pathogens. The partners have expertise in both conventional viral vaccine and bacterial AV production. Their collective skill and experience will create new protocols to revolutionise the response to viral disease within the livestock industry.

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Participant organisation names	Project title	Proposed project costs	Proposed project grant
Landcatch Natural Selection Ltd (lead) University of Edinburgh	Genomic selection for improved resistance to Amoebic Gill Disease in farmed Atlantic salmon	£380,984	£247,629

Project description - provided by applicants

Salmon are a source of high-quality protein and long chain fatty acids for human nutrition and health. Salmon farming is economically important in the UK and a large source of employment in rural and coastal communities. Outbreaks of Amoebic gill disease (AGD) can cause widespread illness and losses to salmon farms. As such, this disease is one of the most serious threats to UK salmon farming and has a negative effect on salmon health and welfare.

Our previous work funded by Innovate UK has led to the development of a chip containing hundreds of thousands of genetic markers for Atlantic salmon. This chip allowed us to predict how resistant a salmon is to sea lice from a sample of its DNA. In this project, we aim to apply this chip and knowledge to improve the resistance of farmed salmon stocks to AGD. By performing a controlled AGD challenge experiment and utilising measures of gill damage collected in the farm environment, we aim to identify and verify accurate measures of resistance. The data collected will be combined with genetic marker data to identify and select more resistant fish and thus help tackle the disease problem.

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Participant organisation names	Project title	Proposed project costs	Proposed project grant
Monaghan Mushrooms Limited (lead) AHDB Potato Council Queens University Belfast ROBOSCIENTIFIC LIMITED University of Lincoln	Early detection and biocontrol of prevalent diseases of mushrooms and potatoes	£1,319,806	£899,827
Project description - provided by applicants			
This project will address the challenges of early disease identification during crop growth and the management of these diseases without the use of chemical pesticides - particularly with the mushroom and potato industries. It aims to develop an electronic nose system capable of rapidly detecting prevalent mushroom and potato crop diseases, enabling the primary producer to make disease management decisions earlier in the crop production process. A biocontrol agent will also be developed that will control prevalent mushroom and potato (storage and tuber) diseases. This biocontrol agent will be tested to ensure that there will be no risk to consumer safety or the environment. It is anticipated that this project will develop a long-needed alternative to the use of pesticides by the mushroom and potato industries, thereby ensuring their future sustainability. It will also provide an innovative platform example for future product development and risk assessment strategies.		

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Participant organisation names	Project title	Proposed project costs	Proposed project grant
Naturiol Bangor Limited (lead) Aberystwyth University Bangor University PhytoQuest Limited Ridgeway Research Limited Telsol Limited	Modified plant saponins for the control of liver fluke in livestock	£995,121	£700,660

Project description - provided by applicants

Liver fluke in cattle and sheep represents an increasing economic problem, particularly because of developing resistance to available drugs, as well as representing a serious animal welfare issue.

This project will develop a nature based alternative treatment by using a bulk chemical that can be isolated in large quantities from a common non-food plant which is currently little used in the UK and often controlled by burning. The plant material, which itself is known to be active against fluke, will be converted into a single chemical entity by simple processes and then modified to optimise its activity.

This will be determined using a highly specialised approach measuring in vitro many individual effects on the fluke, and during small in vivo studies. The consortium will develop and cost a complete product dossier, including material supply, product formulation, efficacy and delivery systems, a route to market, and an analysis of the potential benefits in controlling disease; it is expected that this project portfolio will either lead to a consortium partner moving directly to the process of full product registration, or to the consortium licensing the outputs so that such a process could begin.

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Participant organisation names	Project title	Proposed project costs	Proposed project grant
Neem Biotech Limited (lead) Food and Environment Research Agency (FERA)	Allicin as a potential insecticide for filth-feeding disease vectoring flies of intensive livestock	£271,297	£195,295
Project description - provided by applicants			
Filth feeding flies are major pests of intensive livestock facilities globally and significant losses occur as a result of reduced productivity caused by the nuisance and irritation they cause animals ("fly worry"). Furthermore, flies act as mechanical vectors of a large number of pathogenic organisms of both animals and humans. When fly populations are large, insects may migrate to nearby premises, causing nuisance and creating potential health risks to residents. There are very few insecticides available to control the fly species associated with livestock rearing facilities, a fact that creates the constant risk of resistance development in those products currently in use. The proposed project aims to develop a new insecticidal product based on allicin, a garlic-derived compound, which can be safely used against the major fly pests of livestock, both in the UK and globally. The project will examine the efficacy of the product, the economic case, market size and potential for the new product to be used in the range of other situations where flies are major pests.			

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Participant organisation names	Project title	Proposed project costs	Proposed project grant
OptiSense Limited (lead) Food and Environment Research Agency (FERA) GeneSys Ltd Masstock Arable (UK) Limited	Improved pathogen management in crops using rapid in-field diagnostics	£691,376	£483,276

Project description - provided by applicants

Controlling disease relies on early and accurate diagnosis informing timely and targeted intervention strategies. Good resistance management is based on minimising the levels of exposure of the target pathogen to the fungicide, only spraying where the risk warrants treatment.

Knowledge of the resistance status of a field population will allow specific targeting of products avoiding use of ineffective treatments, maximising efficacy and longevity of active compounds. This multi-disciplinary project brings together agronomy services providers (Agrii) diagnostic providers (Optisense/GeneSys) and underpinning science (Fera) stakeholders to deliver a rapid, hand-held, in-field test for real-time monitoring of fungicide resistance strains of Mycosphaerella graminicola (Septoria tritici) within crops.

The results of testing will directly inform the user on interventions using the correct fungicide to control the specific genotype of the pathogen present in the crop. This method will save money on ineffective spraying, improve yield, decrease losses, prevent build up of resistance and prolong the life of active chemicals and promote their responsible use improving environmental stewardship.

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Participant organisation names	Project title	Proposed project costs	Proposed project grant
RAFT Solutions Ltd (lead) Cranfield University Lee Cairns XLVet UK Ltd	Veterinary clinical data surveillance	£525,075	£346,395
Project description - provided by applicants			
We propose to develop a surveillance tool for vet practices, capturing and refining data from existing practice management systems (EXISTING, but NEW when collated in one place for surveillance), clinical work in the field including medicines usage and clinical recordings (NEW), and objective assessment of the impacts veterinary advice and product usage has on the environmental performance of the livestock herd (NEW) to map disease and inform decisions 'on the ground'. These tools would be sold separately, or in combination to government (prevalence of endemic and emerging diseases), the pharmaceutical industry (medicines usage and impact on farm, including benchmarking by veterinary customer); retailers and processors (mitigation of veterinary advice on climate change and farm economics), farmers (indicators for production improvements) and to vet practices themselves, looking to have an effective, easy to use way of recording clinical notes, medicines usage and benchmarking results (from economics to clinical incidence) on their own practice farms and with others across the country. The product has the potential to sell in UK, Europe and more widely using networks in place		

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Participant organisation names	Project title	Proposed project costs	Proposed project grant
Ridgeway Biologicals Ltd (lead) Marine Harvest (Scotland) Limited University of Stirling	Development of autogenous vaccines for the control of amoebic gill disease in farmed salmon	£728,471	£485,048
Project description - provided by applicants			
Amoebic gill disease (AGD) is a new disease emerging in farmed salmon across the world including Scotland and Ireland. The amoeba colonise the gills of fish causing inflammation which can lead to suffocation of the fish. The project brings together scientists with expertise in AGD at the Institute of Aquaculture, University of Stirling; Marine Harvest Scotland, the biggest producer of farmed salmon in Scotland; and Ridgeway Biologicals Ltd, an SME which specialises in the manufacture of farm-specific "autogenous" vaccines. The consortium aims to sample, culture and characterise amoebae which are killing fish in Scotland and then develop vaccines based on these isolated amoeba. The vaccines will be tested in salmon in experimental trials in a laboratory environment. Experimental vaccines that prove effective in the laboratory will be used to vaccinate fish in sea cages to assess vaccine efficacy in fish following natural exposure to amoeba.			

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Participant organisation names	Project title	Proposed project costs	Proposed project grant
Ridgeway Research Limited (lead) Aberystwyth University Bio-Check (UK) Ltd	Improving diagnostics of Liver and Rumen Fluke Livestock Parasites Utilising Exosome-like Vesicles	£715,916	£513,812
Project description - provided by applicants			
Controlling parasitic worms in livestock is of utmost importance in providing improved animal welfare and higher quality produce for consumers. Of particular note are the parasitic liver flukes and rumen flukes. Significant economic losses are attributed to both of these parasitic flukes in the sheep and cattle industries. Currently there are no farm based diagnostic tests for either liver fluke or rumen fluke that are suitable for routine application. This project exploits new findings of parasite biology to develop a rapid pen-side diagnostic test to diagnose and differentiate between liver and rumen fluke infections. Furthermore, this project will also address the diagnosis of liver fluke drug response status; namely liver fluke infections that are susceptible or resistant to the current drug of choice triclabendazole.			

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Participant organisation names	Project title	Proposed project costs	Proposed project grant
ROBOSCIENTIFIC LIMITED (lead) Banham Poultry Limited Cellular Systems (Grantham) Limited Harper Adams University	Early Disease Detection and Monitoring in Farm and Field Acronym: Farm Monitor	£1,402,883	£862,253

Project description - provided by applicants

Early stage detection of infectious agents in livestock destined for the human food supply chain includes tuberculosis, campylobacter, E coli, avian influenza and micro-organisms that cause mastitis. The agents cause diseases that cost UK and global agriculture billions of pounds every year.

This Innovate UK project will manufacture a new diagnostic platform, comprising an 'in-situ' air sampler and a hand-held detector for early stage monitoring of infections in crop and livestock situations, which has been termed the ‘Farm Monitor’. To focus the project Campylobacter has been chosen as the demonstration target organism.

Previously funded Innovate UK work showed the feasibility of developing this method as an early stage monitor for Campylobacter. Currently this bacteria causes over 460,000 cases, with 22,000 hospitalisations and over 100 deaths per year, costing the UK government over £900m/year. An early stage detection and monitoring system will give a cost benefit of up to £20m/year for UK chicken producers and also the public health risk from Campylobacter will be significantly reduced, resulting in economic savings to the NHS & UK plc up to £450m/year if government guidelines are met.

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Participant organisation names	Project title	Proposed project costs	Proposed project grant
Silent Herdsman Limited (lead) ADC GAS ANALYSIS LIMITED FULLWOOD LIMITED Scotland's Rural College (SRUC)	Cow Health Monitor	£1,031,591	£718,061
Project description - provided by applicants			
There are considerable animal health challenges in modern dairy farming, all with a profound impact on production output and efficiency. The early detection of metabolic diseases such ketosis, acidosis and lameness and intervention at the pre-clinical stage provides valuable information upon which the farmer can decide on the most appropriate interventions. Thus the project will integrate a number of new dairy livestock sensing systems in real-time, including animal-mounted and product in-line monitoring, to provide a robust decision support system for metabolic disease detection at pre-clinical stages. The solution will be capable of integration within existing technologies on commercial farms to enhance the value of the farmer's investment, and the information presented to the livestock-keepers will be in an easily accessible and digestible fashion delivered over multiple channels viz. smartphones, tablets or PCs.			

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Participant organisation names	Project title	Proposed project costs	Proposed project grant
Soilessentials Limited (lead) Mylnefield Research Services Limited Syngenta Seeds Ltd The James Hutton Institute University of Cambridge	BLIGHTSENSE - Development of a rapid biosensor system for in-field detection of potato late blight pathogens	£1,115,360	£795,361

Project description - provided by applicants

Potato late blight is one of the world's most destructive crop diseases, with £3.5Bn annual losses globally in an industry suffering stagnant yields for the last decade.

This project will develop a rapid acoustic biosensor device for in-field identification of air-borne sporangia of Phytophthora Infestans (causal agent of late blight), to meet the compelling need for improved disease management & control. Soil Essentials (SE), a precision-farming SME, together with University of Cambridge (UC), the James Hutton Institute (JHI), Mylnefield Research Services (MRS) & Syngenta (SG), will develop an integrated diagnostic tool for early pathogen detection, by coupling low-cost, antibody-coated acoustic sensing consumables with a proven spore-trap.

The proposed innovation, enabled only by the interdisciplinary convergence of state-of-the art acousto-electronics, smart materials, biochemistry, late blight epidemiology, advanced ICT & precision agriculture, will enable optimised disease control, reducing potato crop waste & fungicide costs, improving marketable yield & quality. As a platform technology, it can be easily adapted to detect other crop & livestock pathogens for wider agricultural impact.

Innovate UK
Technology Strategy Board

Results of competition: Crop and livestock disease challenges - Collaborative R&D

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
TiKa Diagnostics Ltd (lead) Animal Health and Veterinary Laboratories Agency (AHVLA) St George's University of London	Innovative rapid culture media to aid control of bovine tuberculosis	£484,000	£344,000
Project description - provided by applicants			
Bovine tuberculosis (bTB) caused by Mycobacterium bovis is the most pressing animal health problem in the UK. 8.4 million tests for bTB were carried out in the UK leading to slaughter of 32,000 animals. Unfortunately the current diagnosis is reliant on culture of a woefully slow growing organism in conventional media that has not been improved upon for more than 50 years. Our new supplements have excellent potential to significantly reduce the time to diagnosis, massively increase effectiveness of herd screening and positively influence eradication and control programmes for bTB in the UK. We have previously shown that our approach can halve the time for growth of Mycobacterium tuberculosis from human samples. We now wish to adapt and optimise our supplement for bTB and have already preliminary data to show that this will be possible. The project proposes to extensively screen our innovative (and patented) bank of supplements to maximize enhanced growth of bTB in laboratory cultures. We propose in collaboration with AHVLA, to test clinical and environmental samples from cattle and badgers using our supplements and compare against current methods. We will then seek to market this product worldwide.			

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Results of competition: Crop and livestock disease challenges - Collaborative R&D

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
URSULA Agriculture (lead) Manor Fresh Limited Masstock Arable (UK) Limited Mylnefield Research Services Limited The James Hutton Institute	In-field optical detection of potato disease (Poptical)	£930,357	£635,878

Project description - provided by applicants

The withdrawal of numerous pesticides under Directive 91/414/EEC and subsequent amendments is central to promoting low pesticide-input farming in EU Member States. Furthermore, EU-wide standards for Integrated Pest Management (IPM) are being developed that will become mandatory from 2014 relying on adoption of alternative methods to control pests and diseases.

The UK potato industry is particularly vulnerable to a reduction of pesticide use with a likely loss of production across market sectors valued at > £520M. Thus new and novel methods of disease management need to be developed and integrated into IPM strategies.

In this project, we wish to explore whether using cutting edge unmanned aerial vehicle optical platforms it is possible to identify a number of diseases in potato before visual symptoms occur in the field. If successful, this will allow accurate mapping of disease in the field thus allowing targeted application of pesticide or equivalent to manage disease at an early stage. Consequently, this will yield a more efficient production process with fewer inputs resulting in significant environmental benefits and a reduction in production wastage due to disease pressure.

Innovate UK
Technology Strategy Board

Results of competition: Crop and livestock disease challenges - Collaborative R&D

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
Yorkshire Dairy Goats (lead) SRUC	Genomic predictions of mastitis resistance in dairy goats using computational genomics	£828,457	£604,631

Project description - provided by applicants

This project addresses the key challenges facing dairy goat milk production by using new genetic and genomic technologies to improve the quality of milk production and disease management. The main challenge is to breed healthy goats with resistance to bacterial infections leading to mastitis, and to identify sires with daughters that have lower susceptibility to mastitis and generate genomic predictions of merit for this trait.

The wider goat industry in the UK and abroad will access genomic predictions of enhanced mastitis resistance via new molecular technology from the creatipon of a low density (LD), lower cost customised single nucleotide polymorphism (SNP) array for UK goats. This allows for the use of more cost-effective molecular technology to predict ('impute') the information that was previously generated by the more expensive, more comprehensive SNP array and enabling more animals to be genotyped.

The project will ensure sustainable breeding objectives for dairy goats in the long-term, by including routine collection of mastitis records as indicators of health and longevity, thereby helping to translate previous Innovate UK-funded research into practice.