Released on October 15, 2014

GenomeCanada

BACKGROUNDER

Genomic Applications Partnership Program
Funded Projects – Round 1

The Genomic Applications Partnership Program (GAPP) funds research projects that address real world challenges and opportunities as identified by industry, government, not-for-profits, and other "end users" of genomics research. The following five projects have been selected for funding in the first round of funding under the Program.

SALMON and CHIPS - Commercial Application of Genomics to Maximize Genetic Improvement of Farmed Atlantic Salmon

Project Leaders: Elizabeth G. Boulding, University of Guelph; Keng Pee Ang, Cooke Aquaculture Inc. and Kelly Cove Salmon Ltd.
Lead Genome Centres: Genome Atlantic and Ontario Genomics Institute

Aquaculture companies are increasingly incorporating genomics technology into their breeding programs to develop desirable stock traits for improved growth and disease resistance.

To retain its ability to compete internationally, Cooke Aquaculture/Kelly Cove Salmon will partner with Dr. Elizabeth Boulding and her academic group from the University of Guelph to incorporate genomics marker technology into Kelly Cove Salmon's current breeding program. This will allow the company to improve the effectiveness of its breeding program and increase the resistance of its salmon to diseases and parasites.

The company aims to implement an advanced genomics technology known as SNP-chips, which when blended with conventional animal breeding techniques, can yield significant increases in the survival rates of eggs and juvenile stages, as well as improved saltwater performance.

The implementation of this genomics technology is expected to increase the quality and sales of Kelly Cove's salmon, and improve profitability by reducing expenditures on vaccines and medication. Strengthening Kelly Cove Salmon and its parent company, Cooke Aquaculture, will be good news for the more than 1,700 current employees in Atlantic Canada, and will lead to increased employment in rural and coastal communities.

A Metagenomic Approach to Evaluate the Impact of Cheesemaking Technologies and Ripening Conditions on the Microbial Ecosystem of Premium Washed Rind Cheeses

Project Leaders: Steve Labrie, Université Laval; Manon Duquenne, Agropur Cooperative
Lead Genome Centre: Génome Québec

Fine and specialty cheeses have become major products in the portfolio of Agropur, a cooperative owned by 3,400 milk producers that transforms more than a quarter of the milk produced in Canada. Agropur aims to tap the growing demand for fine cheeses by developing a premium brand of washed rind cheese. Cheese production is a very complex process and non-optimal ripening can lead to reduced shelf life, returns and delays.

Agropur will partner with Dr. Steve Labrie, a leading academic from Université Laval, whose genomics-based techniques to monitor microbiota composition will have a direct impact in the production of high quality cheeses.

This project will use next generation sequencing to monitor the ripening process of premium washed rind cheeses. It will also lead to the development of a new genetic tool that will allow Agropur to improve production control, limit losses and produce high quality cheese with increased shelf life and reduced returns. In addition, the project will lead to the creation of a set of standardized genomic profiles that will be unprecedented in the cheesemaking industry and allow for the development of optimal cheese culture. The genomic tools will become integral to Agropur's cheese production process and enable Agropur to identify imbalances in cheese microbiota (microorganisms) that interfere with cheese ripening.

Overall, this project will improve understanding of the complex cheesemaking process and guide the development of new cheeses. The use of genomics will help Agropur bring more competitive products to market and provide members of the cooperative with increased revenues.

Development of low cost diagnostic platform for infectious disease testing

Project Leaders: Shana Kelley, University of Toronto; Graham Jack, Xagenic Canada Inc.
Lead Genome Centre: Ontario Genomics Institute

Conventional lab testing for infectious diseases such as Hepatitis C, malaria and tuberculosis is inefficient and not cost-effective, particularly in developing countries. The development of fast and accurate point-of-care testing for these infections would significantly improve the clinical management of infectious diseases.

For this research, Xagenic will partner with Dr. Shana Kelley, a leading academic from the University of Toronto, to leverage expertise in viral assay development, sensor technology and plastic chip fabrication.

This project will lead to a single affordable and accurate genotyping test to screen for infectious pathogens, and will provide a new solution for rapid disease diagnosis. The low-cost, disposable, battery-powered testing device will identify pathogens in human blood in minutes, which could reduce infectious disease in Canada and around the world, and dramatically improve disease management.

The launch of this new product line by Xagenic will result in increased revenues and significant job creation within the company.

Genomics for a Competitive Greenhouse Vegetable Industry

Project Leaders Keiko Yoshioka, University of Toronto; Daryl J. Somers, Vineland Research and Innovation Centre
Lead Genome Centre: Ontario Genomics Institute

Tomatoes, peppers and cucumbers generate more than $1 billion in annual sales for the Canadian greenhouse vegetable industry. These plants are susceptible to a number of diseases, which threaten crops and decrease profits for producers. In order to maintain a competitive edge, create growth and ensure future success, Canada's greenhouse vegetable industry needs plant varieties that are resistant to disease.

To address this challenge, Vineland Research and Innovation Centre will partner with Dr. Keiko Yoshioka, a leading academic from the University of Toronto, who has discovered a key gene involved in plant disease resistance.

By using proven gene technologies to enhance disease resistance in greenhouse vegetables, this project aims to develop new commercial traits and varieties for Canada's vegetable industry.

These technologies will benefit Canada's greenhouse vegetable industry by adding value to Canadian greenhouse vegetables, and fostering economic growth, increased exports, reducing competition from imports.

Augmenting the Plant Microbiome to Improve Crop Yield and Stress Resilience

Project Co-Leaders: Vladimir Vujanovic and Jim Germida, University of Saskatchewan; Geoffrey von Maltzahn, Symbiota, LLC.
Lead Genome Centre: Genome Prairie

The United Nations' Food and Agriculture Organization forecasts that world food production will have to increase by 70 per cent by 2050 to meet the needs of a growing global population. This challenge is exacerbated by such factors as diminishing freshwater resources, rising energy prices, and the need for crops to adapt to the pressures of a drier, hotter, and more extreme global climate.

Symbiota, a Flagship VentureLabs™-founded company, is partnering with Drs. Vladimir Vujanovic and Jim Germida, leading academics from the University of Saskatchewan, who have discovered a new class of natural microbes that can dramatically improve crop yield and stress resistance.

The project will use genomic tools to systematically evaluate and field test a number of crop-microbe combinations with high commercialization potential. It aims to develop breakthrough microbial products that will address the significant need for improved yield, water use efficiency and heat-stress tolerance in major crops in Canada and around the world including wheat, maize, soybean, canola, barley, and pulses — crops that account for more than $15 billion in annual production in Canada alone.