Biological Industries Research Fund - 2015 Science Investment Round Successful Proposals

Short title	Organisation	Term (yr)	Total funding (excl GST)	Summary
Protecting New Zealand's primary sector from plant pests; a toolkit for the urban battlefield	Scion	3	$3,750,000	This programme directly supports export growth targets of New Zealand's primary production sectors and export growth aspirations of government by delivering improved biosecurity, the number one priority of the Minister for Primary Industries. The establishment of a single high risk plant pest (insect or disease) could cost one or more primary sector $100s of millions and instantly close down export trade due to phytosanitary concerns from trading partners. The threat is real, with many thousand pests intercepted and identified at the border each year. The concerning brown marmorated stink bug, which overwinters in extreme numbers in houses[2], is one of many possible invaders with an appetite for our primary products. With the scale of the pest threat increasing in proportion to increases in trade and tourism, it is critical to NZ's future prosperity that we improve our capability to eradicate plant pests before they become established. Urban environments are our focus because they are in close proximity to the likely points of pest incursion – sea and air ports – and have the highest density of citizens who may be affected by and therefore constrain eradication methods, particularly use of aerial application. There are three key requirements for effective eradication of pests before they become established, all of which we will address: 1) pests must be detected quickly while the population is still small[3, 4], 2) alternatives to broadcast aerial spraying, the only effective means of eradication for many pests (e.g. those found in tall trees), must be developed to reduce pesticide usage and social impacts, 3) residents must be involved in planning and preparation as well as eradication efforts, to ensure that pest eradication aligns with social goals. To 1) improve pest detection we will develop two novel ways of actively seeking pests, rather than relying on current passive methods of attracting pests to traps. To 2) deliver better methods of eradication we will develop targeted spraying methods from helicopters and UAVs which reduce pesticide usage and total areas sprayed, while maintaining efficacy, and taking account of social acceptability issues. In addition, we will develop eco-eradication methods, based on habitat manipulation and understanding of population dynamics, and a method for deciding which combination of eradication tools to use in a particular situation. Collectively, these approaches will further reduce the amount of pesticide spraying required. To 3) ensure that NZ community perspectives are integrated into pest eradication responses, we will work with responsible agencies to develop new methods of community engagement, including taking into account Maori views of ecological spaces, both before and during eradication exercises. This programme will put NZ at the forefront of international pest eradication research, providing an integrated package of tools that address both the technical and social issues that confront agencies responsible for implementing or contributing to eradication programmes i.e. MPI, DOC and Regional Councils. At the same time the research will deliver more efficient methods to manage already established pests to primary sectors. A spillover benefit is improved protection of the conservation estate.
Accelerating sustainable productivity gains for high value export: Dairy Goat infant formula	University of Auckland	3	$3,639,423	Hamilton-based Dairy Goat Cooperative (DGC) pioneered goat milk based formula as a viable alternative to cow milk-based formula. Consumers of goat milk formulae are typically consumers who avoid cow milk-based products because of real or perceived adverse reactions to cow milk proteins. This provides an excellent opportunity to grow export returns for NZ, without directly competing against the traditional supply of NZ cow milk-based commodities. Dairy Goat Cooperative processes over 85% of NZ's goat milk and is the world's leading supplier of goat-based formulae for infants and young children. To satisfy increasing customer demand, the Dairy Goat Cooperative has developed specialised formulation and manufacturing for these high value dairy products. DGC also invested in development of international markets and research resulting in European regulatory approval for goat milk infant formula in 2014. The dairy goat nutritional formula sector is highly profitable, less vulnerable to the commodity cycle, and goat dairying in New Zealand is poised for strong future growth. This expansion creates the opportunity targeted here: to increase goat productivity by accelerating animal breeding using modern testing and selection approaches. The University of Auckland's Joint Graduate School in Dairy Research and Innovation has partnered with New Zealand's largest goat dairy producer to establish genetic markers tailored to improving productivity in dairy goats in NZ. The research

				program will focus on the key building blocks for the development of a resilient herd with strong genetic potential for sustainable future productivity growth: a comprehensive survey of the genetic makeup of the current milking herd, accompanied by understanding of the variability of key milk productivity parameters. Highly productive animals will be identified through systematic milk testing. We will use this information to identify gene variants with major effects on milk production so that they can be directly used for animal selection. Our survey of the genetic diversity of the current dairy goat populations will be used to minimise problems associated with inbreeding and maintain overall herd resilience. In summary this research project will deliver and introduce state-of-the-art dairy goat breeding methodologies which will provide rapid productivity increases, and a solid foundation for the ongoing expansion of this highly profitable industry. Names and addresses for contact. Dr Colin Prosser Dairy Goat Co-operative, Head Office 18 Gallagher Drive Hamilton Professor Russell Snell The University of Auckland Private Bag 92019 Victoria Street West Auckland 1142
Innovative New Zealand Hybrid UHT Food Products	AgResearch Limited	3	$3,750,000	We will develop a new family of ambient shelf-stable and healthy whole-food-based beverages (UHT milks incorporating fruit/vegetables or cereal materials) that are well positioned to appeal to high-value segments of Asian convenience and food service markets and create significant new value for the New Zealand food industry. This will be achieved through unlocking the scientific knowledge and technology required to formulate and manufacture dairy-based UHT products which contain plant or vegetable materials in a manner which meets product requirements (physical stability, shelf-life, retention of nutrition, flavour, and viscosity) through the use of whole-food or minimally processed ingredients, with no addition of highly refined stabilisers, emulsifiers or thickeners. New Zealand is well placed to significantly benefit from unlocking such innovative new products in the hybrid UHT category that combine a dairy base with plant ingredients to provide differentiation and functionality over-and-above current products on the market. The programme contributes strongly to sustainable export growth from the Maori economy (one primary end-user is Miraka, an innovative food company owned by a group of Maori trusts and incorporations). The research is directed at creating transferable scientific knowledge of the properties and characteristics (e.g. pH, temperature and pressure) required for effective combination of plant-based ingredients with fresh milk to achieve the stability and functionality required for ambient shelf-stable products. This knowledge then provides the basis for the development of processing modifications and technologies to produce safe and ambient shelf-stable products with retention of health benefits and consumer-desired sensory attributes (e.g. flavour and texture) to maximise marketing opportunities.
New Zealand Red Meat Super-Premium Petfoods for Export	AgResearch Limited	3	$1,754,001	The natural diet for pets contains high levels of animal protein and fat. Typically commercial kibbled petfoods have a high carbohydrate content but instead the natural petfood industry utilises natural animal-based ingredients with minimal processing. NZ produces high quality, safe, free-range red meat at a relatively low cost. This red meat is highly suited for inclusion into super-premium natural petfoods. We aim to determine how natural red meat petfoods from NZ provides optimal nutrition to pets using low invasive techniques to assess weight management, glycaemic (insulin and glucose) responses and faecal quality (bulk and odours). By adding value within NZ, NZ-owned natural petfood companies can command super-premium prices for their products, thereby increasing export returns to NZ. The research project was co-designed with NZ-owned super-premium, natural red meat petfood manufacturers, who will collaborate in an approach that will benefit the entire NZ petfood industry.
Total over 3 years			**$12,893,424**	