Joint Research Opportunity at the Department of Agriculture and Agri-Food Canada (AAFC) /
L'opportunité de recherche conjointe au ministère de l'Agriculture et de l'Agroalimentaire du Canada (« AAC »)

Note : Although the Opportunity is intended for foreigners, Canadian citizens and Permanent Residents of Canada are eligible to apply for the Joint Research Opportunity described below and will have priority./*Bien que l'opportunité vise les étrangers, les citoyens canadiens et les résidents permanents au Canada sont éligibles à appliquer à l'Opportunité de recherche décrite ci-bas et ils auront la priorité.*

Notes for foreign applicants:

- Who can apply? Graduate students (Ph.D./Master's) and scientists (including post-doctoral fellows) who have or will have a scholarship to cover accommodation and living expenses while in Canada. The scholarship usually comes from a funding agency in the applicant's home country.
- The opportunity will take place at a research facility of AAFC or its partner's lab in Canada. In most cases, AAFC will bear the cost of the research.
- If necessary to get their scholarship, applicants can contact the AAFC scientist (potential supervisor) to obtain a Letter of Acceptance Intent. Applicants should provide recommendation letter(s) to AAFC scientists from their home organization and must demonstrate they meet the academic and language merit criteria to be retained for further consideration. English or French is essential to conduct the research at AAFC.
- Signing of a Research Participant Agreement of AAFC by the applicant and one's home organization is mandatory after the applicant is successful in obtaining a scholarship and before coming to Canada.
- Detailed information on AAFC Research Centres is available online at: www.agr.gc.ca/science

2010 List of Joint Research Opportunities from AAFC
(The list contains 81 opportunities with description in English.)

Opportunity ID (Location_#)	Contact (AAFC Scientist)	Project Title	Duration (months)
Agassiz_01	David Ehret	Development of precision irrigation technologies	12-24
Agassiz_02a	Moussa S. Diarra	Health and Safety Research in Agriculture (community)	12-24
Agassiz_02b	Moussa S. Diarra	Health and Safety Research in Agriculture (ExPEC)	12-24
Agassiz_04a	Todd Kabaluk	Graduate Research in Wireworm Biocontrol	12-24
Agassiz_04b	Todd Kabaluk	Sampling and Monitoring Wireworms for Crop Protection	12-24
Fredericton_02	Xiu-Qing Li	Characterization of somatic genome instability in plants	24
Fredericton_04	Xianzhou Nie	Identification, isolation and characterization of genes involved in resistance against potato virus Y in potato	24
Guelph_01	Rong Cao	Antioxidant and anti-cancer phytochemicals and their potential in disease prevention and health promotion	24
Guelph_03	Joshua Gong	Development and mechanistic studies of probiotics for *Salmonella* control	12-24
Guelph_04	John Shi	Development of Stabilization Technology for Bioactives by "Green Processing" and Nano (Micro) technology	12
Guelph_06	Qi Wang	Development of novel encapsulation platform for target delivery of antimicrobial agent	12-24
Guelph_08	Ting Zhou	Biological Detoxification of Mycotoxins in Food and Feed	12-48
Guelph_09	Krista Power	Role of flaxseed bioactives in modulating inflammatory and hormone-related health effects in mice	12-24
Harrow_01	Craig Drury	Nitrogen management strategies to improve crop productivity and reduce N losses to the environment though leaching and denitrification	24
Harrow_02	Xiuming Hao	Greenhouse crop production	24
Harrow_04	Vaino Poysa	Improvement of soy quality for food through molecular and conventional plant breeding	24-36
Harrow_05	Tiequan Zhang	Nutrient and Water Management for Sustainable Agricultural Production with Improved Environmental Quality	12-36
Harrow_06	Kangfu Yu	Validation of candidate gene functions for soybean and common bean through gene transformation and RNA interference	24-36

Harrow_07	Jingyi Yang	Using crop soil model to simulate nutrient dynamics and crop production potentials	24
Kentville_01	Jun Song	Genomic and proteomic approaches to study fruit ripening and senescence	12-36
Kentville_02	Lihua Fan	Assessments of Natural Antimicrobials for Food Quality and Safety Control	12-24
Lacombe_01	Deng-Jin Bing	Studies on the genetic variations and virulence in Mycosphaerella blight of filed pea (*Pisum sativum* L.)	24
Lennoxville_01a	Luigi Faucitano	Animal welfare and pork quality (for graduate students)	12
Lennoxville_01b	Luigi Faucitano	Animal welfare and pork quality (for scientists)	12
Lennoxville_02	Hélène Petit	Enhanced cow productivity	6-12
Lethbridge_04	John Lu	Genetic modifications of cereal genotypes to product value-added starches	12-36
Lethbridge_05	Kevin Floate	Studies on endosymbiotic bacteria for the control of stored product insect pests	12-24
Lethbridge_09a	Wenzhu Yang	Development of novel nutraceuticals for feedlot cattle systems	18
Lethbridge_09b	Wenzhu Yang	Develop nutritional strategies to optimize protein value of feeding ethanol by-products to beef cattle	18
Lethbridge_10	Xiying Hao	Feasibility, greenhouse gas and odor emission from multiple waste streams	24
Lethbridge_11	François Eudes	Genetic engineering using Cell Penetrating Peptide technology	6-24
Lethbridge_12	Francis J. Larney	Irrigated cropping systems for sustainable soil management	12-24
Lethbridge_13	Newton Lupwayi	Nitrogen fixation and N release from grain legume crop residues	12
London_01	Mark Gijzen	Plant Disease Caused by Phytophthora: Molecular Determinants of Virulence	24
London_02	Aiming Wang	Development of Genetic Resistance against Plant Viral Disease through Target Gene Silencing Technology	12-48
London_03	Abdelali Hannoufa	Study of gene expression and protein accumulation in plant seeds for development of high value products	18-24
London_04	Sangeeta Dhaubhadel	Characterization of transcription factor complex that regulate isoflavonoid synthesis in soybean	12-24
London_06a	Brian McGarvey	Biological Activity and Chemical Identification of Agricultural Crop Residues Before and After Pyrolysis	24
London_06b	Brian McGarvey	Metabolism of the Soybean-*Phytophthora sojae* Host-Pathogen Interaction – A Plant Metabolomics Study	24
London_07	Ian Scott	Investigating natural insect repellents: the potential for enhancing host plant resistance	24
London_09	Lining Tian	Development of crop resistance to diseases and environmental stresses via biotechnology	12-24
NSAC_01	Yousef A. Papadopoulos	Effect of pasture type and dietary fatty acid supplementation on production performance, meat quality, and energy metabolism of ruminant and poultry livestock	12-36
Ottawa_01	Lana Reid	Breeding Corn for Short Season Areas and Disease Resistance	12
Ottawa_02	Thérèse Ouellet	Identification of genes contributing to resistance to Fusarium head blight (FHB) of wheat	12-36
Ottawa_06	Bao-Luo Ma	Identification of optical signals for improving N and water use efficiencies in field crops	24

Ottawa_07	George Fedak	Germplasm enhancement for Fusarium head blight and stem rust resistance in wheat	12
Ottawa_08	Neil McLaughlin	Effect of soil and crop management on sustainability of soil productivity	12-24
Ottawa_09	Nick Tinker	Genetic and cytogenetic studies in oat	24
Ottawa_10	Eden Bromfield	Biodiversity of economically important soil bacteria as affected by agricultural practices	12-24
Ottawa_11	Xiaoyuan Geng	Fertilizer Optimization and Nutrient Management at Watershed and Landscape Scale	12-24
Ottawa_12a	Elizabeth Pattey	Deriving biochemical descriptors for field crops using hyperspectral reflectance	12-24
Ottawa_12b	Elizabeth Pattey	Quantifying and reducing agricultural particulate matter emissions	12-24
Ottawa_13	Jeff Skevington	Systematics of *Pipunculidae* (*Diptera*)	4-12
Ottawa_14	Yiu-Kwok Chan	Prokaryotic microbial population dynamics affecting nutrient cycling in fertilized agricultural soil	12-24
Ottawa_15	James Tambong	Molecular characterization and identification of bacterial strains, potential biopesiticdes for sustainable agriculture	24
Ottawa_16	Joe Zhou	Assessment and Management of China-Canada Science and Technology Cooperation	18-24
Québec_02	Noura Ziadi	Soil Nitrogen Availability in no-till Versus Conventional Tillage Following Freezing and Thawing Cycles	15
Québec_04a	Marie-Josée Simard	Invasive plants and agricultural landscapes	20
Québec_04b	Marie-Josée Simard	Traits associated with woolly cupgrass invasion	20
Québec_05	Annick Bertrand	Impact of climate change on Canadian grassland systems	12-24
Québec_06	Athyna Cambouris	Agri-Environmental Study for Wheat and Corn Productivity as Affected by Soil Texture and Nitrogen Fertilization	12
Saskatoon_02	Ginette Séguin-Swartz	Developing doubled haploid technology for crucifer crops	12-18
Saskatoon_03	Russell Hynes	Biocontrol agents on on canola clubroot pathogens	24-36
Saskatoon_04	Yong-Bi Fu	Molecular characterization of wheat adaptation genes	12-24
SJSR_01a	Shahrokh Khanizadeh	Development of disease resistant fruit lines for niche marketing (fresh cut, juice and ice cider)	24-36
SJSR_01b	Shahrokh Khanizadeh	Development of winter hardy disease resistant thornless *Rubus* cultivars with long shelf-life, rich in phytonutrient	24-36
StHyacinthe_03	Tania Manu NGAPO	Beef, Pork and the Chinese Canadian Community	12-24
StHyacinthe_04a	Joyce Boye	Molecular and structural properties of bioactive and allergenic food proteins and peptides	12-36
StHyacinthe_04b	Joyce Boye	Development of novel hypoallergenic food products with enhanced biofunctional properties	12-36
Summerland_01	B. Dave Oomah	Developing platform(s) to elucidate the synergy of bioactive phytochemicals from fruits and other crops and bioproducts	12-24
Summerland_03	David A. Theilmann	Development of baculoviruses as environmentally sustainable insect control agents and genomic analyses of viral genes	12-48
Summerland_04	Howard Thistlewood	Spatial ecology and management of pests in perennial crops	6-24
Summerland_06	Yu Xiang	Functional analysis of polyphenol oxidase (PPO) genes in potatoes and apples	6-24
Swift Current_03	Michael P. Schellenberg	Forage and range plant reproductive adaptation to changing climates	12-24
Swift Current_04	Alan Iwaasa	Effect of different native and tame pasture systems on forage and beef production on semiarid prairie and their contribution to soil and air quality	12-24

Swift Current_05a	Danny (Asheesh) Singh	Development and validation of molecular tools for disease resistance breeding in durum wheat	24
Swift Current_05b	Danny (Asheesh) Singh	Gluten properties of Canadian durum wheat	24
Swift Current_07(IH)	Guy Lafond	Agronomic Research for No-till Production Systems under Dryland Conditions	20-24
Swift Current_08	Hong Wang	Coping with Climate Change and Climate Variability on Crop Production	12-24
Swift Current_09	Barbara Cade-Menun	Phosphorus Forms and Dynamics From Winter Cattle Feeding Sites	12-24
Winnipeg_02(Morden)	Anfu Hou	Genetic diversity and breeding use of dry bean (*Phaseolus vulgaris L.*) germplasm	12-24

OPPORTUNITY/*OPPORTUNITÉ* ID: 2010_Agassiz_01 Return to the List

A – Identification

Type of Candidate (check one or more)/*Type de candidats recherchés (choisir un ou plus)* :

- Graduate students / étudiants des cycles supérieurs: - Master's or equivalent / *Maîtrise ou équivalent* - Ph.D.
- I accept a candidate that wants to register in a Canadian university: (name)/*J'accepte un candidat qui veut s'inscrire dans une université canadienne (nom)* : University of British Columbia
- Scientist from a university or a research organisation/*Chercheur d'une université ou d'un organisme de recherche*.

If necessary, specify country (or countries) of preference./*Si nécessaire, spécifier le ou les pays de préférence* :

Justify if this Opportunity cannot be offered to a Canadian/*Justifiez si cette Opportunité ne peut être offert à un Canadien :*

OPPORTUNITY TITLE/ TITRE DE L'OPPORTUNITÉ : **Development of precision irrigation technologies**

Foreigner's length of stay at AAFC, specify number of months (minimum and/or maximum)/ *Durée du séjour à AAC, spécifier le nombre de mois (minimal et/ou maximal)* : 12-24

Preferred start date before March 31, 2011/ *Date de préférence pour le début du séjour avant le 31 mars 2011*, specify/*spécifier* : August, 2010

Research location in Canada / *Lieu de la recherche au Canada :* City/*Ville*, Province :
Pacific Agri-Food Research Centre Agassiz, BC
Website : http://www.agr.gc.ca/science

Contact: Email/*Courriel* : david.ehret@agr.gc.ca
Dr. David Ehret Phone/*Téléphone* : 1-604-796-1712

B – The Research Team/ *L'équipe de recherché*

AAFC Supervisor/*Superviseur à AAC* : Dr. David Ehret
Other AAFC scientists/*Autres chercheurs d'AAC* : Dr. Xiuming Hao, Dr. Tom Forge
Other government partners/ *Autres partenaires gouvernementaux* : Dr. Nick Savidov, Alberta Agriculture and Rural Development
University partners/*Partenaires universitaires* : Dr. Youbin Zheng, University of Guelph
Industry partners/*Partenaires industriels* : Canadian Ornamental Horticulture Alliance, BC Blueberry Council

C – Opportunity Description/ *Description de l'Opportunité*

Objective/*Objectif* :
Proper irrigation management is central to the production of high-quality and high-yielding horticultural crops. One objective is to expand the adoption of precision irrigation technologies to reduce water use in greenhouse and nursery production. Real-time plant-based methods will be developed. An automated system will be adapted from a simple technology developed at the Pacific Agri-Food Research Centre to measure transpiration which has already been successfully tested in commercial greenhouse vegetable crops. Models of water use will be developed.

Another goal is to improve irrigation management strategies in blueberries. Current irrigation practices for blueberries are not optimal. Blueberries in Canada are currently irrigated, but growers do not have accurate information on which to base their schedules, particularly for drip irrigation. Both under- and over-irrigation may have negative consequences on fruit quality, yields and incidence of plant diseases. Over-irrigation is also a non-sustainable agricultural practice that promotes water waste, root rot and loss of nutrient through leaching.

Value of the Opportunity (issue, results, outcomes)/*Valeur de l'opportunité (problème, résultats, retombées*):
New plant-based irrigation methods will allow irrigation-on-demand in greenhouse and nursery crops. These state-of-the-art technologies will improve water conservation and production. The study will also generate new information on the effects of water management on blueberry yield and quality, develop simple but precise irrigation management tools based on crop demand, develop irrigation scheduling recommendations to maximize production and fruit quality, and improve the environmental sustainability of the berry industry in BC.

D – Describe the qualifications needed (academic, study, knowledge, skills, experiences, *etc.*), and the benefits to the candidate /*Décrire les qualifications requises (études, connaissances, compétences, expériences, etc) et les avantages pour les candidats*

Candidates should have a background in horticultural science or agricultural engineering, and a thorough knowledge of the

practical and theoretical aspects of water in plants. Experience in irrigation, crop modelling, or computer programming would be an asset.

Dr. Ehret has experience in training and mentoring Canadian and foreign students. The program will provide the candidate with a broad experience in technologically-advanced agricultural science. The candidate will learn techniques and concepts in horticulture, irrigation, crop monitoring and computer modelling. The candidate will be given the opportunity to write scientific papers for international science journals and conferences.

OPPORTUNITY/*OPPORTUNITÉ* ID: 2010_Agassiz_02a Return to the List

A – Identification

Type of Candidate (check one or more)/*Type de candidats recherchés (choisir un ou plus)* :

- Graduate students / étudiants des cycles supérieurs: - Master's or equivalent / *Maîtrise ou équivalent* - Ph.D.
- I accept a candidate that wants to register in a Canadian university: (name)/*J'accepte un candidat qui veut s'inscrire dans une université canadienne (nom)* : University of British Columbia
- Scientist from a university or a research organisation/*Chercheur d'une université ou d'un organisme de recherche*.

If necessary, specify country (or countries) of preference./*Si nécessaire, spécifier le ou les pays de préférence* :

Justify if this Opportunity cannot be offered to a Canadian/*Justifiez si cette Opportunité ne peut être offert à un Canadien :*
This opportunity can be offerred to both Canadian or non-Canadian

OPPORTUNITY TITLE/ TITRE DE L'OPPORTUNITÉ : **Health and Safety Research in Agriculture (community)**

Foreigner's length of stay at AAFC, specify number of months (minimum and/or maximum)/ *Durée du séjour à AAC, spécifier le nombre de mois (minimal et/ou maximal)* :	12-24
Preferred start date before March 31, 2011/ *Date de préférence pour le début du séjour avant le 31 mars 2011*, specify/*spécifier* :	immediately
Research location in Canada / *Lieu de la recherche au Canada :* Pacific Agri-Food Research Centre Website : http://www.agr.gc.ca/science	City/*Ville*, Province : Agassiz, BC
Contact: **Dr. Moussa S. Diarra**	Email/*Courriel* : Moussa.Diarra@agr.gc.ca Phone/*Téléphone* : 1-604-796-1728

B – The Research Team/ *L'équipe de recherché*

AAFC Supervisor/*Superviseur à AAC* : Moussa S. Diarra
Other AAFC scientists/*Autres chercheurs d'AAC* : Ed Topp, AAFC-London, ON
University partners/*Partenaires universitaires* : Kim Cheng (UBC)
Industry partners/*Partenaires industriels* :

C – Opportunity Description/ *Description de l'Opportunité*

Objective/*Objectif* :
Using traditional cultivation and DNA hybridization techniques, we quantified antibiotic phenotype and genotype in bacterial isolates from broiler chicken cecal, fecal and litter sample from commercial and experimental farms. Unexpectedly, resistance to antibiotic like chloramphenicol not used in poultry production was prevalent. Resistance genes disseminating mobile elements called integrons class 1 integrons and virulence determinant were also prevalent in *Escherichia coli*, *Salmonella* and *Enterococcus* independently of the presence of specific antibiotic present in broiler feed. This finding warrants re-examination of our assumptions about the persistence and spread of antibiotic resistance genes in poultry production. In addition, litters from chicken fed antimicrobial agent as growth promoter were used to fertilize fields as indicated by current farming practices. A seasonal variability in total *E. coli* count was noted. In fact, manure application in May resulted of a persistence of high *E. coli* number in soil for 12 mounts after application while this number dropped to undetectable lime after only three mounts of manure application in December. The spread of resistance and virulent determinant depend on the concentrations of these determinants harbouring bacteria in an ecosystem and on the rate of their exchange between ecosystems.

The objective is to study, the evolution of bacterial community from soil fertilized with poultry litter from antibiotic feeding trials to establish the seasonal variation, the spread and persistence of resistant and virulent determinants and the pathogenicity potential bacterial to human.

Value of the Opportunity (issue, results, outcomes)/*Valeur de l'opportunité (problème, résultats, retombées)*:
This study will investigate the relationship between application of poultry litters (biosolids) and soil microbiology related to environment and human health. Overall, this research will yield a better fundamental understanding of how litters as fertilizers can be managed for the protection of the environment and human health.

D – Describe the qualifications needed (academic, study, knowledge, skills, experiences, *etc.*), and the benefits to the candidate /*Décrire les qualifications requises (études, connaissances, compétences, expériences, etc) et les avantages pour les candidats*

English is imperative. The candidate must be graduated from a recognized university in microbiology, biotechnology, biochemistry, bioinformatics or in biology. She/he should have some knowledge in molecular and cellular biology; microbial genetics as well has an interest in research for the control of infectious diseases. Analytical thinking communication and team work skills are desired. Candidates applying will be trained in medical microbiology, bacterial isolation and identification, molecular techniques, bacterial community study and antibiotic resistance related to the on-farm food safety.

OPPORTUNITY/*OPPORTUNITÉ* ID: 2010_Agassiz_02b Return to the List

A – Identification

Type of Candidate (check one or more)/*Type de candidats recherchés (choisir un ou plus)* :

- Graduate students / étudiants des cycles supérieurs: - Master's or equivalent / *Maîtrise ou équivalent* - Ph.D.
- I accept a candidate that wants to register in a Canadian university: (name)/*J'accepte un candidat qui veut s'inscrire dans une université canadienne (nom)* : University of British Columbia
- Scientist from a university or a research organisation/*Chercheur d'une université ou d'un organisme de recherche*.

If necessary, specify country (or countries) of preference./*Si nécessaire, spécifier le ou les pays de préférence* :

Justify if this Opportunity cannot be offered to a Canadian/*Justifiez si cette Opportunité ne peut être offert à un Canadien :*
This opportunity can be offerred to both Canadian or non-Canadian

OPPORTUNITY TITLE/ TITRE DE L'OPPORTUNITÉ : **Health and Safety Research in Agriculture (ExPEC)**

Foreigner's length of stay at AAFC, specify number of months (minimum and/or maximum)/ *Durée du séjour à AAC, spécifier le nombre de mois (minimal et/ou maximal)* : 12-24

Preferred start date before March 31, 2011/ *Date de préférence pour le début du séjour avant le 31 mars 2011*, specify/*spécifier* : immediately

Research location in Canada / *Lieu de la recherche au Canada :*
Pacific Agri-Food Research Centre
Website : http://www.agr.gc.ca/science
City/*Ville*, Province :
Agassiz, BC

Contact: **Dr. Moussa S. Diarra**
Email/*Courriel* : Moussa.Diarra@agr.gc.ca
Phone/*Téléphone* : 1-604-796-1728

B – The Research Team/ *L'équipe de recherché*

AAFC Supervisor/*Superviseur à AAC* : Moussa S. Diarra
Other AAFC scientists/*Autres chercheurs d'AAC* : Ed Topp, AAFC-London, ON
University partners/*Partenaires universitaires* : Kim Cheng (UBC)
Industry partners/*Partenaires industriels* :

C – Opportunity Description/ *Description de l'Opportunité*

Objective/*Objectif* :
Several classes of antimicrobial agents such as glycolipids (bambermycin), cyclic peptides (bacitracin), ionophores (monensin and salinomycin), streptogramin (virginiamycin) and ß-lactam (penicillin) are widely used in modern animal husbandry to prevent infections and promote growth. Increasing antimicrobial resistance in animals and its potential threat to human health led to the ban of bacitracin, spiramycin, tylosin and virginiamycin as feeding additives by the European Union in 1999. *Escherichia coli* is a commensal member of the normal gastrointestinal microflora in humans and animals, however some strains are known to cause serious diseases, such as cystitis, pyelonephritis, sepsis/meningitis and gastroenteritis. The possession of different virulence gene subsets can further define the E. coli pathotype. The extraintestinal pathogenic *E. coli* (ExPEC) strains are epidemiologically and phylogenetically distinct from both intestinal pathogenic and commensal strains. In North America, several million urinary tract or

abdominal and pelvic infections, pneumonia, meningitis and sepsis are caused by ExPEC. In poultry production, avian pathogenic *E. coli* (APEC) is responsible for significant economic losses. They induce extra-intestinal diseases such as air sacculitis, colibacillosis, polysorositis and septicemia in birds. Although no specific set of virulence factors has been clearly linked to APEC strains, most identified virulence factors are similar to those frequently associated with ExPEC. Recently, our data indicated that different resistant *E. coli* pathotypes can be found in broiler chickens and that distribution of such pathotypes and certain virulence determinants could be modulated by antimicrobial agent feed supplementation.

Value of the Opportunity (issue, results, outcomes)/*Valeur de l'opportunité (problème, résultats, retombées*):
This study will investigate the presence of ExPEC in broiler chicken meat in relation to antimicrobial agent used in feed. Overall, this research will yield a better fundamental understanding of how zoonotic ExPEC from poultry have the potential to spread and contaminate both farm workers and processing plants or food (meat).

D – Describe the qualifications needed (academic, study, knowledge, skills, experiences, *etc.*), and the benefits to the candidate /*Décrire les qualifications requises (études, connaissances, compétences, expériences, etc) et les avantages pour les candidats*

English is imperative. The candidate must be graduated from a recognized university in microbiology, biotechnology, biochemistry or in biology. She/he should have some knowledge in molecular and cellular biology; microbial genetics as well has an interest in research for the control of infectious diseases. Analytical thinking communication and team work skills are desired. Candidates applying will be trained in bacteriology and pathogenesis, molecular techniques, pathotypes and virulence genes studies related to the food safety.

OPPORTUNITY/*OPPORTUNITÉ* ID: 2010_Agassiz_04a Return to the List

A – Identification

Type of Candidate (check one or more)/*Type de candidats recherchés (choisir un ou plus)* :

- Graduate students / étudiants des cycles supérieurs: - Master's or equivalent / *Maîtrise ou équivalent* - Ph.D.

If necessary, specify country (or countries) of preference./*Si nécessaire, spécifier le ou les pays de préférence* :

Justify if this Opportunity cannot be offered to a Canadian/*Justifiez si cette Opportunité ne peut être offert à un Canadien :*
This opportunity can be offerred to both Canadian or non-Canadian

OPPORTUNITY TITLE/ TITRE DE L'OPPORTUNITÉ : **Graduate Research in Wireworm Biocontrol**

Foreigner's length of stay at AAFC, specify number of months (minimum and/or maximum)/ *Durée du séjour à AAC, spécifier le nombre de mois (minimal et/ou maximal)* :	12-24
Preferred start date before March 31, 2011/ *Date de préférence pour le début du séjour avant le 31 mars 2011*, specify/*spécifier* :	March 31, 2010
Research location in Canada / *Lieu de la recherche au Canada :* Pacific Agri-Food Research Centre Website : http://www.agr.gc.ca/science	City/*Ville*, Province : Agassiz, BC
Contact: **Dr. Todd Kabaluk**	Email/*Courriel* : Todd.Kabaluk@agr.gc.ca Phone/*Téléphone* : 1-604-796-1710

B – The Research Team/ *L'équipe de recherché*

AAFC Supervisor/*Superviseur à AAC* : Todd Kabaluk, Research Biologist
Other AAFC scientists/*Autres chercheurs d'AAC* : Christine Noronha, Charlottetown, PEI
University partners/*Partenaires universitaires* : Kwantlen University College
Industry partners/*Partenaires industriels* : Novozymes Biologicals Inc.

C – Opportunity Description/ *Description de l'Opportunité*

Objective/*Objectif* :
With significant promise from laboratory results and numerous observations of diseased wireworms in nature, several researchers have historically conducted field trials using *M. anisopliae* for wireworm control in potato. Kabaluk et al. appear to be the only authors to have reported the retrieval of infected cadavers following inundative *M. anisopliae* applications to the field. Given the success in infecting wireworms with inundative field application of *M. anisopliae* in the lab and the field, together with variable crop protection outcomes from field experiments, research needs to continue to optimize application technology and methods, and to understand the ecology within this disease-host system in an agricultural pest control context. The research needs are in the areas of applications methods, formulation of the active ingredients, wireworm behaviour in response to inoculum exposure, and

bioprospecting to acquire isolates that mitigate environmental conditions that limit pathogenicity.

Objective/*Objectif*:

i) To determine if field populations levels of wireworms can be reduced by targeting click beetles (wireworm adults) using spray and dust applications applied to refugia (crop margins), and by using a combination of pheromone and *M. anisopliae* to attract click beetles, infect them, and disseminate the infection to reduce egg-laying.
ii) To address two limitations to wireworm infection: low temperature and exposure time to inoculum, by a) conducting bioassays using cold-active *M. anisopliae* isolates; and b) observing wireworm behavioural responses in the presence of *M. anisopliae* inoculum.
iii) To determine the persistence of *M. anisopliae* in the field soil following application, and the effect of inoculum formulation on persistence.
iv) to share research and cultural experiences for mutual benefit as described

Value of the Opportunity (issue, results, outcomes)/*Valeur de l'opportunité (problème, résultats, retombées*):
This project is well-suited to a graduate student as it provides opportunity for growth in developing technical, statistical, and experimental design skills. The project outcomes will benefit both Canada and China in that wireworms are a serious soil pest in both countries. In China, it has more recently been identified as a pest limiting production of agricultural bamboo. China would benefit by acquiring the current state of Canada's knowledge with respect to wireworm biocontrol for adaptation to Chinese agriculture. Canada would benefit from the skill of a qualified and academically-minded Chinese student in playing a lead-role in the proposed projects. Furthermore, China has the means for rapidly implementing biological control measures. The uptake of Canada's research information by China would be rapid; the awareness of this Chinese model could help Canada progress with respect to implementation. The benefits to the student are to play a significant role of a pioneering effort to explore an area of research that is largely unexplored, the acquisition of skills in experimentation, research and design, to work within the culture of Canada.

D – Describe the qualifications needed (academic, study, knowledge, skills, experiences, *etc.*), and the benefits to the candidate /*Décrire les qualifications requises (études, connaissances, compétences, expériences, etc) et les avantages pour les candidats*

The expectations of the student are:

i) skills in microbiology would be a very desirable asset
ii) clearly understand the purpose of the project, and work with AAFC Scientists in defining it's broad objectives
iii) identifying the research needs for materials, labour, and land of individual projects and working with AAFC Scientists to acquire those needs
iv) in cooperation with AAFC Scientists, design experiments to test specific hypotheses
v) the ability to operate basic technical instruments, including dataloggers
vi) to work in the field and to travel locally
vii) to compile and analyze data
viii) to meet confidentiality requirements

Additional qualifications include self-motivation, the capacity to manage their own work, an aptitude for research, and the ability to work with living biological specimens.

The benefits are to play a significant role of a pioneering effort to explore an area of research that is largely unexplored, the acquisition of skills in experimentation, research and design, to work within the culture of a North American federal research institution.

OPPORTUNITY/*OPPORTUNITÉ* ID: 2010_Agassiz_04b Return to the List

A – Identification

Type of Candidate (check one or more)/*Type de candidats recherchés (choisir un ou plus)* :

- Graduate students / étudiants des cycles supérieurs: - Master's or equivalent / *Maîtrise ou équivalent*

If necessary, specify country (or countries) of preference./*Si nécessaire, spécifier le ou les pays de préférence* :

Justify if this Opportunity cannot be offered to a Canadian/*Justifiez si cette Opportunité ne peut être offert à un Canadien :*
This opportunity can be offerred to both Canadian or non-Canadian

OPPORTUNITY TITLE/ TITRE DE L'OPPORTUNITÉ : **Sampling and Monitoring Wireworms for Crop Protection**

Foreigner's length of stay at AAFC, specify number of months (minimum and/or maximum)/ *Durée du séjour à AAC, spécifier le nombre de mois (minimal et/ou maximal)* :	12-24
Preferred start date before March 31, 2011/ *Date de préférence pour le début du séjour avant le 31 mars 2011*, specify/*spécifier* :	March 31, 2010
Research location in Canada / *Lieu de la recherche au Canada :* Pacific Agri-Food Research Centre Website : http://www.agr.gc.ca/science	City/*Ville*, Province : Agassiz, BC
Contact: **Dr. Todd Kabaluk**	Email/*Courriel* : Todd.Kabaluk@agr.gc.ca Phone/*Téléphone* : 1-604-796-1710

B – The Research Team/ *L'équipe de recherché*

AAFC Supervisor/*Superviseur à AAC* : Todd Kabaluk, Research Biologist
Other AAFC scientists/*Autres chercheurs d'AAC* : Christine Noronha (Charlottetown, PEI), Bob Vernon
University partners/*Partenaires universitaires* :
Industry partners/*Partenaires industriels* : Canadian Horticultural Council, BC Potato Growers

C – Opportunity Description/ *Description de l'Opportunité*

Objective/*Objectif* :
Monitoring for insect pests in agricultural crops is a useful practice to help reduce pesticide usage and avoid planting crops into land where pests could be a problem. Assessing wireworm populations and the risk of crop damage would inform farmers of the following: i) to plant or not to plant the crop (particularly if the crop is to be kept 'organic'); ii) whether or not a prophylactic pesticide treatment for wireworms is required; and iii) identify 'hot spots' to avoid planting or treatment with pesticides.

However, wireworm monitoring has challenges, most importantly: i) the effects of varying levels of soil organic matter on trap catches is unknown; and ii) specific seasonal effects (soil moisture, temperature, calendar date) are unknown.

A new and easy-to-use wireworm bait trap has recently been designed by researchers in Agassiz. The advantage of this trap is that it only requires a fraction of labour resources and enables researchers to address the challenge of developing a wireworm monitoring strategy. We believe that thoroughly addressing these challenges has been previously unexplored because of the lack of availability of a simple and easy-to-use wireworm trap.

Objectives
We are proposing specific experiments to test different hypotheses:

-how do wireworm trap catches relate to crop damage? Into this question, we would introduce the statistical concept of 'binomial counts' whereby variations in populations might be better described using a presence/absence data. We would test the hypothesis that what is important is the *proportion* of traps with wireworms, in contrast to the mean number of wireworms caught per trap.

-what is the effect of crop residue, and trapping in an established crop on wireworm trap catches and if this can be accounted for in making a recommendation to treat for wireworms. We would seek to account for these conditions by means of the binomial data.

-what is the effect of seasonal and weather effects on trap catches and can this be accounted for in making a recommendation to treat for wireworms. Again, we would seek to account for these conditions by means of the binomial data.

-how are wireworm trap catches affected by: soil organic matter, soil temperature, soil moisture, and C02 production in the trap itself.

Value of the Opportunity (issue, results, outcomes)/*Valeur de l'opportunité (problème, résultats, retombées*):
The successful candidate would be working among several entomology professionals and gain specialized knowledge of North American pest management issues and technology. The new low-maintenance wireworm trap opens up an area of research previously unattainable because currently trap technology is too labour intensive. Knowledge of the effect of soil and seasonal variables on wireworm levels, and the successful development of a method for monitoring for wireworms will reduce pesticide use and energy inputs in farming, create industry, and stimulate further research in this area of study.

The value of accurately estimating population levels is that it can i) eliminate unnecessary prophylactic pesticide applications if populations are below a crop damage threshold; and ii) lead to a choice of planting a crop that is not affected by wireworm feeding if populations are high; and iii) lead to choice of control options (rate/type of pesticide) based on the level of infestation. This ability to decide cropping and control activities leads efficient use of pesticides, which in turn reduces their impacts on wildlife and human and environmental health.

D – Describe the qualifications needed (academic, study, knowledge, skills, experiences, *etc.*), and the benefits to the candidate /*Décrire les qualifications requises (études, connaissances, compétences, expériences, etc) et les avantages pour les candidats*

The expectations of the student are:

i) to clearly understand the purpose of the project, and work with AAFC Scientists in defining it's broad objectives
ii) identifying the research projects' needs for materials, labour, and land and working with AAFC Scientists to acquire those needs
iii) in cooperation with AAFC Scientists, design experiments to test specific hypotheses
iv) the ability to operate data-loggers and $C0_2$ monitoring equipment
v) to work in the field and to travel locally
vi) the field experiments generate a lot of data. The ability to compile and analyze data large datasets is required and the student must have an aptitude for spreadsheets and intermediate mathematical operations
vii) to meet confidentiality requirements

Additional qualifications include self-motivation, the capacity to manage their own work, an aptitude for research, and the ability to work with living biological specimens.

The benefits are to play a significant role of a pioneering effort to explore an area of research that is largely unexplored, the acquisition of skills in experimentation, research and design, to work within the culture of a North American federal research institution.

OPPORTUNITY/*OPPORTUNITÉ* ID: 2010_Fredericton_02 Return to the List

A – Identification

Type of Candidate (check one or more)/*Type de candidats recherchés (choisir un ou plus)* :

- Graduate students / étudiants des cycles supérieurs: - Ph.D.
- Scientist from a university or a research organisation/*Chercheur d'une université ou d'un organisme de recherche*.

If necessary, specify country (or countries) of preference./*Si nécessaire, spécifier le ou les pays de préférence* :
China and/or other countries

Justify if this Opportunity cannot be offered to a Canadian/*Justifiez si cette Opportunité ne peut être offert à un Canadien :*
It is expected that the foreign country to provide the living expenses for the students/visitor.

OPPORTUNITY TITLE/ TITRE DE L'OPPORTUNITÉ : **Characterization of somatic genome instability in plants**

Foreigner's length of stay at AAFC, specify number of months (minimum and/or maximum)/ *Durée du séjour à AAC, spécifier le nombre de mois (minimal et/ou maximal)* : 24

Preferred start date before March 31, 2011/
Date de préférence pour le début du séjour avant le 31 mars 2011, specify/*spécifier* :

Research location in Canada / *Lieu de la recherche au Canada :* City/*Ville*, Province :
Potato Research Centre Fredericton, NB
Website : http://www.agr.gc.ca/science

Contact: Email/*Courriel* : xiu-qing.li@agr.gc.ca
Dr. Xiu-Qing Li Phone/*Téléphone* : 1-506-452-4829

B – The Research Team/ *L'équipe de recherché*

AAFC Supervisor/*Superviseur à AAC* : Dr. Xiu-Qing Li
Other AAFC scientists/*Autres chercheurs d'AAC* :
University partners/*Partenaires universitaires* : Professor Gregory Brown, McGill University
Industry partners/*Partenaires industriels* :

C – Opportunity Description/ *Description de l'Opportunité*

Objective/*Objectif* :
Somatic genome stability is the basis for the identity of plant species and cultivars. However, recently it is clear that both nuclear and mitochondrial genomes of somatic cells vary at certain degree during plant development or in response to environment. For vegetative crops such as the potato, somatic genome instability can reduce cultivar degeneration and shorten the utilization period. Somatic instability should be minimized for potato propagation and cultivar maintenance; whereas somatic genome changes can be an approach for mutation breeding because mutated tissues may be propagated into a new cultivar. It is important to characterize the degree of variation and to study the underlying mechanisms of the somatic genome instability in order to predict and influence the genome instability. The objective of this project is to characterize the extent of somatic genome instability in potato and model plants and to study the genetic, environmental and/or developmental factors that cause the insatiability.

D – Describe the qualifications needed (academic, study, knowledge, skills, experiences, *etc.*), and the benefits to the candidate /*Décrire les qualifications requises (études, connaissances, compétences, expériences, etc) et les avantages pour les candidats*

The candidates are expected to have MSc and/or PhD degrees in a genome-related area such as genetics, bioinformatics, plant physiology or cellular/molecular biology. The student/scientist will participate in the study of environmental and developmental genomic variation in somatic cells at the chromosomal level and gene level and will have the opportunity to learn and use various technologies such as DNA sequence analysis, chromosomal analysis, gene cloning, real-time PCR, nCounter, and/or microarray. The student will receive training not only in technical aspects but also in research direction, research method, experimental design, data analysis, and scientific writing.

OPPORTUNITY/*OPPORTUNITÉ* ID: 2010_Fredericton_04 Return to the List

A – Identification

Type of Candidate (check one or more)/*Type de candidats recherchés (choisir un ou plus)* :

- Graduate students / étudiants des cycles supérieurs: - Ph.D.
- Scientist from a university or a research organisation/*Chercheur d'une université ou d'un organisme de recherche*.

If necessary, specify country (or countries) of preference./*Si nécessaire, spécifier le ou les pays de préférence* :
China and/or other countries

Justify if this Opportunity cannot be offered to a Canadian/*Justifiez si cette Opportunité ne peut être offert à un Canadien :*

OPPORTUNITY TITLE/ TITRE DE L'OPPORTUNITÉ : **Identification, isolation and characterization of genes involved in resistance against potato virus Y in potato**

Foreigner's length of stay at AAFC, specify number of months (minimum and/or maximum)/ *Durée du séjour à AAC, spécifier le nombre de mois (minimal et/ou maximal)* : 24

Preferred start date before March 31, 2011/ *Date de préférence pour le début du séjour avant le 31 mars 2011*, specify/*spécifier* : October 1, 2010

Research location in Canada / *Lieu de la recherche au Canada :* City/*Ville*, Province :
Potato Research Centre Fredericton, NB
Website : http://www.agr.gc.ca/science

Contact: Email/*Courriel* : xianzhou.nie@agr.gc.ca
Dr. Xianzhou Nie Phone/*Téléphone* : 1-506-452-4843

B – The Research Team/ *L'équipe de recherché*

AAFC Supervisor/*Superviseur à AAC* : Dr. Xianzhou Nie
Other AAFC scientists/*Autres chercheurs d'AAC* : Dr. Helen Tai
University partners/*Partenaires universitaires* : Dr. Fanrui Meng, Univ of New Brunswick
Industry partners/*Partenaires industriels* : Dr. Mathuresh Singh, Agricultural Certification Services

C – Opportunity Description/ *Description de l'Opportunité*

Objective/*Objectif* :
The ultimate objective of the research is to effectively control viral diseases in potato by using host resistance. The immediate objectives of the project include (1) identification, isolation and characterization of genes associated with incompatible (resistance) reactions to Potato virus Y and/or A; (2) revealing of signal pathways leading to susceptibilities and/or resistance.

Value of the Opportunity (issue, results, outcomes)/*Valeur de l'opportunité (problème, résultats, retombées)*:
Potato is the forth most important crop in the world, following rice, corn and wheat. It is also a major crop in many counties, contributing significantly to food supply and economy. However, potato is susceptible to a wide range of fungal, bacterial and viral diseases. Viral diseases, which are caused by viruses and viroids, are the major constraints of potato production in the world. Although approaches such as phytosanitary measures (e.g., tissue culture of virus-free propagales, seed-potato certification program) and field management practices can be used, utilization of virus resistant cultivars is probably the most economical approach for control of the diseases.

Responses of potato plants to virus invasion largely depend on the host-virus compatibility. When compatible, systemic infection of the host by the virus take place, and the plants exhibit susceptibility; while as incompatible, systemic infection of host and transportation/replication of virus are disrupted, and plants demonstrate resistance. Resistance is typically controlled by resistance (R) gene, and is virus- and strain-specific. However, little is known about the globe gene expression profiles as well as molecular backgrounds under compatible and incompatible interactions in potato plants. By studying the molecular aspects of potato-virus interactions, this study will likely lead to better understanding of resistance mechanisms as well as key elements in control of resistance.

This research will not only be beneficial to countries involved in terms of scientific exchange/cooperation and development of new knowledge and technology, but also play a significant role in development and utilization of host resistance for viral disease control. Currently, viral disease control is solely relies on phytosanitary measures and virus vector (mainly aphids) control. However, it is costly and sometimes, environmental-unfriendly (pesticide application for controlling aphids). Utilization of host resistance will significant lower the production cost, thus benefit stakeholders in both countries. In addition, using resistance potato lines will benefit China particularly due to its relative low availability of virus-free seed-potatoes. New knowledge and technology in the form of publication is expected.

D – Describe the qualifications needed (academic, study, knowledge, skills, experiences, *etc.*), and the benefits to the candidate /*Décrire les qualifications requises (études, connaissances, compétences, expériences, etc) et les avantages pour les candidats*
Under the supervision of Dr. Nie, the student will be actively involved in the planning and execution of the research project. It is expected that the student has adequate training in biochemistry and plant biology as well as hands-on experience in relevant fields. The student will be encouraged, and is also anticipated, to conduct independent and cooperative problem solving, lab work, and data analysis etc. The student will gain significant experience and knowledge in the proposed research area. In addition, these researches will likely lead to at least one peer-reviewed publication.

OPPORTUNITY/*OPPORTUNITÉ* ID: 2010_Guelph_01 Return to the List

A – Identification

Type of Candidate (check one or more)/*Type de candidats recherchés (choisir un ou plus)* :

- Graduate students / étudiants des cycles supérieurs: - Ph.D.
- I accept a candidate that wants to register in a Canadian university: (name)/*J'accepte un candidat qui veut s'inscrire dans une université canadienne (nom)* : University of Guelph
- Scientist from a university or a research organisation/*Chercheur d'une université ou d'un organisme de recherche*.

If necessary, specify country (or countries) of preference./*Si nécessaire, spécifier le ou les pays de préférence* :
Any country or region that AAFC has signed an MOU (e.g. Chile, Brazil, India, Italy, Egypt, Taiwan etc)

Justify if this Opportunity cannot be offered to a Canadian/*Justifiez si cette Opportunité ne peut être offert à un Canadien :*
There is no fund available for salary

OPPORTUNITY TITLE/ TITRE DE L'OPPORTUNITÉ : **Antioxidant and anti-cancer phytochemicals and their potential in disease prevention and health promotion**

Foreigner's length of stay at AAFC, specify number of months (minimum and/or maximum)/ *Durée du séjour à AAC, spécifier le nombre de mois (minimal et/ou maximal)* : 24

Preferred start date before March 31, 2011/ *Date de préférence pour le début du séjour avant le 31 mars 2011*, specify/*spécifier* : before December 31, 2010

Research location in Canada / *Lieu de la recherche au Canada :* City/*Ville*, Province :
Guelph Food Research Centre Guelph, ON
Website : http://www.agr.gc.ca/science

Contact:
Dr. Rong Cao (Tsao)
Email/*Courriel* : rong.cao@agr.gc.ca
Phone/*Téléphone* : 1-519-780-8062

B – The Research Team/ *L'équipe de recherché*

AAFC Supervisor/*Superviseur à AAC* : Rong Cao (Tsao)
Other AAFC scientists/*Autres chercheurs d'AAC* : Drs. Krista Power, Dan Ramdath
University partners/*Partenaires universitaires* : Drs.Kelly Meckling, Yoshinori Mine, . Mary-Ruth McDonald, Massimo Marcone (All Uof Guelph), Prof. Zhongying Liu, Jilin University; Prof. Zeyuan Deng, Nanchang University
Industry partners/*Partenaires industriels* : Ontario Fruits and Vegetables Growers Association, Asparagus Board, Mushroom Marketing Board

C – Opportunity Description/ *Description de l'Opportunité*

Objective/*Objectif* :
1) To investigate phytochemical profiles of antioxidants, particularly polyphenols and carotenoids, of major Ontario/Canadian fruits, vegetables, grains and medicinal herbs
2) To develop methods for separation and purification of the bioactive phytochemicals, and for in vitro and ex vivo assessment of antioxidant, anti-cancer and anti-inflammatory activities
3) To study the interaction, particularly the synergistic effect of the different phytochemicals within the same and among different foods, and the mechanisms behind the above activities and the synergistic effect, using nutrigenomics approaches
4) To develop nutraceuticals and functional foods with enhanced antioxidant and other health promoting potential

Value of the Opportunity (issue, results, outcomes)/*Valeur de l'opportunité (problème, résultats, retombées*):
Issue: Epidemiologic and recent studies have shown that food-originated phytochemical antioxidants play a significant role in alleviating human chronic diseases such as cancer, cardiovascular disease, diabetes, and chronic inflammation related illnesses. These diseases are the top killers of Canadians and other citizens in industrialised countries, as well as many advanced developing countries such as China and India. These diseases not only significantly reduce the quality of life of the people, but also are a tremendous economic burden in health care to both the people and the government. The fast growing functional foods and nutraceuticals industry is a result of the trend that people are taking preventative measures to maintain good health.

Results: Recent results obtained in our laboratory have shown that food-originated phytochemicals including polyphenols, carotenoids and saponins are good source of antioxidants, many of which are also potential anti-cancer and anti-inflammatory agents. Understanding the chemistry, biochemistry and bioactivities of these phytochemicals and the mechanisms of the activities, will help us develop products for enhanced human health and wellness.

Outcomes: Results of this project will contribute to knowledge creation by identifying the bioactive components, developing

method of extraction and purification, and by understanding their mechanism of action; will add value to some important Canadian/Ontario crops; will lead to the development of functional foods or nutraceuticals which will help enhance the health and wellness of human and reduced healthcare cost. This project will bring expertise from other countries to Canada, help exchange knowledge and experience in the Nutraceuticals, Functional Foods, and Natural Health Products (NFFNHP) related research. The research will contribute to scientific knowledge through peer-reviewed publications (3-4 papers) and other forms of intellectual properties, and will build the foundation for future studies and collaborations with China and other countries.

D – Describe the qualifications needed (academic, study, knowledge, skills, experiences, *etc.*), and the benefits to the candidate /*Décrire les qualifications requises (études, connaissances, compétences, expériences, etc) et les avantages pour les candidats*

A PhD candidate registered in a university or research institute in the area of food science, human nutrition, nutritional biochemistry, or other closely related fields. The candidate should be knowledgeable in food chemistry, biochemistry and analytical chemistry, and plant physiology and human nutrition, and have skills and experience working in a chemistry lab, including wet chemistry and operating analytical instruments such as HPLC. Experiences in tissue culture and analysis of plant and other biological fluid samples (e.g. plasma and urine) are preferred. The Candidate will be trained in all the above aspects, particularly in separation and analytical skills, in antioxidant and anti-cancer assays using in vitro and ex vivo models (e.g. HPLC, LC-MS, antioxidant assays – FRAP/ORAC/ PCL/DPPH, tissue culture, Microarray, Rt-PCR etc.), and in the English language and scientific writing.

The requirement of qualification and benefits will be the same for a visiting Scientist.

OPPORTUNITY/*OPPORTUNITÉ* ID: 2010_Guelph_03 Return to the List

A – Identification

Type of Candidate (check one or more)/*Type de candidats recherchés (choisir un ou plus)* :

- Graduate students / étudiants des cycles supérieurs: - Ph.D.
- I accept a candidate that wants to register in a Canadian university: (name)/*J'accepte un candidat qui veut s'inscrire dans une université canadienne (nom)* : University of Guelph
- Scientist from a university or a research organisation/*Chercheur d'une université ou d'un organisme de recherche*.

If necessary, specify country (or countries) of preference./*Si nécessaire, spécifier le ou les pays de préférence* :
MOE-AAFC PhD Research Program for the Ph.D. student

Justify if this Opportunity cannot be offered to a Canadian/*Justifiez si cette Opportunité ne peut être offert à un Canadien :*
A Canadian student is welcome if she or he meets the requirements and can financially support her or his PhD studies

OPPORTUNITY TITLE/ TITRE DE L'OPPORTUNITÉ : **Development and mechanistic studies of probiotics for *Salmonella* control**

Foreigner's length of stay at AAFC, specify number of months (minimum and/or maximum)/ *Durée du séjour à AAC, spécifier le nombre de mois (minimal et/ou maximal)* : 12-24

Preferred start date before March 31, 2011/ *Date de préférence pour le début du séjour avant le 31 mars 2011*, specify/*spécifier* : September 2010

Research location in Canada / *Lieu de la recherche au Canada :* City/*Ville*, Province :
Guelph Food Research Centre Guelph, ON
Website : http://www.agr.gc.ca/science

Contact: Email/*Courriel* : joshua.gong@agr.gc.ca
Dr. Joshua Gong Phone/*Téléphone* : 1-519-780-8027

B – The Research Team/ *L'équipe de recherché*

AAFC Supervisor/*Superviseur à AAC* : Dr. Joshua Gong
Other AAFC scientists/*Autres chercheurs d'AAC* : Drs. Jim Chambers & Parviz Sabour
University partners/*Partenaires universitaires* : Dr. Shayan Sharif; U of Guelph
Industry partners/*Partenaires industriels* :

C – Opportunity Description/ *Description de l'Opportunité*

Objective/*Objectif* :
Probiotics for controlling *Salmonella* infection: development and mechanistic studies

Value of the Opportunity (issue, results, outcomes)/*Valeur de l'opportunité (problème, résultats, retombées*):
Salmonella species are important food-borne pathogens worldwide. Poultry and poultry products have been identified as a major source of *Salmonella* contamination causing human salmonellosis. Appropriate practical intervention strategies are thus required to control *Salmonella* in poultry production. Probiotics can be used to control food-borne pathogens in food animals. Nevertheless, limited good quality probiotic products with solid scientific evaluation are available in the market for poultry use, particularly in Canada.

Recently, we have selected several *Lactobacillus* isolates from chickens, which were able to inhibit the growth of *S.* Typhimurium and protect *Caenorhabditis elegans* (a laboratory animal model) from *Salmonella*-infection caused death (Wang et al., 2009). These isolates present a unique opportunity for successful development of effective probiotics, as the nematode has been used successfully for prescreening antimicrobial agents (Moy et al., 2006) and probiotic bacteria (Ikeda et al., 2007). The research proposed for the internship is to evaluate the potential of the *Lactobacillus* isolates in developing into probiotics and to study their potential mechanisms underlying *Salmonella* control. The student needs to: **1)** characterize the *Lactobacillus* isolates in respect to their safe use as probiotics, which includes the investigation into the presence of plasmids, antibiotic resistances, and tolerance to low pH, high bile salt, and oxygen; **2)** conduct *Salmonella*-challenge chicken trials to evaluate the ability of the isolates to reduce the burden of *S.* Typhimurium in chicken guts (Haghighi et al., 2008); **3)** study the ecology of gut microbiota associated with *Salmonella* infection and the control by the *Lactobacillus* isolates (Feng et al., 2009), upon the success of the chicken challenge trials; **4)** investigate potential mechanisms of the isolates in *Salmonella* control, particularly the chicken host responses (Haghighi et al., 2005; 2006; Brisbin et al., 2008).

The proposed research addresses AAFC National Priority #2 - Enhancing the quality of food and the safety of the food system.
The expected outcomes include: **1)** 1 - 2 scientific journal publications (SCI collected); **2)** a well-trained Ph.D. student for scientific research for China; **3)** a potential probiotic product.

D – Describe the qualifications needed (academic, study, knowledge, skills, experiences, *etc.*), and the benefits to the candidate /*Décrire les qualifications requises (études, connaissances, compétences, expériences, etc) et les avantages pour les candidats*

Qualifications: The expected qualifications include: **1)** majored in veterinary medicine/animal science or related disciplines; **2)** experience with animals (must) and basic training in lab skills/scientific thinking (additional experience in microbiology or molecular biology is a plus); **3)** able to communicate effectively in English (verbal/written); **4)** good computer skills for data analyses.

Benefits: The student will be trained to master the techniques for conducting proposed research. She/he will carry out data analysis and prepare scientific reports and manuscripts. She/he will also participate in experimental designs and group discussions on research planning and trouble shooting. Additionally, she/he can interact with other students, postdoctoral fellows, and researchers at both AAFC and University Guelph by attending seminars and giving presentations. All of the training will help the student to develop into an independent researcher with a well-prepared scientific mind and technical skills. Furthermore, the student can establish valuable contacts for future potential research opportunities.

OPPORTUNITY/*OPPORTUNITÉ* ID: 2010_Guelph_04 Return to the List

A – Identification

Type of Candidate (check one or more)/*Type de candidats recherchés (choisir un ou plus)* :

- Graduate students / étudiants des cycles supérieurs: - Ph.D.
- Scientist from a university or a research organisation/*Chercheur d'une université ou d'un organisme de recherche*.

If necessary, specify country (or countries) of preference./*Si nécessaire, spécifier le ou les pays de préférence* :
China, Taiwan, Chile, Brazil, Italy, Spain

Justify if this Opportunity cannot be offered to a Canadian/*Justifiez si cette Opportunité ne peut être offert à un Canadien :*

OPPORTUNITY TITLE/ TITRE DE L'OPPORTUNITÉ : **Development of Stabilization Technology for Bioactives by "Green Processing" and Nano(Micro) technology**

Foreigner's length of stay at AAFC, specify number of months (minimum and/or maximum)/ *Durée du séjour à AAC, spécifier le nombre de mois (minimal et/ou maximal)* : 12

Preferred start date before March 31, 2011/
Date de préférence pour le début du séjour avant le 31 mars 2011, specify/*spécifier* :

Research location in Canada / *Lieu de la recherche au Canada :* Guelph Food Research Center Website : http://www.agr.gc.ca/science	City/*Ville*, Province : Guelph, ON
Contact: **Dr. John Shi**	Email/*Courriel* : john.shi@agr.gc.ca Phone/*Téléphone* : 1-519-780-8035

B – The Research Team/ *L'équipe de recherché*

AAFC Supervisor/*Superviseur à AAC* : John Shi
Other AAFC scientists/*Autres chercheurs d'AAC* :
University partners/*Partenaires universitaires* : University of Guelph
Industry partners/*Partenaires industriels* : Joseph Natural Co., Heinz Co.

C – Opportunity Description/ *Description de l'Opportunité*

Objective/*Objectif* :
a). To develop a lager scale "organic-solvent free" "green" extraction process and to optimize operating conditions based on supercritical fluid extraction to obtained intact bioactives with high bioactivity; b). To develop a nanoe(micro)-emulsion process to stabilize bioactivity, and to enhance bioavailability and delivery efficacy of the target bioactives (hydrophobic components such as carotenoids);

Value of the Opportunity (issue, results, outcomes)/*Valeur de l'opportunité (problème, résultats, retombées*):
The development of innovative "organic-solvent free" "green" extraction technologies is one of the most important technological challenges to produce intact natural bioactives without chemical contamination. The supercritical-CO_2 fluid extraction process offers an excellent alternative choice due to its high selectivity and ability to operate effectively at low temperature with an absence of oxygen.

The nano(micro)-emulsion technology may achieve the ability to protect bioactives and to make these bioactives water soluble in food formulations and stability during food preparation and processing. Thus these new bioactive food ingredients are expected to improve bioavailability and to satisfactorily fit into more food formulations. This pioneering technology has shown a great potential to protect bioactives and to enhance health benefits.

The proposed stabilization technology based on a"green" extraction process integrated with nano(micro)technology will provide the feasibility and bring a validated promise to protect bioactives during the entire processing chain from raw material to end products, stabilize bioactivity, enhance the bioavailability and health benefits.
(1). The "organic solvent free" "green" extraction technology will ensure to recover intact bioactives with high health benefits but without toxic chemical residue in end product.
(2). The nano(micro)-structure process provides stabilization of bioactives against heat and light during food preparation and distribution, and enhances the absorption of bioactives.
(3). The bioavailability testing will ensure that the bioactive molecules within the extracts, as formulated into products, can be absorbed by the body and therefore be available to exert their intended health benefits. This aspect of the project will also provide insights into the relationship between the structure of the delivery vehicle and the absorption for a better understanding of how bioactive ingredients should be presented to the body for optimally efficacious value.
(4). New formulations incorporating bioactive ingredients will stabilize bioactive lipophilic components such as carotenoids with high levels of antioxidant activities;

D – Describe the qualifications needed (academic, study, knowledge, skills, experiences, *etc.*), and the benefits to the candidate /*Décrire les qualifications requises (études, connaissances, compétences, expériences, etc) et les avantages pour les candidats*

Ph. D. Students with background of food engineering, chemical engineering, food science and technology will well fit in this project. They will be well –trained through the lab work activity and to gain sound knowledge, skill and to learn experimental methodology. We are confident that the project will be well profitable for both countries, and such research and collaborative demands are very high.

OPPORTUNITY/*OPPORTUNITÉ* ID: 2010_Guelph_06 Return to the List

A – Identification

Type of Candidate (check one or more)/*Type de candidats recherchés (choisir un ou plus)* :

- Graduate students / étudiants des cycles supérieurs: - Ph.D.
- I accept a candidate that wants to register in a Canadian university: (name)/*J'accepte un candidat qui veut s'inscrire dans une université canadienne (nom)* :
- Scientist from a university or a research organisation/*Chercheur d'une université ou d'un organisme de recherche*.

If necessary, specify country (or countries) of preference./*Si nécessaire, spécifier le ou les pays de préférence* :

Justify if this Opportunity cannot be offered to a Canadian/*Justifiez si cette Opportunité ne peut être offert à un Canadien :*

OPPORTUNITY TITLE/ TITRE DE L'OPPORTUNITÉ : **Development of novel encapsulation platform for target delivery of antimicrobial agent**

Foreigner's length of stay at AAFC, specify number of months (minimum and/or maximum)/ *Durée du séjour à AAC, spécifier le nombre de mois (minimal et/ou maximal)* : 12-24

Preferred start date before March 31, 2011/ *Date de préférence pour le début du séjour avant le 31 mars 2011*, specify/*spécifier* : Septembre, 2010

Research location in Canada / *Lieu de la recherche au Canada :* City/*Ville*, Province :
Guelph Food Research Centre Guelph, ON
Website : http://www.agr.gc.ca/science

Contact: Email/*Courriel* : qi.wang@agr.gc.ca
Dr. Qi Wang Phone/*Téléphone* : 1-519-780-8029

B – The Research Team/ *L'équipe de recherché*

AAFC Supervisor/*Superviseur à AAC* : Dr. Qi Wang
Other AAFC scientists/*Autres chercheurs d'AAC* : Drs. Joshua Gong and Parviz Sabour
University partners/*Partenaires universitaires* : Professor Robert Friendship, U of Guelph
Industry partners/*Partenaires industriels* :

C – Opportunity Description/ *Description de l'Opportunité*

Objective/*Objectif* :
To develop novel encapsulation technologies for protection and maximising the antibacterial activities of antimicrobial agents as alternatives to antibiotics.

Value of the Opportunity (issue, results, outcomes)/*Valeur de l'opportunité (problème, résultats, retombées*):
Bacterial adherence to host tissue is regarded as a critical initial step for colonization and infection. The mammalian cell surface is known to be coated by a layer of carbohydrate molecules attached usually to lipids and proteins which plays important role in cell-cell recognition, adhesion and thus pathogen-cell interaction. Evidence shows that the binding of E. coli and Salmonella to epithelial cells of the intestine is mediated by a mannose-specific, lectin type substance present on the surface of bacterium, which binds to the mannose-like residue site on the epithelial cell. Adhesion receptors such as fucosylated, galactosylated, lactosylated saccharides have also been reported. Therefore, mannose containing substances may either specifically inhibit bacterial adherence or displace adherent bacteria from the epithelial cell surface, most probably by interaction with the mannose-binding sites of the bacteria. Animal studies have demonstrated that Salmonella colonisation was reduced in broilers given a diet supplemented with lactose, mannose or mannose-oligosaccharides. This has led to the development of antiadhesive therapeutics against bacteria and viruses by displaying carbohydrate on flexible polymers.
Grounded on this concept, this project plans to screen mannose-like receptor analogues or other substances that have great affinity to Salmonella and then incorporate them into the encapsulation matrix or the surface of microcapsules loaded with antibacterial agents. It is expected that the microcapsules prepared in this way would have enhanced affinity to selected pathogens. This may not only reduce pathogen adherence to intestinal mucosa cells, but also increase the relative concentration of pathogens in the vicinity of microcapsules, which in turn increase the opportunity of contact between pathogens and the antibacterial agents released from the microcapsules.
The proposed research addresses AAFC National Priority #2 - Enhancing the quality of food and the safety of the food system. The outcome from the project includes 1. advancing the research in development of antibiotic alternatives, 2. at least one research papers or patent. 3. Training a PhD student.

D – Describe the qualifications needed (academic, study, knowledge, skills, experiences, *etc.*), and the benefits to the candidate /*Décrire les qualifications requises (études, connaissances, compétences, expériences, etc) et les avantages pour les candidats*

The student should be proficient with both oral and written English. The student needs to have basic training and experience in a microbiology lab. The student should also have some basic knowledge of polysaccharides structures and functional properties. The internship will provide opportunity to learn skills and knowledge in the development of various encapsulation techniques for bioactive agents; to study the host-pathogen interactions and to participate in seminars and meetings in AAFC labs and University of Guelph.

OPPORTUNITY/*OPPORTUNITÉ* ID: 2010_Guelph_08 Return to the List

A – Identification

Type of Candidate (check one or more)/*Type de candidats recherchés (choisir un ou plus)* :

- Graduate students / étudiants des cycles supérieurs: - Ph.D.
- I accept a candidate that wants to register in a Canadian university: (name)/*J'accepte un candidat qui veut s'inscrire dans une université canadienne (nom)* : University of Guelph
- Scientist from a university or a research organisation/*Chercheur d'une université ou d'un organisme de recherche*.

If necessary, specify country (or countries) of preference./*Si nécessaire, spécifier le ou les pays de préférence* :

Justify if this Opportunity cannot be offered to a Canadian/*Justifiez si cette Opportunité ne peut être offert à un Canadien :*

OPPORTUNITY TITLE/ TITRE DE L'OPPORTUNITÉ : **Biological Detoxification of Mycotoxins in Food and Feed**

Foreigner's length of stay at AAFC, specify number of months (minimum and/or maximum)/ *Durée du séjour à AAC, spécifier le nombre de mois (minimal et/ou maximal)* : 12-48

Preferred start date before March 31, 2011/ *Date de préférence pour le début du séjour avant le 31 mars 2011*, specify/*spécifier* : September 2010

Research location in Canada / *Lieu de la recherche au Canada :* City/*Ville*, Province :
Guelph Food Research Centre Guelph, ON
Website : http://www.agr.gc.ca/science

Contact: **Dr. Ting Zhou**
Email/*Courriel* : ting.zhou@agr.gc.ca
Phone/*Téléphone* : 1-519-780-8036

B – The Research Team/ *L'équipe de recherché*

AAFC Supervisor/*Superviseur à AAC* : Dr. Ting Zhou
Other AAFC scientists/*Autres chercheurs d'AAC* : Dr. Chris Young, Dr. Rong Cao
University partners/*Partenaires universitaires* : Prof. Keith Warriner, Prof. Peter Pauls, Prof. Paul Godwin
Industry partners/*Partenaires industriels* : Biomin, Canada, Ontario Pork

C – Opportunity Description/ *Description de l'Opportunité*

Objective/*Objectif* :
Contamination of grains with trichothecene mycotoxins, especially deoxynivalenol (DON), is a serious problem in both Canada and China; it creates food safety risks, reduces grain market values, threatens livestock industries, limits agricultural produce exports and negatively affects the emerging biofuel industry. To date, there are no effective and economical methods available to significantly reduce the level of trichothecene mycotoxins in food and feed. Innovative biological approaches such as using microorganisms and their enzymes to convert the toxins to non- or less toxic compounds may lead to promising solutions. The research team has successfully discovered several bacterial strains that are able to effectively degrade a variety of trichothecene mycotoxins under both aerobic and anaerobic conditions. The proposed research will build on the discovery and aims at: 1) Identification and characterization of the newly isolated active bacterial species; 2) Determination of the properties and toxicity of the biotransformed products of different bacterial species; 3) Evaluation of the potential use of the detoxification bacteria as probiotics in swine production; 4) Isolation, identification and characterization of mycotoxin detoxification enzymes from the selected bacteria. 5) Evaluation of the potential use of the detoxification bacteria or/and enzymes in mycotoxin decontaminations.

Value of the Opportunity (issue, results, outcomes)/*Valeur de l'opportunité (problème, résultats, retombées*):

A highly experienced multidisciplinary team of mycologists, molecular microbiologists, chemists, biochemists, biotechnologists and plant pathologists from AAFC, universities and industries will collaborate on this research project. The research will start with identification and characterization of the newly discovered isolates using both molecular and biochemical techniques. The biotransformed products will be identified by a combination of ultraviolet and nuclear magnetic resonance spectroscopy and mass spectrometry. The metabolites of the selected bacteria will be studied to identify enzyme(s) that are responsible for trichothecene detoxification followed by their isolation, purification, and molecular characterization. This research should deliver the technology of microbial detoxification of trichothecene mycotoxins, biological agents that may be used in swine and possibly poultry production, detoxification enzyme(s) for food and feed industries. The study may result in future identification of novel gene(s) for mycotoxin detoxification that have potential in developing Fusarium / trichothecene resistant crops.

D – Describe the qualifications needed (academic, study, knowledge, skills, experiences, *etc.*), and the benefits to the candidate /*Décrire les qualifications requises (études, connaissances, compétences, expériences, etc) et les avantages pour les candidats*

The candidate will pass one of the requested English tests and be efficient in both oral and written communications in English. The candidate is expected to have substantial experience in a lab related to the research area of mycotoxin, molecular biology, biochemistry, microbiology or a field relevant to the proposed research.

The candidate will join the multidisciplinary team and make contribution to the comprehensive research project with emphasis on one or two of the objectives, while be trained to master the techniques for conducting the proposed research and gain experience in experimental designs, data analysis, preparation of scientific reports and manuscripts. In addition, the candidate will have opportunity to expose to facilities and expertise at AAFC and Canadian universities and to interact with other students, postdoctoral fellows, and researchers for developing potential future collaborations.

OPPORTUNITY/*OPPORTUNITÉ* ID: 2010_Guelph_09 Return to the List

A – Identification

Type of Candidate (check one or more)/*Type de candidats recherchés (choisir un ou plus)* :

- Graduate students / étudiants des cycles supérieurs: - Ph.D.
- I accept a candidate that wants to register in a Canadian university: (name)/*J'accepte un candidat qui veut s'inscrire dans une université canadienne (nom)* : University of Guelph
- Scientist from a university or a research organisation/*Chercheur d'une université ou d'un organisme de recherche*.

If necessary, specify country (or countries) of preference./*Si nécessaire, spécifier le ou les pays de préférence* :

Justify if this Opportunity cannot be offered to a Canadian/*Justifiez si cette Opportunité ne peut être offert à un Canadien :*

OPPORTUNITY TITLE/ TITRE DE L'OPPORTUNITÉ : **Role of flaxseed bioactives in modulating inflammatory and hormone-related health effects in mice**

Foreigner's length of stay at AAFC, specify number of months (minimum and/or maximum)/ *Durée du séjour à AAC, spécifier le nombre de mois (minimal et/ou maximal)* : 12-24

Preferred start date before March 31, 2011/ *Date de préférence pour le début du séjour avant le 31 mars 2011*, specify/*spécifier* : September 2010

Research location in Canada / *Lieu de la recherche au Canada :* City/*Ville*, Province :
Guelph Food Research Centre Guelph, ON
Website : http://www.agr.gc.ca/science

Contact: Email/*Courriel* : krista.power@agr.gc.ca
Dr. Krista Power Phone/*Téléphone* : 1-519-780-8102

B – The Research Team/ *L'équipe de recherché*

AAFC Supervisor/*Superviseur à AAC* : Dr. Krista Power
Other AAFC scientists/*Autres chercheurs d'AAC* : Dr. Rong Cao, Dr. Steve Cui
University partners/*Partenaires universitaires* :
Industry partners/*Partenaires industriels* :

C – Opportunity Description/ *Description de l'Opportunité*

Objective/*Objectif* :

The long term objective of the project is to identify and assess how the processing of cereal based matrices in which flaxseed (FS) or bioactives derived from FS are incorporated affects the delivery of bioactives to the target site and influences the efficacy of bioactives. The short term objectives are: (1) To extract and characterize FS bioactives that will be used throughout the project; (2) To obtain a comprehensive assessment of bioavailability and bioactivity of FS and its individual and combined FS bioactives before and after processing in different food matrices. The specific objectives of the candidate are to determine and compare the biological activities and mechanisms of action of different, well-characterized, FS and FS bioactives on metabolism and biomarkers of inflammatory and hormone-related chronic diseases, such as cardiovascular disease, cancer, and osteoporosis. This will be done using well established preclinical mouse models of human chronic diseases, as well as novel mouse models to assess in vivo mechanism of action.

Value of the Opportunity (issue, results, outcomes)/*Valeur de l'opportunité (problème, résultats, retombées*):
FS contains various bioactives (phytoestrogens, protein, omega-3 fatty acids, fibre), which when studied in isolation induce diverse biological effects. Since these bioactives are consumed within a complex food matrix, understanding how their bioavailability and bioactivity is affected when combined, is of major importance when assessing the potential health effects of the whole food. Various mouse models of human health, metabolomic, and nutrigenomic technologies will be used to characterize the interactive effects of FS bioactives at the gastrointestinal tract, and on their mechanisms relating to inflammatory and hormone-related disease processes.

This project will offer valuable mechanistic scientific data that will support future development of FS novel foods and ingredients for use in human clinical trials and health claim applications. By utilizing high quality well-characterized dietary components and accurate metabolomic profile analyses, we will be able to obtain a comprehensive assessment of the mechanisms, and provide guidance with respect to the role of food matrix, on the health effects of FS.

D – Describe the qualifications needed (academic, study, knowledge, skills, experiences, *etc.*), and the benefits to the candidate /*Décrire les qualifications requises (études, connaissances, compétences, expériences, etc) et les avantages pour les candidats*

The successful candidate should have at least an MSc degree with a nutrition/biochemistry background. The candidate should have experience conducting preclinical animal trials and cell culture studies. The candidate should have some knowledge and experience conducting real time PCR from cell or animal tissues. Knowledge of the role of inflammation in chronic disease would be helpful. The candidate will gain experience working with transgenic reporter mice, establishing and maintaining breeding colonies, performing live mouse molecular imaging, and conducting nutrition and health research. The candidate will also gain experience in histological and immunohistochemcial analysis of mouse tissue samples. The candidate will gain experience in working with a multidisciplinary research team made up of food engineers, food chemists, nutritional biochemists, and molecular biologists. Furthermore, the candidate will gain experience utilizing various cell culture models to test the effects of dietary compounds on cell growth and cell signalling.

OPPORTUNITY/*OPPORTUNITÉ* ID: 2010_Harrow_01 Return to the List

A – Identification

Type of Candidate (check one or more)/*Type de candidats recherchés (choisir un ou plus)* :

- Graduate students / étudiants des cycles supérieurs: - Ph.D.
- I accept a candidate that wants to register in a Canadian university: (name)/*J'accepte un candidat qui veut s'inscrire dans une université canadienne (nom)* :

If necessary, specify country (or countries) of preference./*Si nécessaire, spécifier le ou les pays de préférence* :

Justify if this Opportunity cannot be offered to a Canadian/*Justifiez si cette Opportunité ne peut être offert à un Canadien :*

OPPORTUNITY TITLE/ TITRE DE L'OPPORTUNITÉ : **Nitrogen management strategies to improve crop productivity and reduce N losses to the environment though leaching and denitrification**

Foreigner's length of stay at AAFC, specify number of months (minimum and/or maximum)/ *Durée du séjour à AAC, spécifier le nombre de mois (minimal et/ou maximal)* : 24

Preferred start date before March 31, 2011/ *Date de préférence pour le début du séjour avant le 31 mars 2011*, specify/*spécifier* : April 2010

Research location in Canada / *Lieu de la recherche au Canada :* City/*Ville*, Province :
Greenhouse and Processing Crops Research Centre Harrow, ON
Website : http://www.agr.gc.ca/science

Contact: Email/*Courriel* : craig.drury@agr.gc.ca
Dr. Craig Drury Phone/*Téléphone* : 1-519-738-1266

B – The Research Team/ *L'équipe de recherché*

AAFC Supervisor/*Superviseur à AAC* : Dr. Craig Drury
Other AAFC scientists/*Autres chercheurs d'AAC* : Dr. Xueming Yang, Dr. W. Dan Reynolds
University partners/*Partenaires universitaires* :
Industry partners/*Partenaires industriels* :

C – Opportunity Description/ *Description de l'Opportunité*

Objective/*Objectif* :
Research studies will be conducted to improve our understanding of the impact of management factors (eg. crop rotation, conservation tillage) and soil properties in controlling soil nitrogen supply and environmental losses to water and air. Methods for examining the role of labile N (particular amino sugar-N) from agricultural soils will be developed and the crop (maize) responsiveness to N fertilization based on this labile fraction of soil organic N will be determined.

Value of the Opportunity (issue, results, outcomes)/*Valeur de l'opportunité (problème, résultats, retombées*):
Issue:
Nitrogen (N) fertilizer rates for corn production are normally based on the targeted yield, with adjustments to allow for other N inputs, such as legumes and manure. The reason for this is that the soil N tests are not currently able to account for amount of N mineralized from the organic N fractions in soil (including also organic N in manure and/or legume residues). We have found from a survey of 140 farm fields that the average amount of inorganic N remaining in the soil at the end of the growing season was 38 kg N/ ha and over 10% of sampled fields tested had inorganic N contents which were greater than 100 kg N/ha. This implies that farmers could reduce their N fertilizer inputs and/or apply manure to adjacent fields. When too much N is added to a given field, not only is it not economical but the high inorganic N remaining in soil is a substantial environmental risk to both air (denitrification losses) and water (nitrate contamination of surface and groundwater).

Results:
The graduate student will conduct field and laboratory studies which will help improve crop productivity and reduce environmental losses of nitrogen to air and water. The expectation is that the student will produce and publish at least 2 manuscripts from their research studies in Canada.

Outcomes :
This research will enable producers to apply N rates more closely linked to crop requirements, leading to reduced nutrient loss to the environment and improved economics of crop production. This would lead to both economic and societal benefits for rural communities and urban populations within the sphere of influence of the agro-ecosystem.

D – Describe the qualifications needed (academic, study, knowledge, skills, experiences, *etc.*), and the benefits to the

candidate /*Décrire les qualifications requises (études, connaissances, compétences, expériences, etc) et les avantages pour les candidats*
The PhD student should be registered in a soil chemistry, soil fertility or soil biology program and should have completed soil chemistry and fertility courses as per the requirements of their doctorate program. He/she should have knowledge of soil organic carbon and nitrogen dynamics. Experience in soil chemical analysis techniques and associated instrumentation would be an asset. The successful candidate should also be willing to work as part of an integrated soils team and have proficiency in both written and oral English. The student will gain laboratory experience in a AAFC soil biochemistry laboratory and this program will enhance his/her knowledge of agricultural production practices in humid regions. This experience will also provide students with an opportunity to improve verbal and written English skills.

OPPORTUNITY/*OPPORTUNITÉ* ID: 2010_Harrow_02	Return to the List
A – Identification	
Type of Candidate (check one or more)/*Type de candidats recherchés (choisir un ou plus)* :	
• Graduate students / étudiants des cycles supérieurs:	- Master's or equivalent / *Maîtrise ou équivalent* - Ph.D.
• I accept a candidate who wants to register in a Canadian university: (name)/*J'accepte un candidat qui veut s'inscrire dans une université canadienne (nom)* : University of Guelph	
• Scientist from a university or a research organisation/*Chercheur d'une université ou d'un organisme de recherche*.	
If necessary, specify country (or countries) of preference./*Si nécessaire, spécifier le ou les pays de préférence* : Justify if this Opportunity cannot be offered to a Canadian/*Justifiez si cette Opportunité ne peut être offert à un Canadien :*	
OPPORTUNITY TITLE/ TITRE DE L'OPPORTUNITÉ : **Greenhouse crop production**	
Foreigner's length of stay at AAFC, specify number of months (minimum and/or maximum)/ *Durée du séjour à AAC, spécifier le nombre de mois (minimal et/ou maximal)* :	6-24
Preferred start date before March 31, 2011/ *Date de préférence pour le début du séjour avant le 31 mars 2011*, specify/*spécifier* :	September 2010
Research location in Canada / *Lieu de la recherche au Canada :* Greenhouse and Processing Crops Research Centre Website : http://www.agr.gc.ca/science	City/*Ville*, Province : Harrow, ON
Contact: **Dr. Xiuming Hao**	Email/*Courriel* : xiuming.hao@agr.gc.ca Phone/*Téléphone* : 1-519-738-1228
B – The Research Team/ *L'équipe de recherché*	
AAFC Supervisor/*Superviseur à AAC* : Dr. Xiuming Hao Other AAFC scientists/*Autres chercheurs d'AAC* : University partners/*Partenaires universitaires* : University of Guelph Industry partners/*Partenaires industriels* : Ontario Greenhouse Vegetable Growers	
C – Opportunity Description/ *Description de l'Opportunité*	
Objective/*Objectif* : To develop new climate control strategies for improving crop productivity and energy use efficiency in greenhouse crop production **Value of the Opportunity (issue, results, outcomes)/*Valeur de l'opportunité (problème, résultats, retombées)***: Protected crop cultivation is to grow a crop under some kind of protective structure such as greenhouse which improves the climate conditions so that a crop can be grown when outside (field) conditions are not suitable for crop production. Protected crop production is a major sector of Canadian agriculture and the agriculture across the world. In northern regions, considerable heating energy is usually required to increase greenhouse temperature in the winter. With the rising energy price, energy has become one of the largest cost components in greenhouse crop production. When heating is not available or can not be afforded, the success of crop production will largely depends on the crop tolerance and adaptation to low temperature. With high tolerance to low temperature, heating requirement and the associated fossil fuel consumption can be reduced while greenhouse crop productivity can be increased. This project will explore the natural ability of the plants to tolerate and to adapt to variable environmental	

conditions to develop dynamic plant-based temperature control strategies for improving energy use efficiency and crop productivity in greenhouse crop production. The strategies developed by the project will improve the sustainability and competitiveness of greenhouse industry by increasing crop yield and quality and energy use efficiency, and by reducing the emission of CO_2 (greenhouse gas) and air pollutants into the atmosphere.

The research project is expected to generate new dynamic plant-based climate control strategies for increasing greenhouse crop yield and quality, and energy use efficiency. The research is also expected to generate new fundamental information on 1) the mechanism of crop tolerance and adaptation to low and high temperature stress and 2) greenhouse and plant microclimate.

D – Describe the qualifications needed (academic, study, knowledge, skills, experiences, *etc.*), and the benefits to the candidate /*Décrire les qualifications requises (études, connaissances, compétences, expériences, etc) et les avantages pour les candidats*

Expected candidate qualifications: The candidate is expected to conduct both growth chamber and greenhouse experiments to determine the threshold of the greenhouse vegetables to tolerate low and high temperatures and to explore the mechanism on crop tolerance and adaptation to low and high temperature stress using automatic data acquisition systems and complex physiological equipment. Therefore, for the candidate, excellent knowledge and training in plant physiology or horticulture or agronomy, good English communication and interpersonal skills are required. Also, skills or experience with greenhouse crop cultivation, statistical analysis, leaf gas exchange and chlorophyll fluorescence measurements, and climate monitoring are definitely an asset.

Benefits to student: The candidate will be exposed to and can learn modern greenhouse climate control technology, techniques for evaluating crop tolerance to temperature stress such as leaf gas exchange and chlorophyll fluorescence, on-line automatic data acquisition systems for microclimate monitoring, plant growth, and modelling, and the advanced Canadian greenhouse crop cultivation technology. It will significantly improve the candidate's knowledge and skills in environmental stress physiology.

OPPORTUNITY/*OPPORTUNITÉ* ID: 2010_Harrow_04 Return to the List

A – Identification

Type of Candidate (check one or more)/*Type de candidats recherchés (choisir un ou plus)* :

- Graduate students / étudiants des cycles supérieurs: - Ph.D.

If necessary, specify country (or countries) of preference./*Si nécessaire, spécifier le ou les pays de préférence* :
India, Italy, Brazil, Chile, China

Justify if this Opportunity cannot be offered to a Canadian/*Justifiez si cette Opportunité ne peut être offert à un Canadien :*

OPPORTUNITY TITLE/ TITRE DE L'OPPORTUNITÉ : **Improvement of soy quality for food through molecular and conventional plant breeding**

Foreigner's length of stay at AAFC, specify number of months (minimum and/or maximum)/ *Durée du séjour à AAC, spécifier le nombre de mois (minimal et/ou maximal)* : 24-36

Preferred start date before March 31, 2011/ *Date de préférence pour le début du séjour avant le 31 mars 2011*, specify/*spécifier* : before September of 2010

Research location in Canada / *Lieu de la recherche au Canada :* City/*Ville*, Province :
Greenhouse and Processing Crops Research Centre Harrow, ON
Website : http://www.agr.gc.ca/science

Contact:
Dr. Vaino Poysa
Email/*Courriel* : vaino.poysa@agr.gc.ca
Phone/*Téléphone* : 1-519-738-1260

B – The Research Team/ *L'équipe de recherché*

AAFC Supervisor/*Superviseur à AAC* : Dr. Vaino Poysa
Other AAFC scientists/*Autres chercheurs d'AAC* : Drs. Kangfu Yu, Lorna Woodrow
University partners/*Partenaires universitaires* :
Industry partners/*Partenaires industriels* : Ontario Soybean Growers

C – Opportunity Description/ *Description de l'Opportunité*

Objective/*Objectif* :
Molecular marker assisted breeding has become an essential component in modern plant breeding programs. Functional or gene specific markers have been proven to be the most efficient markers that can be used for accurate selection of plant genotypes.

Glycinin (11S) and ß-conglycinin (7S) are the predominant seed storage proteins in soybeans (*Glycine max* L.). Functional properties, such as gelation and emulsification of soy proteins for tofu production, appear to have a close relationship with some of the soy storage protein subunits or peptides. Cadmium (Cd) is a major pollutant metal that is highly toxic to living organisms. Vast areas of agricultural soils including areas in Ontario are contaminated with Cd through the use of super phosphate fertilizers and sewage sludge, and airborne inputs from mining and smelting industries. Soybean cultivars in Ontario can contain higher Cd concentration than the proposed Codex standard of 0.2 mg $kg^{-1.}$ In our soybean breeding program, mutant lines with different combinations of 11S and 7S protein components have been developed. The molecular mechanisms underlying the absence of some protein components in the mutant lines, however, are not fully understood. In a previous study, molecular markers linked to a major gene controlling low cadmium concentration in soy seeds have been developed. But the major gene for low cadmium accumulation has not been cloned although several candidate genes were identified. The objectives of this project are to: 1) develop gene specific markers for each of the genes controlling soy protein subunits and low cadmium concentration in soy seed; 2) characterize the soybean mutant lines at the molecular level to understand the mechanisms controlling the absence of the 11S and 7S protein subunits in the mutant lines, and 3) use the gene specific molecular markers in soybean breeding program for the development of cultivars with better food quality.

Value of the Opportunity (issue, results, outcomes)/*Valeur de l'opportunité (problème, résultats, retombées*):
A better understanding of the molecular mechanisms underlying the absence of specific soy seed storage protein subunits and soy seed cadmium concentration would make the development of gene specific markers possible and may provide researchers with new approaches to improve the favourable protein combinations and reduce cadmium content for soy food production through conventional and/or molecular plant breeding. Soybean cultivars with better food quality traits will increase the market share for Canadian food type soybeans.

D – Describe the qualifications needed (academic, study, knowledge, skills, experiences, *etc.*), and the benefits to the candidate /*Décrire les qualifications requises (études, connaissances, compétences, expériences, etc) et les avantages pour les candidats*

The candidate should have a MSc. degree and laboratory experience in plant molecular biology and genetics. Laboratory experiences in DNA, RNA, and protein manipulations are necessary. Knowledge and experience in bioinformatics and analytical chemistry are preferred but not essential. After the training, the candidate would acquire most of the modern molecular biology and genomics technologies for crops and generate papers that would be publishable in international scientific journals, the candidate will also have the opportunity to gain experience in practical plant breeding in the field.

OPPORTUNITY/*OPPORTUNITÉ* ID: 2010_Harrow_05 Return to the List

A – Identification

Type of Candidate (check one or more)/*Type de candidats recherchés (choisir un ou plus)* :

- Graduate students / étudiants des cycles supérieurs: - Master's or equivalent / *Maîtrise ou équivalent* - Ph.D.
- I accept a candidate who wants to register in a Canadian university: (name)/*J'accepte un candidat qui veut s'inscrire dans une université canadienne (nom)* : University of Guelph, University of Windsor, McGill University
- Scientist from a university or a research organisation/*Chercheur d'une université ou d'un organisme de recherche*.

If necessary, specify country (or countries) of preference./*Si nécessaire, spécifier le ou les pays de préférence* :

Justify if this Opportunity cannot be offered to a Canadian/*Justifiez si cette Opportunité ne peut être offert à un Canadien :*

OPPORTUNITY TITLE/ TITRE DE L'OPPORTUNITÉ : **Nutrient and Water Management for Sustainable Agricultural Production with Improved Environmental Quality**

Foreigner's length of stay at AAFC, specify number of months (minimum and/or maximum)/ *Durée du séjour à AAC, spécifier le nombre de mois (minimal et/ou maximal)* :	12-36 (36 for post-doctoral fellows)
Preferred start date before March 31, 2011/ *Date de préférence pour le début du séjour avant le 31 mars 2011*, specify/*spécifier* :	flexible
Research location in Canada / *Lieu de la recherche au Canada :* Greenhouse and Processing Crops Research Center Website : http://www.agr.gc.ca/science	City/*Ville*, Province : Harrow, ON

Contact:
Dr. Tie Quan Zhang
Email/*Courriel* : tiequan.zhang@agr.gc.ca
Phone/*Téléphone* : 1-519-738-1269

B – The Research Team/ *L'équipe de recherché*

AAFC Supervisor/*Superviseur à AAC* : Dr. T.Q. Zhang
Other AAFC scientists/*Autres chercheurs d'AAC* : Dr. C.S. Tan; Dr. J.Y. Yang
University partners/*Partenaires universitaires* : Dr. I. O'Halloran; Dr. Y.M. Zhao; Dr. J. Ciborowski
Industry partners/*Partenaires industriels* : Mr. G. Patterson

C – Opportunity Description/ *Description de l'Opportunité*

Objective/*Objectif* :

- Short- and Long-term Phosphorous Cycling in Various Soil-Crop Eco-Systems.
- Fate, Residual Values, and Loss Pathways (Surface Runoff and Subsurface) of Soil Phosphorus as Related to Soil-Crop-Water Management and Organic Amendments.
- Development of Tools for Risk Assessment of Soil Phosphorus to Water Resource
- - Development of Phosphorus-Based Innovative Nutrient Management Practices for Various Types of Manure, Compost and Biosolids
- Agronomic and Environmental Assessment of Manure Phosphorus, Nitrogen, and Metals from Pigs Developed or Treated Using Innovative Technologies (Transgenic Phytase Envirpig™ and New Diet Formulation) Using Advanced Technologies, Such as XANES.
- Modelling Phosphorus Cycling in Soil-Crop-Water Systems.
- Nutrient and Water Management (Drip Fertigation/Irrigation, Organic Production) for Horticultural Crops, Including Sweet Corn, Green Peppers, Processing Tomatoes, etc.
- Identification of Soil Factors Limiting Root Growth and Development of Sweet Corn and Grain Corn

Value of the Opportunity (issue, results, outcomes)/*Valeur de l'opportunité (problème, résultats, retombées*):
Both nutrient and water management are world-wide issues for agricultural production to secure food supply in an environmental sustainable manner. Enhanced collaboration of research would effectively and efficiently develop innovative theories, knowledge, and technologies, which enable farmers to maximize crop productivity with improved quality, while minimizing damages to the environment (soil, water, and air quality).

D – Describe the qualifications needed (academic, study, knowledge, skills, experiences, *etc.*), and the benefits to the candidate /*Décrire les qualifications requises (études, connaissances, compétences, expériences, etc) et les avantages pour les candidats*

Expected qualification of the candidates:
1) Training in soil fertility and chemistry, agronomy, or natural resource and environmental sciences;
2) Excellent English skills in reading, writing, and speaking; and
3) A good team player.

Benefits to the candidates

The research program at AAFC, Harrow, ON, provides excellent experimental (well-equipped analytical laboratories and long-term filed plots and accessibility of advanced instruments, such as XANES) and theoretical platform to determine soil nutrient and water dynamics and to develop new technologies for beneficial nutrient and water management practices. The research work that the candidate will involve will be under direct supervision of highly qualified scientists and/or professors. The activities include 1) set up field plots, facility set-up, data collection and analyses; 2) laboratory sample analysis using the mostly advanced technologies and instruments (such as FIA auto-analyzer, XANES); 3) attend various research meetings to discuss project progress and to exchange ideas for further research planning; 4) prepare research reports (in English) and scientific publications in internationally highly-ranked journals by closely working with the program team scientists; and 4) further develop network for future collaboration.

OPPORTUNITY/*OPPORTUNITÉ* ID: 2010_Harrow_06 Return to the List

A – Identification

Type of Candidate (check one or more)/*Type de candidats recherchés (choisir un ou plus)* :

- Graduate students / étudiants des cycles supérieurs: - Ph.D.
- Scientist from a university or a research organisation/*Chercheur d'une université ou d'un organisme de recherche*.

If necessary, specify country (or countries) of preference./*Si nécessaire, spécifier le ou les pays de préférence* :
India, Italy, Brazil, Chile

Justify if this Opportunity cannot be offered to a Canadian/*Justifiez si cette Opportunité ne peut être offert à un Canadien :*

OPPORTUNITY TITLE/ TITRE DE L'OPPORTUNITÉ : **Validation of candidate gene functions for soybean and common bean through gene transformation and RNA interference**

Foreigner's length of stay at AAFC, specify number of months (minimum and/or maximum)/ *Durée du séjour à AAC, spécifier le nombre de mois (minimal et/ou maximal)* : 24-36

Preferred start date before March 31, 2011/ *Date de préférence pour le début du séjour avant le 31 mars 2011*, specify/*spécifier* : before September of 2010

Research location in Canada / *Lieu de la recherche au Canada :* City/*Ville*, Province :
Greenhouse and Processing Crops Research Centre Harrow, ON
Website : http://www.agr.gc.ca/science

Contact:
Dr. Kangfu Yu
Email/*Courriel* : kangfu.yu@agr.gc.ca
Phone/*Téléphone* : 1-519-738-1207

B – The Research Team/ *L'équipe de recherché*

AAFC Supervisor/*Superviseur à AAC* : Dr. Kangfu Yu
Other AAFC scientists/*Autres chercheurs d'AAC* : Drs. Vaino Poysa; Alireza Navabi
University partners/*Partenaires universitaires* : Dr. Peter Pauls
Industry partners/*Partenaires industriels* : Ontario Soybean Growers; Ontario White and Coloured Bean Growers

C – Opportunity Description/ *Description de l'Opportunité*

Objective/*Objectif* :
Validation of candidate gene functions underlying disease resistance in common bean and/or quality traits in soybean is of great importance to the molecular genomics project at AAFC-GPCRC, Harrow.
There are two general approaches that can be used to validate the functions of candidate genes underlying any traits of interest, namely gene transformation and RNA interference (RNAi). Because both soybean and common bean are recalcitrant to transformation, RNAi methods, such as virus induced gene silencing (VIGS) is increasingly being used as a reverse genetics tool to study functions of specific candidate genes. The objective of this project is to use both gene transformation and VIGS approaches to validate the functions of the previously identified candidate gene controlling the resistance of common bean (*Phaseolus vulgaris* L.) to common bacterial blight (CBB), and the cadmium concentration in soybean seeds (*Glycine max* L.).

Value of the Opportunity (issue, results, outcomes)/*Valeur de l'opportunité (problème, résultats, retombées*):
With the availability of the whole genomic sequence of soybean now and common bean in a year or two, validation of gene functions is and will be one of the most important parts of modern plant genomics for crop improvement. Establishment of gene transformation and RNA interference for functional genomics will be of fundamental importance to understand the functions of the candidate genes we have identified in our soybean and common bean genomics projects. This opportunity would result in the successful establishment of gene transformation and/or RNA interference system for soybean and common beans.

D – Describe the qualifications needed (academic, study, knowledge, skills, experiences, *etc.*), and the benefits to the candidate /*Décrire les qualifications requises (études, connaissances, compétences, expériences, etc) et les avantages pour les candidats*

The candidate should have at least a MSc degree in plant molecular genetics or hand on experience in *Agribacterium*-mediated and/or biolistic delivery gene transformation systems. Knowledge and experience in recombinant DNA technology, such as vector construction, are necessary. Experience with plant viruses in general, and bean pod mottle virus (BPMV) in specific is preferred. After this training, the candidate will learn both gene transformation and VIGS technologies which are very useful tools for functional genomics and crop improvement. Scientific papers may also be generated for publication in international journals.

OPPORTUNITY/*OPPORTUNITÉ* ID: 2010_Harrow_07 Return to the List

A – Identification

Type of Candidate (check one or more)/*Type de candidats recherchés (choisir un ou plus)* :

- Graduate students / étudiants des cycles supérieurs: - Ph.D.
- I accept a candidate who wants to register in a Canadian university: (name)/*J'accepte un candidat qui veut s'inscrire dans une université canadienne (nom)* : University of Guelph
- Scientist from a university or a research organisation/*Chercheur d'une université ou d'un organisme de recherche*.

If necessary, specify country (or countries) of preference./*Si nécessaire, spécifier le ou les pays de préférence* :

Justify if this Opportunity cannot be offered to a Canadian/*Justifiez si cette Opportunité ne peut être offert à un Canadien :*

OPPORTUNITY TITLE/ TITRE DE L'OPPORTUNITÉ : **Using crop soil model to simulate nutrient dynamics and crop production potentials**

Foreigner's length of stay at AAFC, specify number of months (minimum and/or maximum)/ *Durée du séjour à AAC, spécifier le nombre de mois (minimal et/ou maximal)* : 24

Preferred start date before March 31, 2011/
Date de préférence pour le début du séjour avant le 31 mars 2011, specify/*spécifier* :

Research location in Canada / *Lieu de la recherche au Canada :* City/*Ville*, Province :
Greenhouse and Processing Crop Research Centre Harrow, ON
Website : http://www.agr.gc.ca/science

Contact: Email/*Courriel* : jingyi.yang@agr.gc.ca
Dr. Jingyi Yang Phone/*Téléphone* : 1-519-738-1270

B – The Research Team/ *L'équipe de recherché*

AAFC Supervisor/*Superviseur à AAC* : Dr. J. Y. Yang
Other AAFC scientists/*Autres chercheurs d'AAC* : Dr. C. F. Drury (Harrow), Dr. R. DeJong (Ottawa)
University partners/*Partenaires universitaires* : Dr. G. Hoogenboom (Georgia, USA)
Industry partners/*Partenaires industriels* :

C – Opportunity Description/ *Description de l'Opportunité*

Objective/*Objectif* :
The Soil and Environmental Team at Harrow Research Centre uses different models to monitor Agri-Environmental Health. Some of these models are commercially available whereas others are developed by our team using computer software programs including Fortran, Visual Studio and Oracle database.

The objective of this project is to evaluate crop and soil dynamic models to simulate soil nutrient (C, N, P and water) cycling using long term rotation experiments established in Eastern Canada (ex. Southwestern Ontario) and Western Canada (ex. Swift Current, Saskatchewan). Three models (DSSAT, EPIC and DNDC) will be evaluated using the long term rotation field experiment (Wheat-soybean-alfalfa in Ontario, or wheat-wheat-fallow in Saskatchewan). The simulated data (biomass, grain yield, water, C, N & P) will be compared with field measured data and the models will be further evaluated based on sensitivity and statistical validation methods. Key relationships in soil water balance and soil C and N dynamics will be examined.

Value of the Opportunity (issue, results, outcomes)/*Valeur de l'opportunité (problème, résultats, retombées*):
Issue: Environmentally sustainable soil nutrient management has been a long-term research goal for producers, scientists and policy makers. Because of the complexity of the issue as well as limited resources, modelling approaches are being used at varying scales to help identify both the problem areas and the possible solutions to ensure that both productivity and environmental health are maintained. For example, residual soil N which remains in the soil at the end of the growing season can be lost to leaching and/or lost to the atmosphere through denitrification. Good BMP practices reduce nutrients loss whereas the business as usual scenario could lead to enhanced leaching, runoff losses and greenhouse gases (CO_2, CH_4, N_2O) emissions. Surplus soil P can also cause serious problem such as eutrophication of the aquatic environment. Modelling of soil nutrients provides an alternative method to examine the effects of soil nutrient dynamics on nutrient management practices and it provides modelling tool to select Best Management Practices for reducing nutrient loss.

Results: The result of this PhD project will provide the validated crop-soil models for use in assessing the soil nutrient management under different fertilizer N application practices and crop rotations.

Outcomes: A validated crop-soil model will be available for use in Canadian and China. Two journal papers and two conference presentations will be produced. The student will benefit from this program by obtaining (1) up-to-date knowledge on crop simulation models, (2) skills for testing and validation of simulation models and 3) improved English communication skills through interaction with soil scientists at Agriculture & Agri-Food Canada.
D – Describe the qualifications needed (academic, study, knowledge, skills, experiences, *etc.*), and the benefits to the candidate /*Décrire les qualifications requises (études, connaissances, compétences, expériences, etc) et les avantages pour les candidats*
The candidate should be a currently registered PhD student in China or in Canada in soil and environmental science, agronomy or computer science and have good knowledge of mathematics, statistics and at least one computer programming language. Programming knowledge in Fortran, C or Visual Basic would be desirable assets.

OPPORTUNITY/*OPPORTUNITÉ* ID: 2010_Kentville_01 Return to the List

A – Identification

Type of Candidate (check one or more)/*Type de candidats recherchés (choisir un ou plus)* :

- Graduate students / étudiants des cycles supérieurs: - Ph.D.
- I accept a candidate who wants to register in a Canadian university: (name)/*J'accepte un candidat qui veut s'inscrire dans une université canadienne (nom)* :
- Scientist from a university or a research organisation/*Chercheur d'une université ou d'un organisme de recherche*.

If necessary, specify country (or countries) of preference./*Si nécessaire, spécifier le ou les pays de préférence* :
Canada, Chile, China, Israel or Italy

Justify if this Opportunity cannot be offered to a Canadian/*Justifiez si cette Opportunité ne peut être offert à un Canadien :*

OPPORTUNITY TITLE/ TITRE DE L'OPPORTUNITÉ : **Genomic and proteomic approaches to study fruit ripening and senescence**

Foreigner's length of stay at AAFC, specify number of months (minimum and/or maximum)/ *Durée du séjour à AAC, spécifier le nombre de mois (minimal et/ou maximal)* : 12-36

Preferred start date before March 31, 2011/ *Date de préférence pour le début du séjour avant le 31 mars 2011*, specify/*spécifier* : November 2010

Research location in Canada / *Lieu de la recherche au Canada :* City/*Ville*, Province :
Atlantic Food and Horticulture Research Centre Kentville, NS
Website : http://www.agr.gc.ca/science

Contact:
Dr. Jun Song
Email/*Courriel* : jun.song@agr.gc.ca
Phone/*Téléphone* : 1-902-679-5607

B – The Research Team/ *L'équipe de recherché*

AAFC Supervisor/*Superviseur à AAC* : Dr. Jun Song
Other AAFC scientists/*Autres chercheurs d'AAC* :
University partners/*Partenaires universitaires* :
Industry partners/*Partenaires industriels* :

C – Opportunity Description/ *Description de l'Opportunité*

The focus of this proposed research is to characterize biochemical and molecular changes in fruits during ripening, senescence, and postharvest handling with the goal of identifying key components responsible for fruit ripening and senescence in relation to fruit quality. Based on the biochemical pathways and regulation of the synthesis of flavour, nutritional compounds and ripening using state-of-the-art genomic, proteomic and microscopy tools to study fundamental metabolism and its localization.

To date, many progresses have been made on developing GC/MS and HPLC methodologies to identify and analyze flavour and nutritional compounds and physiological studies to characterize their biosynthesis during ripening and postharvest changes in apples, blueberry and bananas. Applying molecular tool to study genes related to volatile biosynthesis in apple and banana fruit has revealed their usefulness to understand regulation of volatile biosynthesis during fruit ripening. Kentville Research Centre, AAFC has established a proteomic research capability as a new tool to study system biology of fruit and food products. With newly installed LC/MS system (Qtrap4000 from Applied Biosystems), improved experimental protocols and softwares, the proteomic research has been shifted from qualitative profiling to targeted quantitative approach.

New research directions will be integrating genomic, proteomic, and metabolic approaches and expanding our understanding of fundamental mechanisms of ripening and senescence and create new opportunities to optimize the quality of fresh fruit.

Objective/*Objectif* :
Apply genomic and proteomic tools to determine biological pathways and identify control mechanisms regulating flavour and nutritional compounds in fresh fruit.

- Characterize changes in biochemical and molecular changes in fruit during ripening, senescence and postharvest handling.
- Develop and improve new quantitative proteomic techniques for fruit.
- Conduct genomic and proteomic techniques to study fruit quality and ripening.
- Identify key compounds responsible for flavor and nutritional quality in fruit.

Value of the Opportunity (issue, results, outcomes)/*Valeur de l'opportunité (problème, résultats, retombées*):

Understanding of the fundamental mechanisms controlling the changes in fruit ripening, especially eating quality (flavour and nutritional compounds) is still limited. Under the new science strategy of AAFC, fundamental research is needed to capture innovative opportunities in food quality and safety. This research keeps in line with AAFC's priorities:

1) Enhance the quality of food and the safety of the food system.
2) Enhance economic benefits for all stakeholders.

In addition, this research will also address enhancing human health and wellness through food and nutrition and innovative products. To deliver the proposed research, practical and scientifically sound approaches linking postharvest physiology and technology, molecular biology will be required. We will use state-of-the-art technologies genomic and proteomic tools to investigate these important and interesting characteristics on fruit.

By characterizing the molecular changes at both the transcript and protein levels, these studies will provide better insights into the molecular framework of fruit ripening and senescence, increase our understanding of basic biological questions, reveal new pathways or processes affecting fruit quality, and provide avenues for product improvement in the future.

D – Describe the qualifications needed (academic, study, knowledge, skills, experiences, *etc.*), and the benefits to the candidate /*Décrire les qualifications requises (études, connaissances, compétences, expériences, etc) et les avantages pour les candidats*

Recent laboratory experience in plant physiology, postharvest physiology, biochemistry and molecular biology techniques, such as protein/RNA extraction, PCR, electrophoresis, gene expressions, and the genetic transformation of plants. Experience in analytical chemistry of plant metabolisms. Experience in data collection, statistical analysis and graphical presentation using computers.

Knowledge of biochemistry, general molecular biology, chemistry laboratory techniques, biochemical and chemical properties of plant tissues, preparative and analytical chemical separation techniques, instrumental analysis, information retrieval techniques.

Benefits to the candidate: Successful candidates will have 2-3 years training at AAFC research centre from experimental design to data analysis. The candidates will have opportunity working on state of the art techniques using genomic and proteomic tools to reveal the fundamental changes in fruit in relation to fruit quality during ripening and senescence.

OPPORTUNITY/*OPPORTUNITÉ* ID: 2010_Kentville_02 Return to the List

A – Identification

Type of Candidate (check one or more)/*Type de candidats recherchés (choisir un ou plus)* :

- Graduate students / étudiants des cycles supérieurs: - Ph.D.
- I accept a candidate who wants to register in a Canadian university: (name)/*J'accepte un candidat qui veut s'inscrire dans une université canadienne (nom)* :
- Scientist from a university or a research organisation/*Chercheur d'une université ou d'un organisme de recherche*.

If necessary, specify country (or countries) of preference./*Si nécessaire, spécifier le ou les pays de préférence* :
Canada, China, and other countries

Justify if this Opportunity cannot be offered to a Canadian/*Justifiez si cette Opportunité ne peut être offert à un Canadien :*

OPPORTUNITY TITLE/ TITRE DE L'OPPORTUNITÉ : **Assessments of Natural Antimicrobials for Food Quality and Safety Control**

Foreigner's length of stay at AAFC, specify number of months (minimum and/or maximum)/ *Durée du séjour à AAC, spécifier le nombre de mois (minimal et/ou maximal)* : 12-24

Preferred start date before March 31, 2011/ *Date de préférence pour le début du séjour avant le 31 mars 2011*, specify/*spécifier* : March 2011

Research location in Canada / *Lieu de la recherche au Canada :* City/*Ville*, Province :
Atlantic Food and Horticulture Research Centre Kentville, NS
Website : http://www.agr.gc.ca/science

Contact: **Dr. Lihua Fan**
Email/*Courriel* : lihua.fan@agr.gc.ca
Phone/*Téléphone* : 1-902-679-5550

B – The Research Team/ *L'équipe de recherché*

AAFC Supervisor/*Superviseur à AAC* : Dr. Lihua Fan
Other AAFC scientists/*Autres chercheurs d'AAC* :
University partners/*Partenaires universitaires* : Dr. Lisbeth Truelstrup Hansen (Dalhousie University)
Industry partners/*Partenaires industriels* : Nancy Tregunno, Nova Agri Inc. NS

C – Opportunity Description/ *Description de l'Opportunité*

The postharvest losses for horticultural products are estimated to be 30-40%. There is also a danger of outbreaks of human diseases due to consumption of fruit and vegetables contaminated with microbial hazards. Crop diseases and postharvest contamination with spoilage and human pathogenic microorganisms can negatively impact the availability, quality and safety of food products. Due to increasing public concern over the level of pesticide residues in foods, there has been a growing interest in using natural antimicrobial compounds for postharvest decay control and extension of shelf life. Among them are plant essential oils such as tea tree oil (TTO), chitosan, lactic acid bacteria (LAB) and bacteriocins which all have Generally Recognized As Safe (GRAS) status.

Blueberries and strawberries are economically important crops in the world. In recent years, blueberries have been included in a category of functional foods because of their favourable combination of nutrient richness, antioxidant strength, and emerging evidence of health benefits. However, both blueberries and strawberry are highly perishable and susceptible to microbial attack.

We hypothesize that the combinations of TTO and/or chitosan and /or LAB will act synergistically and result in better control of produce contamination. The combined hurdle effect will reduce minimum inhibitory concentrations of the individual compound/treatment, which will increase long-term control, enhance quality of the stored fruits, and reduce health hazards for both the consumer and the worker.

Objective/*Objectif* :
The goal of the proposed project is to improve postharvest control of fungal and bacterial contaminants of fresh fruits by combining sub-lethal/inhibitory concentrations of sustainable treatments. The specific objectives are to test the efficacy of environmentally friendly antimicrobials and LAB on the inactivation of fungal and bacterial pathogens related to blueberries and strawberries and to elucidate the treatment mode of action. This will be followed by investigations of the treatment impact on the quality, safety, physiology and shelf life of fruits.

(1) *In vitro* studies to determine the effect of TTO, chitosan and/or LAB on control of postharvest fungal pathogen including *Botrytis cinerea*, *Penicillium* spp and *Colletotrichum* spp., and on control of planktonic and sessile (biofilm) foodborne bacterial pathogens (*Listeria. spp, Escherichia coli*) and elucidate the antimicrobial mode of action;
(2) Investigate the treatment effects on fruit quality and shelf life;
(3) Evaluate the treatment effects on decontaminating blueberries and strawberries inoculated with fungal and bacterial pathogens;
(4) Identify host defence responses to combined treatments.

Value of the Opportunity (issue, results, outcomes)/*Valeur de l'opportunité (problème, résultats, retombées*):
The proposed research is expected to lead to the development of novel, environmentally friendly postharvest decontamination technology that will improve the quality, safety and shelf life of products; more effective use can be made of natural antimicrobials to reduce risk of foodborne illness and food spoilage. The food industry can better control microbial contamination and spoilage during posharvest handling, storage, and packaging. The outcome of this research will enhance the consumption of fruits within and beyond Canada, expand markets and increase economic benefits for the fruit industry in Canada and other countries.

D – Describe the qualifications needed (academic, study, knowledge, skills, experiences, *etc.*), and the benefits to the candidate /*Décrire les qualifications requises (études, connaissances, compétences, expériences, etc) et les avantages pour les candidats*

Qualifications needed: Ph. D students studying in Food Science and/or Microbiology, or visiting scientists in the field of Food Science and Technology, Horticulture and/or Microbiology with experiences in research and excellent knowledge in food science, microbiology, and postharvest physiology and technology.

Benefits to the candidates: The proposed research keeps in line with AAFC's priorities 1, Enhance the quality of food and the safety of the food system and 2, enhancing human health and wellness through food and nutrition and innovative products. To deliver the proposed research, practical and scientifically sound approaches will be applied. Students will get hands-on training from AAFC scientists. This Training program at AAFC laboratories provides students or visiting scientists with a good opportunity to apply state-of-the-art technologies to their future research. The new technical skills and knowledge obtained from AAFC laboratories will also be valuable assets for their professional career development within the Agri-Food industry. This program also provides us with a good collaborative opportunity. I believe that it will be a significant step for our future collaborations.

OPPORTUNITY/*OPPORTUNITÉ* ID: 2010_Lacombe_01 Return to the List

A – Identification

Type of Candidate (check one or more)/*Type de candidats recherchés (choisir un ou plus)* :

- Graduate students / étudiants des cycles supérieurs: - Master's or equivalent / *Maîtrise ou équivalent* - Ph.D.
- I accept a candidate who wants to register in a Canadian university: (name)/*J'accepte un candidat qui veut s'inscrire dans une université canadienne (nom)* :

Justify if this Opportunity cannot be offered to a Canadian/*Justifiez si cette Opportunité ne peut être offert à un Canadien :*
This program will provide an opportunity to train a foreign student and enhance the scientific relationship between research institutes in both countries. This program will also improve communication and relationship between scientists or supervisors on mutually interesting research areas through co-supervision of the student. In addition, it is more economical to train a graduate student when the stipend to the graduate student is paid by the foreign country.

OPPORTUNITY TITLE/ TITRE DE L'OPPORTUNITÉ : **Studies on the genetic variations and virulence in Mycosphaerella blight of filed pea (*Pisum sativum* L.)**

Foreigner's length of stay at AAFC, specify number of months (minimum and/or maximum)/ *Durée du séjour à AAC, spécifier le nombre de mois (minimal et/ou maximal)* : 24

Preferred start date before March 31, 2011/ *Date de préférence pour le début du séjour avant le 31 mars 2011*, specify/*spécifier* : May 15, 2010 if possible, or March 15, 2011

Research location in Canada / *Lieu de la recherche au Canada :* City/*Ville*, Province :
Lacombe Research Centre Lacombe, Alberta
Website : http://www.agr.gc.ca/science

Contact:
Dr. Deng-Jin Bing
Email/*Courriel* : dengjin.bing@agr.gc.ca
Phone/*Téléphone* : 1-403-782-8875

B – The Research Team/ *L'équipe de recherché*

AAFC Supervisor/*Superviseur à AAC* : Dr. D.J. Bing
Other AAFC scientists/*Autres chercheurs d'AAC* :
University partners/*Partenaires universitaires* : Dr. Kan-Fa. Chang (Adjunct professor, Univ. of Alberta), Dr. Stephen Strelkov (Associate professor, Univ. of Alberta), Dr. Sheau-Fang Hwang (Adjunct professor, Univ. of Alberta)
Industry partners/*Partenaires industriels* :

C – Opportunity Description/ *Description de l'Opportunité*

Objective/*Objectif* :
To study genetic variation of mycosphaerella blight (*Mycosphaerella pinodes* and related species) of field pea.

Value of the Opportunity (issue, results, outcomes)/*Valeur de l'opportunité (problème, résultats, retombées*):

- Mycosphaerella blight is the most serious disease affecting field pea production in western Canada. Recent surveys have shown that the disease occurred in every pea field examined. Severe outbreaks can result in over 50% yield losses, especially under wet growing conditions. Infection of the pods causes the seed to shrivel and darken, which further reduces the economic return to growers.
- Currently, commercial field pea cultivars are considered at best moderately susceptible to mycospharella blight. Comprehensive information on the genetic structure and dynamics of the population and host-pathogen interaction mechanisms of the *Mycosphaerella* spp. complex responsible for blight in Alberta is necessary for breeders to develop cultivars with polygenic resistance to mycosphaerella blight.
- Genetic diversity of *M. pinodes* and related pathogens: Isolates obtained from diseased pea plants will be characterized using random amplified polymorphic DNA (RAPD) and PCR-RFLP analysis; the virulence of pathogen populations will also be assessed on differential pea cultivars. Isolates will be categorized and frequency of isolate types will be recorded for each site.
- The candidate student will get proper training under the supervision of Canadian scientists to complete his/her graduate study. In addition, the candidate will have opportunities to attend scientific conferences to practice presentation skills in poster and oral forms.

D – Describe the qualifications needed (academic, study, knowledge, skills, experiences, *etc.*), and the benefits to the candidate /*Décrire les qualifications requises (études, connaissances, compétences, expériences, etc) et les avantages pour les candidats*

The candidate should have general knowledge in plant pathology including mycological, microscopic and laboratory skills. The candidate should also have biotechnological skills. Experience in agronomy and plant breeding would be an asset in the study. Basic knowledge in experimental design and statistical analysis of data are also required. Ability to summarize results and write research reports.

OPPORTUNITY/*OPPORTUNITÉ* ID: 2010_Lennoxville_01a Return to the List

A – Identification

Type of Candidate (check one or more)/*Type de candidats recherchés (choisir un ou plus)* :

- Graduate students / étudiants des cycles supérieurs: - Ph.D.
- I accept a candidate who wants to register in a Canadian university: (name)/*J'accepte un candidat qui veut s'inscrire dans une université canadienne (nom)* : Université Laval

If necessary, specify country (or countries) of preference./*Si nécessaire, spécifier le ou les pays de préférence* :
China

Justify if this Opportunity cannot be offered to a Canadian/*Justifiez si cette Opportunité ne peut être offert à un Canadien :*
Too few Canadian students signed up at Meat Science doctorate program combine knowledge on animal welfare and meat science in their studies.

OPPORTUNITY TITLE/ TITRE DE L'OPPORTUNITÉ : **Animal welfare and pork quality** (for graduate students)

Foreigner's length of stay at AAFC, specify number of months (minimum and/or maximum)/ *Durée du séjour à AAC, spécifier le nombre de mois (minimal et/ou maximal)* : 12

Preferred start date before March 31, 2011/ *Date de préférence pour le début du séjour avant le 31 mars 2011*, specify/*spécifier* : April 2010

Research location in Canada / *Lieu de la recherche au Canada :* City/*Ville*, Province :
Dairy and Swine Research and Development Centre – Lennoxville Research Station Sherbrooke, Québec
Website : http://www.agr.gc.ca/science

Contact:
Dr. Luigi Faucitano
Email/*Courriel* : luigi.faucitano@agr.gc.ca
Phone/*Téléphone* : 1-819-565-9174 ext. 237

B – The Research Team/ *L'équipe de recherché*

AAFC Supervisor/*Superviseur à AAC* : Luigi Faucitano
Other AAFC scientists/*Autres chercheurs d'AAC* : Nicolas Devillers
University partners/*Partenaires universitaires* : Huazhong Agricultural University (Wuhan, China)
Industry partners/*Partenaires industriels* : Aliments du Breton and Pfizer Animal Health Canada

C – Opportunity Description/ *Description de l'Opportunité*

Objective/*Objectif* :
The student will work on a project aims at studying the effects of the interaction ractopamine x gender x genotype on growth performance, behavioural and physiological response to stress and carcass and meat quality.

In this study the student will have the opportunity to learn the techniques for the assessment of animal welfare, through behaviour observation and blood sampling, and carcass and meat quality. He/she will get experience in laboratory analysis of muscle and blood samples, data handling, statistical analysis and writing of scientific papers and reports.

Value of the Opportunity (issue, results, outcomes)/*Valeur de l'opportunité (problème, résultats, retombées*):
This study will provide the pork chain stakeholders with evidence on the advantages and disadvantages of each production system and transport procedure and with the information producers and processors will need to decide about the most profitable strategy to raise and handle pigs in the years to come. Furthermore, the application of more welfare-friendly production systems will benefit the image of Canadian pork within the world market and, based on the recent accreditation of pork processor in Eastern Canada for export to Europe, it may give new opportunities to other Canadian processors for exporting Canadian pork to sensitive markets, such as Europe.

D – Describe the qualifications needed (academic, study, knowledge, skills, experiences, *etc.*), and the benefits to the candidate /*Décrire les qualifications requises (études, connaissances, compétences, expériences, etc) et les avantages pour les candidats*

The candidate must hold a Bachelor degree in Animal Science. He/she must have a basic knowledge on livestock production, animal welfare and meat quality.

OPPORTUNITY/*OPPORTUNITÉ* ID: 2010_Lennoxville_01b	Return to the List
A – Identification	
Type of Candidate (check one or more)/*Type de candidats recherchés (choisir un ou plus)* : • Scientist from a university or a research organisation/*Chercheur d'une université ou d'un organisme de recherche*.	
If necessary, specify country (or countries) of preference./*Si nécessaire, spécifier le ou les pays de préférence* : Brazil Justify if this Opportunity cannot be offered to a Canadian/*Justifiez si cette Opportunité ne peut être offert à un Canadien :* This opportunity can be offered to Canadian scientists too.	
OPPORTUNITY TITLE/ TITRE DE L'OPPORTUNITÉ : **Animal welfare and pork quality** (for scientists)	
Foreigner's length of stay at AAFC, specify number of months (minimum and/or maximum)/ *Durée du séjour à AAC, spécifier le nombre de mois (minimal et/ou maximal)* :	12
Preferred start date before March 31, 2011/ *Date de préférence pour le début du séjour avant le 31 mars 2011*, specify/*spécifier* :	June 2010
Research location in Canada / *Lieu de la recherche au Canada :* Dairy and Swine Research and Development Centre – Lennoxville Research Station Website : http://www.agr.gc.ca/science	City/*Ville*, Province : Sherbrooke, Québec
Contact: **Dr. Luigi Faucitano**	Email/*Courriel* : luigi.faucitano@agr.gc.ca Phone/*Téléphone* : 1-819-565-9174 ext. 237
B – The Research Team/ *L'équipe de recherché*	
AAFC Supervisor/*Superviseur à AAC* : Luigi Faucitano Other AAFC scientists/*Autres chercheurs d'AAC* : Nicolas Devillers, Stephanie Torrey University partners/*Partenaires universitaires* : Université Laval Industry partners/*Partenaires industriels* : Sask. Pork	
C – Opportunity Description/ *Description de l'Opportunité*	
Objective/*Objectif* : The post-doc will work on a project that aims at evaluating the efficiency of water misting in a stationary swine transport vehicle and identifying the most appropriate average temperature (between 15 and 25°C) to obtain the maximum efficiency in terms of animal welfare and meat quality In this study the post-doc will help coordinate the assessment of animal welfare, through behaviour observation and blood sampling, and carcass and meat quality. He/she will help supervise the laboratory analysis of muscle and blood samples, data handling, statistical analysis and writing of scientific papers and reports. **Value of the Opportunity (issue, results, outcomes)/*Valeur de l'opportunité (problème, résultats, retombées*)**: This study will provide the pork chain stakeholders with evidence on the advantages and disadvantages of each production system and transport procedure and with the information producers and processors will need to decide about the most profitable strategy to raise and handle pigs in the years to come. Furthermore, the application of more welfare-friendly production systems will benefit the image of Canadian pork within the world market and, based on the recent accreditation of pork processor in Eastern Canada for export to Europe, it may give new opportunities to other Canadian processors for exporting Canadian pork to sensitive markets, such as Europe.	
D – Describe the qualifications needed (academic, study, knowledge, skills, experiences, *etc.*), and the benefits to the candidate /*Décrire les qualifications requises (études, connaissances, compétences, expériences, etc) et les avantages pour les candidats*	
The candidate must hold a PhD degree in Animal Science and own a specific knowledge on pig production and more specifically on the preslaughter handling of pigs. Thorough knowledge of animal welfare and capability to evaluate the behaviour, physiology and meat quality of pigs.	

OPPORTUNITY/*OPPORTUNITÉ* ID: 2010_Lennoxville_02 Return to the List

A – Identification

Type of Candidate (check one or more)/*Type de candidats recherchés (choisir un ou plus)* :

- Graduate students / étudiants des cycles supérieurs: - Master's or equivalent / *Maîtrise ou équivalent* - Ph.D.
- I accept a candidate who wants to register in a Canadian university: (name)/*J'accepte un candidat qui veut s'inscrire dans une université canadienne (nom)* : McGill University, Université de Montreal
- Scientist from a university or a research organisation/*Chercheur d'une université ou d'un organisme de recherche*.

If necessary, specify country (or countries) of preference./*Si nécessaire, spécifier le ou les pays de préférence* :
Brazil

Justify if this Opportunity cannot be offered to a Canadian/*Justifiez si cette Opportunité ne peut être offert à un Canadien :*

OPPORTUNITY TITLE/ TITRE DE L'OPPORTUNITÉ : **Enhanced cow productivity**

Foreigner's length of stay at AAFC, specify number of months (minimum and/or maximum)/ *Durée du séjour à AAC, spécifier le nombre de mois (minimal et/ou maximal)* : 6-12

Preferred start date before March 31, 2011/ *Date de préférence pour le début du séjour avant le 31 mars 2011*, specify/*spécifier* : September 2010

Research location in Canada / *Lieu de la recherche au Canada :* City/*Ville*, Province :
Centre de R & D sur le bovin laitier et le porc Sherbrooke, Québec
Website : http://www.agr.gc.ca/science

Contact:
Dr. Hélène Petit
Email/*Courriel* : helene.petit@agr.gc.ca
Phone/*Téléphone* : 1-819-564-9174 ext. 210

B – The Research Team/ *L'équipe de recherché*

AAFC Supervisor/*Superviseur à AAC* : Hélène Petit
Other AAFC scientists/*Autres chercheurs d'AAC* : Marie-France Palin et Chaouki Benchaar
University partners/*Partenaires universitaires* : Alan Goff (Université de Montréal) and Arif Mustafa (McGill University)
Industry partners/*Partenaires industriels* : Dairy Farmers of Canada

C – Opportunity Description/ *Description de l'Opportunité*

Objective/*Objectif* :
The objective is to improve efficacy of the dairy production through enhanced health of animals through better feeding strategy, which will also decrease the use of medicine (e.g. products used to treat the fatty liver syndrome) in dairy herds. Another objective is to enhance concentration of bioactive lipids and antioxidants in milk by incorporating specific feed ingredients in the diet of dairy cows.

Value of the Opportunity (issue, results, outcomes)/*Valeur de l'opportunité (problème, résultats, retombées*):
The transition period, from 3 wk before to wk 3 wk after parturition, is critically important for health, production, and profitability of dairy cows. During this period, intake of energy does not meet the requirements for milk production, which results in a negative energy balance. In early lactation, excessive lipid mobilization from adipose tissue, muscle, and other tissues occurs to support maintenance and milk production. As a consequence, the liver accumulates a great amount of triglycerides, resulting in aberrant hepatic function, lower productivity, reduced feed intake, and poor reproductive performance in dairy cows; this leads to a condition known as the fatty liver syndrome. Our research team observed that feeding whole flaxseed (high in omega 3 fatty acids) increased glycogen in the liver of dairy cows and modified the expression of different genes involved in the establishment of pregnancy. These observations lead us to hypothesize that better productivity of dairy herds may be achieved by feeding whole flaxseed due to regulation of gene expression in hepatic and reproductive tissues by dietary omega 3 fatty acids. If successful, these results would encourage dairy farmers to feed a better diet to improve overall health and productivity of dairy cattle, while maintaining milk production. Moreover, this will improve the knowledge on the effects of feeding fat sources with different fatty acid profiles (e.g. omega 6 and omega 3) on productivity of the transition dairy cow. In parallel, feed ingredients known to improve the immune status of cows will be added to the diet to increase their concentrations in milk (e.g. antioxidants and bioactive lipids) and their effect on immunity and milk quality (e.g. oxidation) will be determined.

D – Describe the qualifications needed (academic, study, knowledge, skills, experiences, *etc.*), and the benefits to the candidate /*Décrire les qualifications requises (études, connaissances, compétences, expériences, etc) et les avantages pour les candidats*

The candidate must undertake a MSc or PhD degree or have obtained a PhD degree within the last 3 years. The candidate will be responsible to carry out experiments with lactating dairy cows fed different antioxidants (e.g. flaxseed and flax hulls) and sources of oil (e.g. omega 6 and omega 3 fatty acids) in order to look at their transfer from the diet into milk. He (she) will collect different samples (e.g. milk and feces) on dairy cows and analyze them in the laboratory (e.g. fatty acids). The candidate will also measure the expression of genes involved in inflammation of the mammary gland and transfer of fatty acids in milk. The candidate will perform the statistical analysis of these data and write at least one scientific manuscript. The expected candidate's qualifications must include comprehension of English (French is ideal) to carry out the experiments and he (she) must have aptitudes to work with animals and in laboratory.

OPPORTUNITY/*OPPORTUNITÉ* ID: 2010_Lethbridge_04 Return to the List

A – Identification

Type of Candidate (check one or more)/*Type de candidats recherchés (choisir un ou plus)* :

- Graduate students / étudiants des cycles supérieurs: - Master's or equivalent / *Maîtrise ou équivalent* - Ph.D.
- I accept a candidate who wants to register in a Canadian university: (name)/*J'accepte un candidat qui veut s'inscrire dans une université canadienne (nom)* : University of Lethbridge
- Scientist from a university or a research organisation/*Chercheur d'une université ou d'un organisme de recherche*.

If necessary, specify country (or countries) of preference./*Si nécessaire, spécifier le ou les pays de préférence* :

Justify if this Opportunity cannot be offered to a Canadian/*Justifiez si cette Opportunité ne peut être offert à un Canadien :*
Can be offered to a Canadian

OPPORTUNITY TITLE/ TITRE DE L'OPPORTUNITÉ : **Genetic modifications of cereal genotypes to product value-added starches**

Foreigner's length of stay at AAFC, specify number of months (minimum and/or maximum)/ *Durée du séjour à AAC, spécifier le nombre de mois (minimal et/ou maximal)* : 12-36

Preferred start date before March 31, 2011/ *Date de préférence pour le début du séjour avant le 31 mars 2011*, specify/*spécifier* : September 2010

Research location in Canada / *Lieu de la recherche au Canada :* City/*Ville*, Province :
Lethbridge Research Centre Lethbridge, AB
Website : http://www.agr.gc.ca/science

Contact: Email/*Courriel* : zhen-xiang.lu@agr.gc.ca
Dr. John Lu Phone/*Téléphone* : 1-403-317-3302

B – The Research Team/ *L'équipe de recherché*

AAFC Supervisor/*Superviseur à AAC* : Dr. John Lu
Other AAFC scientists/*Autres chercheurs d'AAC* : Dr. André Laroche; Dr. François Eudes
University partners/*Partenaires universitaires* : Dr. James Thomas Univ. of Lethbridge
Industry partners/*Partenaires industriels* : CTBI Inc.

C – Opportunity Description/ *Description de l'Opportunité*

Objective/*Objectif* :
Cereal represents one of the most important economic forces in Canada. Starch is the most abundant and renewable polysaccharide in cereal crops and can be produced cost-effectively in vast quantities by using modern agronomic systems. Our research objectives will be focused on genetic modifications of triticale genotypes to produce value-added starches, such as amylose-free starches (waxy starches) and high-amylose starches (resistant starches), for industrial applications. The experimental approaches will include the RNA interference (RNAi) to artificially manipulate or regulate the gene expression in triticale starch biosyntheses.

Value of the Opportunity (issue, results, outcomes)/*Valeur de l'opportunité (problème, résultats, retombées*):
This research project will turn out measurable and deliverable bioproducts (e.g. waxy and resistant starches) and biotechnology (e.g. the novel delivery system for gene transformation), which will benefit the economy in Canada and advance our knowledge in plant sciences.

D – Describe the qualifications needed (academic, study, knowledge, skills, experiences, *etc.*), and the benefits to the candidate /*Décrire les qualifications requises (études, connaissances, compétences, expériences, etc) et les avantages pour les candidats*

The PhD student under this internship project will have the opportunity to employ the latest techniques for studying gene isolation, expression, transient and whole plant transformation, quantitative real-time PCR, antisense or RNAi, and all other ancillary technologies. The student will employ these techniques to isolate and characterize the conserved domains of triticale starch syntheses genes; construct the expression vectors for RNAi function; conduct the target gene transformations; develop transgenic triticale genotypes; and evaluate the transformants for novel starch properties. He/She will be trained to conceive research objectives, design experimental approaches, conduct the independent researches, and analyze the experimental results. The student is required to have strong communication skills on speaking, reading, and writing in English, and he/she would be expected in preparation and presentation of experimental results at local or national conference and in preparation of a manuscript on the works carried out in our labs.

OPPORTUNITY/*OPPORTUNITÉ* ID:	2010_Lethbridge_05	Return to the List
A – Identification		
Type of Candidate (check one or more)/*Type de candidats recherchés (choisir un ou plus)* :		
• Graduate students / étudiants des cycles supérieurs:		- Ph.D.
If necessary, specify country (or countries) of preference./*Si nécessaire, spécifier le ou les pays de préférence* :		
Justify if this Opportunity cannot be offered to a Canadian/*Justifiez si cette Opportunité ne peut être offert à un Canadien :* Can be offered to a Canadian		
OPPORTUNITY TITLE/ TITRE DE L'OPPORTUNITÉ : **Studies on endosymbiotic bacteria for the control of stored product insect pests**		
Foreigner's length of stay at AAFC, specify number of months (minimum and/or maximum)/ *Durée du séjour à AAC, spécifier le nombre de mois (minimal et/ou maximal)* :		12-24
Preferred start date before March 31, 2011/ *Date de préférence pour le début du séjour avant le 31 mars 2011*, specify/*spécifier* :		September 2010
Research location in Canada / *Lieu de la recherche au Canada :* Lethbridge Research Centre Website : http://www.agr.gc.ca/science		City/*Ville*, Province : Lethbridge, AB
Contact: **Dr. Kevin Floate**	Email/*Courriel* : Kevin.Floate@agr.gc.ca Phone/*Téléphone* : 1-403-317-2242	
B – The Research Team/ *L'équipe de recherché*		
AAFC Supervisor/*Superviseur à AAC* : Dr. Kevin Floate Other AAFC scientists/*Autres chercheurs d'AAC* : Dr. Paul Fields (Winnipeg, MB) University partners/*Partenaires universitaires* : Dr. Steve Perlman (University of Victoria, BC) Industry partners/*Partenaires industriels* : CTBI Inc.		
C – Opportunity Description/ *Description de l'Opportunité*		
Objective/*Objectif* : To develop knowledge, methods and tools to use endosymbiotic bacteria (i.e., *Wolbachia, Arsenophonus, Cardinium*) for the control of stored product insect pests. **Value of the Opportunity (issue, results, outcomes)/*Valeur de l'opportunité (problème, résultats, retombées*)**: Issue: Alternatives are needed for chemical insecticides. Insect pest species routinely develop insecticide resistance, fewer replacement products are being developed, and chemical residues have potential adverse effects on consumers and on the environment. Symbiotic bacteria are common in insects and can have profound effects on their host's reproduction. Research on these bacteria provides exciting and novel new opportunities for insect pest control and addresses the need for alternatives to chemical insecticides. Results/Outcomes: scientific training for a PhD student to pursue studies on symbiotic bacteria to control insect pests; development of future collaborations on symbiotic bacteria among researchers at AAFC, Canadian universities, and foreign institutions; publication of a scientific paper to identify the prevalence and type of symbiotic bacteria in stored product insect pests; publication of a scientific paper to document the effect of symbiotic bacteria in one or more pest species.		
D – Describe the qualifications needed (academic, study, knowledge, skills, experiences, *etc.*), and the benefits to the candidate /*Décrire les qualifications requises (études, connaissances, compétences, expériences, etc) et les avantages pour les candidats*		
The ideal candidate will be a PhD student with a research interest studying insects, and some skill in the use of basic molecular techniques (e.g., DNA extraction, PCR, gel electrophoresis). They will have good written and oral communication skills in English. The student participating in this project will: develop molecular expertise in the characterization of symbiotic bacteria; develop skills in the collection and identification of stored pest insects; learn techniques to maintain laboratory cultures of different insect species; learn methods of experimental design and statistical analyses; further develop their written and oral communication skills in the English language; develop skills in the preparation of scientific peer-reviewed manuscripts for submission to English language journals; develop a network of contacts in Canada to further their research career.		

OPPORTUNITY/*OPPORTUNITÉ* ID: 2010_Lethbridge_09a Return to the List

A – Identification

Type of Candidate (check one or more)/*Type de candidats recherchés (choisir un ou plus)* :

- Graduate students / étudiants des cycles supérieurs: - Master's or equivalent / *Maîtrise ou équivalent* - Ph.D.
- I accept a candidate who wants to register in a Canadian university: (name)/*J'accepte un candidat qui veut s'inscrire dans une université canadienne (nom)* : University of Alberta
- Scientist from a university or a research organisation/*Chercheur d'une université ou d'un organisme de recherche*.

If necessary, specify country (or countries) of preference./*Si nécessaire, spécifier le ou les pays de préférence* :

Justify if this Opportunity cannot be offered to a Canadian/*Justifiez si cette Opportunité ne peut être offert à un Canadien :*

OPPORTUNITY TITLE/ TITRE DE L'OPPORTUNITÉ : **Development of novel nutraceuticals for feedlot cattle systems**

Foreigner's length of stay at AAFC, specify number of months (minimum and/or maximum)/ *Durée du séjour à AAC, spécifier le nombre de mois (minimal et/ou maximal)* : 18

Preferred start date before March 31, 2011/ *Date de préférence pour le début du séjour avant le 31 mars 2011*, specify/*spécifier* : January 2011

Research location in Canada / *Lieu de la recherche au Canada :* City/*Ville*, Province :
Lethbridge Research Cnetre Lethbridge, AB
Website : http://www.agr.gc.ca/science

Contact:
Dr. Wenzhu Yang
Email/*Courriel* : wenzhu.yang@agr.gc.ca
Phone/*Téléphone* : 1-403-317-3427

B – The Research Team/ *L'équipe de recherché*

AAFC Supervisor/*Superviseur à AAC* : Dr. Wenzhu Yang
Other AAFC scientists/*Autres chercheurs d'AAC* :
University partners/*Partenaires universitaires* : Dr. Burim Ametaj
Industry partners/*Partenaires industriels* : Phodé S.A., France; Canadian Cattleman Association

C – Opportunity Description/ *Description de l'Opportunité*

Objective/*Objectif* :
The overall objective of the project is to elucidate the mode of action of EOs under continuous flow rumen environment and to define the optimum dosage of EO that could be safely used under feedlot cattle management system. Specifically, A series of in vitro batch culture studies will be conducted to screen EO or the components based on in vitro fermentation characteristics and dose response. The selected EO product will be tested in vivo study using ruminally fistulated beef cattle to evaluate the effects of EO on ruminal pH and rumen fermentation characteristics, ruminal microbial populations, blood metabolites and immune responses (neutrophils, eosinophils, monocytes and lymphocytes; acute phase blood proteins).

Value of the Opportunity (issue, results, outcomes)/*Valeur de l'opportunité (problème, résultats, retombées*):
The expected results of this project are to enhance the efficiency of feed utilization, lower the cost of production, ameliorate immune status and animal health, as well as improve animal welfare. Another important outcome of the proposed research is to decrease feedlot industry reliance on in-feed antimicrobials, lower the risk of antibiotic resistance and its consequences to human health. The outcomes of the proposed work will have significant implications on the sustainability of dairy and beef cattle production systems in both Canada and China. The proposed research project is part of a large and long research program aiming at developing nutraceuticals as new alternatives to in-feed antibiotics for use in livestock production systems.

D – Describe the qualifications needed (academic, study, knowledge, skills, experiences, *etc.*), and the benefits to the candidate /*Décrire les qualifications requises (études, connaissances, compétences, expériences, etc) et les avantages pour les candidats*

The potential graduate student will become a member of our integrated research team and is expected to have an in-depth knowledge of biochemistry, ruminant nutrition, and immunology. More specifically, the student will be expected to: 1) use in vitro, in vivo and molecular (Real-time PCR) techniques as research tools to assess the effects of EOs on rumen bacterial composition and to define the optimum conditions for application of these novel additives; 2) participate and learn diverse methods of data entry and statistical analysis and report results in both scientific conferences and peer-reviewed journals; and 3) work effectively under minimum supervision. The proposed work would allow the student to get acquainted with research activities at a Canadian

University and at a Canadian National Research Laboratory. The student will be trained to establish a database and to write scientific papers in peer-reviewed journals and present the data at national or international scientific conferences.

OPPORTUNITY/*OPPORTUNITÉ* ID: 2010_Lethbridge_09b Return to the List

A – Identification

Type of Candidate (check one or more)/*Type de candidats recherchés (choisir un ou plus)* :

- Graduate students / étudiants des cycles supérieurs: - Master's or equivalent / *Maîtrise ou équivalent* - Ph.D.
- I accept a candidate who wants to register in a Canadian university: (name)/*J'accepte un candidat qui veut s'inscrire dans une université canadienne (nom)* : University of Alberta
- Scientist from a university or a research organisation/*Chercheur d'une université ou d'un organisme de recherche*.

If necessary, specify country (or countries) of preference./*Si nécessaire, spécifier le ou les pays de préférence* :

Justify if this Opportunity cannot be offered to a Canadian/*Justifiez si cette Opportunité ne peut être offert à un Canadien :*

OPPORTUNITY TITLE/ TITRE DE L'OPPORTUNITÉ : **Develop nutritional strategies to optimize protein value of feeding ethanol by-products to beef cattle**

Foreigner's length of stay at AAFC, specify number of months (minimum and/or maximum)/ *Durée du séjour à AAC, spécifier le nombre de mois (minimal et/ou maximal)* : 18

Preferred start date before March 31, 2011/ *Date de préférence pour le début du séjour avant le 31 mars 2011*, specify/*spécifier* : January 2011

Research location in Canada / *Lieu de la recherche au Canada :* Lethbridge Research Cnetre
Website : http://www.agr.gc.ca/science
City/*Ville*, Province : Lethbridge, AB

Contact:
Dr. Wenzhu Yang
Email/*Courriel* : wenzhu.yang@agr.gc.ca
Phone/*Téléphone* : 1-403-317-3427

B – The Research Team/ *L'équipe de recherché*

AAFC Supervisor/*Superviseur à AAC* : Dr. Wenzhu Yang
Other AAFC scientists/*Autres chercheurs d'AAC* : Dr. Karen Beauchemin
University partners/*Partenaires universitaires* : Dr. Masahito Oba
Industry partners/*Partenaires industriels* : Canadian Cattleman Association

C – Opportunity Description/ *Description de l'Opportunité*

Objective/*Objectif* :
The purpose of the project is to develop a nutritional strategy to optimize protein utilization of feeding DDGS to beef cattle. The specific objectives are to determine: 1) rumen protein degradability of DG from varying grain sources (corn and wheat) and milling processes (traditional vs. fractionation); 2) flows of microbial protein, RUP and amino acid (AA) supply to the duodenum, and digestibility of RUP and AA in the intestine; 3) growth performance and feed efficiency of beef cattle; and 4) the amount of nitrogen and phosphorous excreted and route of excretion from cattle fed DG.

Value of the Opportunity (issue, results, outcomes)/*Valeur de l'opportunité (problème, résultats, retombées*):
Protein supplement is the most expensive major feed ingredients in cattle ration. Increased DG supply due to expansion of ethanol plants and consequently reduced DG price make it a viable source of protein or energy. The proposed project will lead to the development of a nutrient database for DG with information on protein content and AA profiles, as well as estimates of RUP, and intestinal digestibility of protein and AA. This information will enable Canadian and Chinese cattle producers to feed cattle in a manner that maximizes utilization of DG as protein sources without reducing cattle performance, while minimizing feed costs and maximizing the profits. The information from this project will also permit beef producers to have more flexibility in terms of using DG in cattle rations depending upon availability and cost of feed ingredients.

D – Describe the qualifications needed (academic, study, knowledge, skills, experiences, *etc.*), and the benefits to the candidate /*Décrire les qualifications requises (études, connaissances, compétences, expériences, etc) et les avantages pour les candidats*

The potential graduate student will become a member of our integrated research team and is expected to have an in-depth knowledge of biochemistry, ruminant nutrition, and biotechnology. The student will be expected to: 1) use in vitro, in vivo and

molecular techniques as research tools to assess the effects of DG on feed intake, rumen fermentation, rumen microbial population, feed digestion and animal performance; 2) participate and learn diverse methods of data entry and statistical analysis and report results in both scientific conferences and peer-reviewed journals; and 3) work effectively under minimum supervision. The proposed work would allow the student to get acquainted with research activities at a Canadian University and at a Canadian National Research Laboratory. The student will be trained to establish a database and to write scientific papers in peer-reviewed journals and present the data at national or international scientific conferences.

OPPORTUNITY/*OPPORTUNITÉ* ID:	2010_Lethbridge_10	Return to the List

A – Identification

Type of Candidate (check one or more)/*Type de candidats recherchés (choisir un ou plus)* :

- Graduate students / étudiants des cycles supérieurs: - Ph.D.

If necessary, specify country (or countries) of preference./*Si nécessaire, spécifier le ou les pays de préférence* :

Justify if this Opportunity cannot be offered to a Canadian/*Justifiez si cette Opportunité ne peut être offert à un Canadien :*
No Canadian Ph.D. student is available

OPPORTUNITY TITLE/ TITRE DE L'OPPORTUNITÉ : **Feasibility, greenhouse gas and odor emission from multiple waste streams**

Foreigner's length of stay at AAFC, specify number of months (minimum and/or maximum)/ *Durée du séjour à AAC, spécifier le nombre de mois (minimal et/ou maximal)* :	24
Preferred start date before March 31, 2011/ *Date de préférence pour le début du séjour avant le 31 mars 2011*, specify/*spécifier* :	November 2010
Research location in Canada / *Lieu de la recherche au Canada :* Lethbridge Research Cnetre Website : http://www.agr.gc.ca/science	City/*Ville*, Province : Lethbridge, AB

Contact:
Dr. Xiying Hao
Email/*Courriel* : xiying.hao@agr.gc.ca
Phone/*Téléphone* : 1-403-317-2279

B – The Research Team/ *L'équipe de recherché*

AAFC Supervisor/*Superviseur à AAC* : Dr. Xiying Hao
Other AAFC scientists/*Autres chercheurs d'AAC* : Dr. Tim McAllister
University partners/*Partenaires universitaires* : Angus Chu (U of Calgary) and Kim Stanford (Alberta Agriculture and Food)
Industry partners/*Partenaires industriels* : Peter Morrison (Eco-Ag Initiatives)

C – Opportunity Description/ *Description de l'Opportunité*

Objective/*Objectif* :
1) Quantify emissions of GHG through biodigestion and alkaline hydrolysis of specified risk materials (SRM).
2) Evaluate soil nutrients, heavy metals and crop productivity from using resulting compost as a soil amendment.

Value of the Opportunity (issue, results, outcomes)/*Valeur de l'opportunité (problème, résultats, retombées)*:
The proposed project will develop a multi-stage system to combine multiple waste streams (specified risk material from slaughter of cattle, high pH fly ash waste from forestry, low pH phospho-gypsum waste from the fertilizer industry, beeffeedlot manure, sawdust/woodchips, with the end-product being compost which is suitable for use as a soil ammendment in oil field land reclamation. The system will initially use bio-digestion of SRM to capture energy from methane production. Residual solids from bio-digestion will then be combined with high pH fly ash in an alkaline hydrolysis unit to eliminate prion infectivity. Output from the alkaline hydrolysis unit will then be blended with phospho-gypsum, beef manure and/or sawdust to achieve a 25:1 carbon:nitrogen ratio suitable for composting. Content of nutrients, heavy metals and uptake of compost nutrients by plants will be monitored to develop guidelines for safe use of organics to support the oil and gas industry.

The technology we are investigating will add value to a number of waste streams which are presently being disposed of by landfill, resulting in a safe, environmentally sustainable product which will be valuable in land reclammation. The technology combines bio-digestion, alkaline hydrolysis and composting. Waste streams come from agriculture (specified risk material from slaughter of beef cattle, beef feedlot manure, phospho-gypsum from fertilizer manufacture), forestry (fly ash, wood chips, sawdust) and the construction industry (drywall waste). The technology we are investigating will reduce waste entering landfills, reduce greenhouse gas emissions by capturing methane during biodigestion, improving air quality by reducing greenhouse gas emissions compared to present rendering and landfill disposal practices and also by controlling odor with the addition of drywall waste to the composted effluent from alkaline hydrolysis. Impacts on clean soil will be made by eliminating prion infectivity in the specified risk material

through alkaline hydrolysis and by generating compost with appropriate nutrient balance to be of value to reclamation of contaiminated sites of oil and gas exploration. Impacts on clean water will be made through monitoring waste water from the biodigestion process and elimination of possible leaching of infective prions into ground water.

Expected outcomes of the project will be analyses of environmental impacts (air, soil, water) from converting a number of environmentally challenging waste streams into compost. Using these data guidelines will be developed for the safe application of compost.

D – Describe the qualifications needed (academic, study, knowledge, skills, experiences, *etc.*), and the benefits to the candidate /*Décrire les qualifications requises (études, connaissances, compétences, expériences, etc) et les avantages pour les candidats*

Qualification: The student must be enrolled in a Ph.D. program in China and have training in one of following field : soil science, chemistry, animal science, agronomy or environmental science.

Benefit: The student will learn how take and analyze gas samples, and prepare, extract and digest soil, compost and vegetation samples and techniques to analyze these samples using gas chromatograph, an auto-analyzer, atomic absorption machine, and ion chromatograph. The student will learn proper data management and record keeping and how to conduct statistical analysis. Finally, the student will learn how to write scientific papers for publication.

OPPORTUNITY/*OPPORTUNITÉ* ID: 2010_Lethbridge_11 Return to the List

A – Identification

Type of Candidate (check one or more)/*Type de candidats recherchés (choisir un ou plus)* :

- Graduate students / étudiants des cycles supérieurs: - Master's or equivalent / *Maîtrise ou équivalent* - Ph.D.
- I accept a candidate who wants to register in a Canadian university: (name)/*J'accepte un candidat qui veut s'inscrire dans une université canadienne (nom)* : University of Alberta
- Scientist from a university or a research organisation/*Chercheur d'une université ou d'un organisme de recherche*.

If necessary, specify country (or countries) of preference./*Si nécessaire, spécifier le ou les pays de préférence* :

Justify if this Opportunity cannot be offered to a Canadian/*Justifiez si cette Opportunité ne peut être offert à un Canadien :*
There is a shortage of Canadian students in the field of cereal biotechnology, and few Canadian scientists would find the time of support to relocate for a few months in AAFC Lethbridge.

OPPORTUNITY TITLE/ TITRE DE L'OPPORTUNITÉ : **Genetic engineering using Cell Penetrating Peptide technology**

Foreigner's length of stay at AAFC, specify number of months (minimum and/or maximum)/ *Durée du séjour à AAC, spécifier le nombre de mois (minimal et/ou maximal)* : 6-24

Preferred start date before March 31, 2011/
Date de préférence pour le début du séjour avant le 31 mars 2011, specify/*spécifier* :

Research location in Canada / *Lieu de la recherche au Canada :* City/*Ville*, Province :
Lethbridge Research Cnetre Lethbridge, AB
Website : http://www.agr.gc.ca/science

Contact: Email/*Courriel* : francois.eudes@agr.gc.ca
Dr. François Eudes Phone/*Téléphone* : 1-403-317-3338

B – The Research Team/ *L'équipe de recherché*

AAFC Supervisor/*Superviseur à AAC* : Dr. François Eudes
Other AAFC scientists/*Autres chercheurs d'AAC* : Drs. André Laroche, John Lu, Denis Gaudet, Harpinder Randhawa
University partners/*Partenaires universitaires* : Dr. Igor Kowalchuk
Industry partners/*Partenaires industriels* :

C – Opportunity Description/ *Description de l'Opportunité*

Objective/*Objectif* :
- Describe transgene inheritance and stability of expression following delivery using Cell Penetrating Peptide mediated transfection.
- Develop site targeted insertion technology for small grain cereal (or Gene targeting)

Value of the Opportunity (issue, results, outcomes)/*Valeur de l'opportunité (problème, résultats, retombées)*:
The tissue culture and DNA delivery in cereal represent the bottle neck of the process to produce the large number of genetically engineered crop. The opportunity is to perform tissue culture and genetic engineering in cereal, e.g. triticale, using isolated microspore culture and CPP mediated delivery of DNA and proteins needed for the incremental production of plants. The proposed process applied to isolated microspore open the possibility to DNA integration in haploid uninucleated cell. The value will also arise from the control of DNA site targeted integration.

D – Describe the qualifications needed (academic, study, knowledge, skills, experiences, *etc.*), and the benefits to the candidate /*Décrire les qualifications requises (études, connaissances, compétences, expériences, etc) et les avantages pour les candidats*

Successful completion of a Master degree in plant science, molecular biology or an acceptable combination of education, training and experience; Recent experience conducting laboratory research in cereal tissue culture; Recent experience in conducting laboratory research in genetic engineering; Recent experience in conducting research in molecular microbiology.

Knowledge of plant, cell and tissue culture and maintenance; Knowledge of cereal tissue culture and transformation techniques, microspore culture, biolistics and Cell Penetrating Peptide mediated transfection; Knowledge of handling transgenic plant and seed materials.

Ability to perform standard laboratory, growth chamber/greenhouse and field protocols with accuracy and precision.

Interactive communication; Teamwork; Analytical Thinking; Problem solving; Creativity and innovation.

OPPORTUNITY/*OPPORTUNITÉ* ID: 2010_Lethbridge_12 Return to the List

A – Identification

Type of Candidate (check one or more)/*Type de candidats recherchés (choisir un ou plus)* :

- Graduate students / étudiants des cycles supérieurs: - Ph.D.
- Scientist from a university or a research organisation/*Chercheur d'une université ou d'un organisme de recherche*.

If necessary, specify country (or countries) of preference./*Si nécessaire, spécifier le ou les pays de préférence* :

Justify if this Opportunity cannot be offered to a Canadian/*Justifiez si cette Opportunité ne peut être offert à un Canadien :*

OPPORTUNITY TITLE/ TITRE DE L'OPPORTUNITÉ : **Irrigated cropping systems for sustainable soil management**

Foreigner's length of stay at AAFC, specify number of months (minimum and/or maximum)/ *Durée du séjour à AAC, spécifier le nombre de mois (minimal et/ou maximal)* : 12-24

Preferred start date before March 31, 2011/ *Date de préférence pour le début du séjour avant le 31 mars 2011*, specify/*spécifier* : November 2010

Research location in Canada / *Lieu de la recherche au Canada :* City/*Ville*, Province :
Lethbridge Research Cnetre Lethbridge, AB
Website : http://www.agr.gc.ca/science

Contact:
Dr. Francis J. Larney
Email/*Courriel* : francis.larney@agr.gc.ca
Phone/*Téléphone* : 1-403-317-2216

B – The Research Team/ *L'équipe de recherché*

AAFC Supervisor/*Superviseur à AAC* : Dr. Francis J. Larney
Other AAFC scientists/*Autres chercheurs d'AAC* : Drs. Robert E. Blackshaw, Newton Z. Lupwayi
University partners/*Partenaires universitaires* :
Industry partners/*Partenaires industriels* : Potato Growers of Alberta, Alberta Pulse Growers

C – Opportunity Description/ *Description de l'Opportunité*

Objective/*Objectif* :
This project looks at further completing the 12th year of an irrigated rotation study at Vauxhall, AB followed by a wrap-up year to measure effects on soil properties over a 12 year management period. The objectives of this study were to devise crop sequences and tillage management systems for irrigated land that: (1) optimized crop response; (2) reduced soil erosion, enhanced soil quality and promoted long-term sustainability; and (3) minimized weed, insect and disease pressures.

Value of the Opportunity (issue, results, outcomes)/*Valeur de l'opportunité (problème, résultats, retombées)*:
This research proposal builds on an irrigated rotation study initiated in 2000. In spring 2011, plots will be seeded to beans, potatoes, sugar beets, soft wheat and oats/timothy, as dictated by the rotation sequence. The plot measurements carried out from 2000-2010 will be repeated in 2011. This will represent the 12th growing season and as such the following numbers of cycles will be completed: 3-yr rotations, 4 cycles; 4-yr rotations, 3 cycles; 5-yr rotation, 2.4 cycles; 6-yr rotation, 2 cycles. A further set of soil samples will be taken in fall 2011 for comparison with samples taken in 1999, 2003, 2005 and 2008 for soil organic carbon, total nitrogen, nitrate-nitrogen, available phosphorus, soil pH and electrical conductivity. The phospholipids fatty acid (PLFA) procedure will be used to measure the biomass and diversity of bacteria, fungi, bacteria/fungi ratio, Gram-positive bacteria, Gram-negative bacteria, Actinomycetes and arbuscular mycorrhizal (AM) fungi.

D – Describe the qualifications needed (academic, study, knowledge, skills, experiences, *etc.*), and the benefits to the candidate /*Décrire les qualifications requises (études, connaissances, compétences, expériences, etc) et les avantages pour les candidats*

The student must be enrolled in a Ph.D. program in China and have training in one of the following areas: soil science, agronomy, or environmental science.

The student will learn about agronomy of irrigated field crops (potatoes, sugar beet, dry beans, wheat), soil sampling and analysis for soil fertility and microbiology. He/she will also learn data management and statistical analysis as well as scientific writing for publication in peer-reviewed journals.

OPPORTUNITY/*OPPORTUNITÉ* ID: 2010_Lethbridge_13 Return to the List

A – Identification

Type of Candidate (check one or more)/*Type de candidats recherchés (choisir un ou plus)* :

- Graduate students / étudiants des cycles supérieurs: - Ph.D.
- Scientist from a university or a research organisation/*Chercheur d'une université ou d'un organisme de recherche*.

If necessary, specify country (or countries) of preference./*Si nécessaire, spécifier le ou les pays de préférence* :

Justify if this Opportunity cannot be offered to a Canadian/*Justifiez si cette Opportunité ne peut être offert à un Canadien :*

OPPORTUNITY TITLE/ TITRE DE L'OPPORTUNITÉ : **Nitrogen fixation and N release from grain legume crop residues**

Foreigner's length of stay at AAFC, specify number of months (minimum and/or maximum)/ *Durée du séjour à AAC, spécifier le nombre de mois (minimal et/ou maximal)* : 12

Preferred start date before March 31, 2011/ *Date de préférence pour le début du séjour avant le 31 mars 2011*, specify/*spécifier* : August 2010

Research location in Canada / *Lieu de la recherche au Canada :* City/*Ville*, Province :
Lethbridge Research Cnetre Lethbridge, AB
Website : http://www.agr.gc.ca/science

Contact:
Dr. Newton Lupwayi
Email/*Courriel* : newton.lupwayi@agr.gc.ca
Phone/*Téléphone* : 1-403-317-3315

B – The Research Team/ *L'équipe de recherché*

AAFC Supervisor/*Superviseur à AAC* : Dr. Newton Lupwayi
Other AAFC scientists/*Autres chercheurs d'AAC* : Dr. Yoong Soon
University partners/*Partenaires universitaires* :
Industry partners/*Partenaires industriels* :

C – Opportunity Description/ *Description de l'Opportunité*

Objective/*Objectif* :
1. Quantify N fixed by pea and faba bean.
2. Quantify N released from crop residues of pea and faba bean to two consecutive subsequent crops in rotation.
3. Determine the effects of N released from crop residues of pea and faba bean on N uptake and crop yields of two consecutive subsequent crops.

Value of the Opportunity (issue, results, outcomes)/*Valeur de l'opportunité (problème, résultats, retombées*):
The rotational benefits of field peas include N contribution to the following crops. However, in most studies N release is determined in one season only, and results usually show that little (< 12 kg ha^{-1}) of the N in pea residue is released to the first subsequent crop. This study will determine N released from pea residues to two subsequent crops. It is hypothesized that the N immobilized (tied-up) in the early stages of pea residue decomposition improves soil biological quality (soil organic matter) and that net mineralization (release) eventually occurs in subsequent years.

N release depends on N fixed and how much of the fixed N is returned to the soil. A long-vine forage pea variety (4010), a short-vine yellow pea variety (Camry) and faba bean will be compared in amounts of N fixed and N released from crop residues. A long-vine pea variety is expected to add more biomass (and possibly N) to the soil than a short-vine variety. To estimate the contribution of roots to the N economy of subsequent crops, treatments will be added in which above-ground residues will be removed.

D – Describe the qualifications needed (academic, study, knowledge, skills, experiences, *etc.*), and the benefits to the candidate /*Décrire les qualifications requises (études, connaissances, compétences, expériences, etc) et les avantages pour les candidats*

The student must be enrolled in a Ph.D. program and have training in one of the following areas: soil science (especially soil microbiology), agronomy, or environmental science.

The student will gain knowledge on soil sampling and analysis for soil microbiology and fertility, data management, statistical analysis and scientific writing for publication in peer-reviewed journals.

OPPORTUNITY/*OPPORTUNITÉ* ID: 2010_London_01 Return to the List

A – Identification

Type of Candidate (check one or more)/*Type de candidats recherchés (choisir un ou plus)* :

- Graduate students / étudiants des cycles supérieurs: - Ph.D.
- I accept a candidate who wants to register in a Canadian university: (name)/*J'accepte un candidat qui veut s'inscrire dans une université canadienne (nom)* : University of Western Ontario
- Scientist from a university or a research organisation/*Chercheur d'une université ou d'un organisme de recherche*.

If necessary, specify country (or countries) of preference./*Si nécessaire, spécifier le ou les pays de préférence* :
No preference.

Justify if this Opportunity cannot be offered to a Canadian/*Justifiez si cette Opportunité ne peut être offert à un Canadien :*

OPPORTUNITY TITLE/ TITRE DE L'OPPORTUNITÉ : **Plant Disease Caused by *Phytophthora*: Molecular Determinants of Virulence**

Foreigner's length of stay at AAFC, specify number of months (minimum and/or maximum)/ *Durée du séjour à AAC, spécifier le nombre de mois (minimal et/ou maximal)* : 24

Preferred start date before March 31, 2011/
Date de préférence pour le début du séjour avant le 31 mars 2011, specify/*spécifier* :

Research location in Canada / *Lieu de la recherche au Canada :* City/*Ville*, Province :
Southern Crop Protection and Food Research Centre London, ON
Website : http://www.agr.gc.ca/science

Contact:
Dr. Mark Gijzen
Email/*Courriel* : mark.gijzen@agr.gc.ca
Phone/*Téléphone* : 1-519-457-1470 ext. 280

B – The Research Team/ *L'équipe de recherché*

AAFC Supervisor/*Superviseur à AAC* : Dr. Mark Gijzen
Other AAFC scientists/*Autres chercheurs d'AAC* :
University partners/*Partenaires universitaires* : University of Western Ontario
Industry partners/*Partenaires industriels* :

C – Opportunity Description/ *Description de l'Opportunité*

Objective/*Objectif* :
This research is on a disease problem that affects all soybean growing areas. The disease is caused by a soil borne pathogen *Phytophthora sojae*. It produces a root and stalk rot of soybean that reduces the yield and quality of the crop. The objective of the research is to discover the molecular and genetic factors that mediate this host-pathogen interaction, for the purpose of developing better diagnostic and control measures. The research is important to Canada because soybeans are a major crop in this country, and root rot caused by *P. sojae* is a serious disease problem that results in crop loss. Many other crops, ornamental plants, and even natural environments are damaged by *Phytophthora* species, since these organisms are all destructive and invasive plant pathogens. The study of the interaction between *P. sojae* and soybean provides a model for other *Phytophthora* diseases. The expected outcome for the student/scientist will be co-authorship on a publication derived from the research project.

Value of the Opportunity (issue, results, outcomes)/*Valeur de l'opportunité (problème, résultats, retombées*):
The student/scientist will be engaged in functional genomics work, using genome sequence information from the pathogen (*Phytophthora sojae*) and from the host (*Glycine max*) to find targets for functional characterization. The genome sequences of *P. sojae* and soybean (*G. max*) are now available and offer new opportunities for discovery. Genes that are crucial for pathogen growth in the host, and for soybean resistance to *P. sojae*, will be identified. Candidate genes will be systematically chosen form genome sequence data and compared among different strains of the pathogen or host cultivars. Bioassays will be preformed to measure the effect on the virulence and aggressiveness of the pathogen, or level of resistance of the host. The work may also involve genetic mapping using molecular markers, and expression of proteins in *E. coli* for purification and characterization. The student/scientist benefit from working in a modern biochemical laboratory engaged in molecular genetic and genomic research. The organisms under study are economically important. The research is practically driven. The student/scientist will conduct experiments, assembly the results, draft a manuscript, and carry this through to publication in a major international journal.

D – Describe the qualifications needed (academic, study, knowledge, skills, experiences, *etc.*), and the benefits to the candidate /*Décrire les qualifications requises (études, connaissances, compétences, expériences, etc) et les avantages pour les candidats*

The candidate needs to have an excellent knowledge of English, spoken and written, in order to function safely in the laboratory where English is the working language. The candidate should have extensive university-level training in Biochemistry, Microbiology, Bioinformatics, or related disciplines. The candidate should be familiar with a modern molecular biology laboratory and be capable of performing basic procedures such as: calculating concentrations and making solutions, using a mass balance and pH meter, using liquid handling devices including pipettes, and keeping a laboratory notebook. Familiarity with computers and software for word processing, spreadsheet, database storage, presentations, and graphics is required. For bioinformatics candidates, an in-depth knowledge DNA sequence based analysis programs is necessary.

OPPORTUNITY/*OPPORTUNITÉ* ID: 2010_London_02 Return to the List

A – Identification

Type of Candidate (check one or more)/*Type de candidats recherchés (choisir un ou plus)* :

- Graduate students / étudiants des cycles supérieurs: - Ph.D.
- I accept a candidate who wants to register in a Canadian university: (name)/*J'accepte un candidat qui veut s'inscrire dans une université canadienne (nom)* : University of Western Ontario
- Scientist from a university or a research organisation/*Chercheur d'une université ou d'un organisme de recherche*.

If necessary, specify country (or countries) of preference./*Si nécessaire, spécifier le ou les pays de préférence* :
Possibly from Chile, Taiwan, Korea, China or other countries and areas

Justify if this Opportunity cannot be offered to a Canadian/*Justifiez si cette Opportunité ne peut être offert à un Canadien :*
These are non-pay positions. The candidates to these positions are supported by their scholarships. Canadian students/scientists with scholarships will have priority to take these non-pay positions.

OPPORTUNITY TITLE/ TITRE DE L'OPPORTUNITÉ : **Development of Genetic Resistance against Plant Viral Disease through Target Gene Silencing Technology**

Foreigner's length of stay at AAFC, specify number of months (minimum and/or maximum)/ *Durée du séjour à AAC, spécifier le nombre de mois (minimal et/ou maximal)* : 12-48

Preferred start date before March 31, 2011/ *Date de préférence pour le début du séjour avant le 31 mars 2011*, specify/*spécifier* : September 2010

Research location in Canada / *Lieu de la recherche au Canada :*
Southern Crop Protection and Food Research Centre
Website : http://www.agr.gc.ca/science
City/*Ville*, Province :
London, ON

Contact:
Dr. Aiming Wang
Email/*Courriel* : Aiming.Wang@agr.gc.ca
Phone/*Téléphone* : 1-519-457-1470 ext. 313

B – The Research Team/ *L'équipe de recherché*

AAFC Supervisor/*Superviseur à AAC* : Dr. Aiming Wang
Other AAFC scientists/*Autres chercheurs d'AAC* :
University partners/*Partenaires universitaires* : University of Western Ontario
Industry partners/*Partenaires industriels* :

C – Opportunity Description/ *Description de l'Opportunité*

Objective/*Objectif* :
Plant viral diseases cause yearly losses over multibillion dollars worldwide. In many cases, several different viruses infect a crop. For instance, soybean is commonly infected by Soybean mosaic virus (SMV), Alfalfa mosaic virus (AMV), Bean pod mottle mosaic virus (BPMV), and Tobacco ringspot virus (TRSV). All plant viruses have a small genome. Their infection and replication must depend on host gene products (host factors). Please refer to our recent publications: Huang et al. 2010. Plant Physiology (in press) published online as doi:10.1104/pp.109.147983; Wei et al. 2010. Journal of Virology (in press) published online as doi:10.1128/JVI.01824.09; Cui et al. 2010. Virology (in press) published online as doi:10.1016/j.virol.2009.11.015; Wei et al. 2008. Journal of Virology 82: 12252-12264. Mutation or silencing of these host factors, yet dispensable for plant cell viability will generate novel recessive resistance. Alternatively, RNAi technology can be used for the development of pathogen-derived resistance to multi-viral diseases. The objective of this research is to understand replication mechanism of plant viruses, to isolate host genes required for virus replication and to develop genetic resistance against them.

Value of the Opportunity (issue, results, outcomes)/*Valeur de l'opportunité (problème, résultats, retombées*):
This proposed project will identify host genes that can be manipulated against plant viruses. Agricultural sectors from Canada and the other country involved will directly benefit from this project. The research achievements from this project will be presented in

academic conferences and submitted to peer-reviewed journals for publication.

D – Describe the qualifications needed (academic, study, knowledge, skills, experiences, *etc.*), and the benefits to the candidate /*Décrire les qualifications requises (études, connaissances, compétences, expériences, etc) et les avantages pour les candidats*

This project offers an opportunity to two visiting PhD students/scientists to join this molecular virology/biology laboratory. Aiming at academic excellence, our lab resides in a research centre equipped with state-of-the-art facility for research in the areas of plant molecular biology, genomics, biotechnology and biochemistry. Our lab has extensive experience in training technicians, postdoctoral scientists and graduate students with multicultural background. The visiting students/scientists are expected to have basic knowledge and lab experience in plant molecular biology (basic DNA, RNA and protein technologies). Under Dr. Wang's direct supervision, the visiting students/scientists will team up with his group consisting postdoctoral scientists, technicians and graduate students to conduct the project. Thus the visiting students/scientists will receive extensive training in the area of plant molecular biology/virology and biotechnology. The results from this project are expected to be published in high impact journals.

OPPORTUNITY/*OPPORTUNITÉ* ID: 2010_London_03 Return to the List

A – Identification

Type of Candidate (check one or more)/*Type de candidats recherchés (choisir un ou plus)* :

- Graduate students / étudiants des cycles supérieurs: - Master's or equivalent / *Maîtrise ou équivalent* - Ph.D.
- Scientist from a university or a research organisation/*Chercheur d'une université ou d'un organisme de recherche*.

If necessary, specify country (or countries) of preference./*Si nécessaire, spécifier le ou les pays de préférence* :

Justify if this Opportunity cannot be offered to a Canadian/*Justifiez si cette Opportunité ne peut être offert à un Canadien :*

OPPORTUNITY TITLE/ TITRE DE L'OPPORTUNITÉ : **Study of gene expression in plant seeds for production of high value products**

Foreigner's length of stay at AAFC, specify number of months (minimum and/or maximum)/ *Durée du séjour à AAC, spécifier le nombre de mois (minimal et/ou maximal)* :	18-24
Preferred start date before March 31, 2011/ *Date de préférence pour le début du séjour avant le 31 mars 2011*, specify/*spécifier* :	October 2010
Research location in Canada / *Lieu de la recherche au Canada :* Southern Crop Protection and Food Research Centre Website : http://www.agr.gc.ca/science	City/*Ville*, Province : London, ON
Contact: **Dr. Abdelali Hannoufa**	Email/*Courriel* : Abdelali.Hannoufa@agr.gc.ca Phone/*Téléphone* : 1-519-457-1470 ext. 638

B – The Research Team/ *L'équipe de recherché*

AAFC Supervisor/*Superviseur à AAC* : Dr. Abdelali Hannoufa
Other AAFC scientists/*Autres chercheurs d'AAC* :
University partners/*Partenaires universitaires* :
Industry partners/*Partenaires industriels* :

C – Opportunity Description/ *Description de l'Opportunité*

Plant seeds are important storage organs for the accumulation of various biomolecules, including proteins, lipids and small size secondary metabolites. However, many of the biological mechanisms controlling seed development and the accumulation of various seed storage components are still poorly understood. Therefore, the economic values derived from seeds of many plant species remain low relative to their potential impact if they are used for the production of high value products for the agricultural system.

This research will study gene expression networks and biological processes that control the biosynthesis and accumulation of high value bioproducts, including secondary metabolites and proteins. The project will use molecular, biochemical and genomics approaches to study the accumulations of seed storage compounds. This will include study of genes, gene expression, protein processes, protein accumulation, protein stability and functions in seeds. The aim is to develop technologies for the production of biomolecules/bioproducts in seeds of selected plant species, including soybean, flax (and other related crops).

D – Describe the qualifications needed (academic, study, knowledge, skills, experiences, *etc.*), and the benefits to the candidate /*Décrire les qualifications requises (études, connaissances, compétences, expériences, etc) et les avantages pour les candidats*
Candidates should have general knowledge and basic skills in plant molecular biology, biochemistry, and genetics. Under this program, the candidate will gain knowledge and technical skills in research on plant seed storage compounds. The candidate will be trained in plant molecular biology, biochemistry and biotechnology. The candidate is expected to use knowledge and skills obtained through this program to develop relevant research programs in the future.

OPPORTUNITY/*OPPORTUNITÉ* ID: 2010_London_04	Return to the List
A – Identification	
Type of Candidate (check one or more)/*Type de candidats recherchés (choisir un ou plus)* : • Graduate students / étudiants des cycles supérieurs: - Master's or equivalent / *Maîtrise ou équivalent* - Ph.D. • I accept a candidate who wants to register in a Canadian university: (name)/*J'accepte un candidat qui veut s'inscrire dans une université canadienne (nom)* : University of Western Ontario • Scientist from a university or a research organisation/*Chercheur d'une université ou d'un organisme de recherche*.	
If necessary, specify country (or countries) of preference./*Si nécessaire, spécifier le ou les pays de préférence* : Possibly from Chile, Taiwan, Korea, China or other countries and areas Justify if this Opportunity cannot be offered to a Canadian/*Justifiez si cette Opportunité ne peut être offert à un Canadien :* These are non-pay positions. The candidates to these positions are supported by their scholarships. Canadian students/scientists with scholarships will have priority to take these non-pay positions.	
OPPORTUNITY TITLE/ TITRE DE L'OPPORTUNITÉ : **Characterization of transcription factor complex that regulate isoflavonoid synthesis in soybean**	
Foreigner's length of stay at AAFC, specify number of months (minimum and/or maximum)/ *Durée du séjour à AAC, spécifier le nombre de mois (minimal et/ou maximal)* :	12-24
Preferred start date before March 31, 2011/ *Date de préférence pour le début du séjour avant le 31 mars 2011*, specify/*spécifier* :	September 2010
Research location in Canada / *Lieu de la recherche au Canada :* Southern Crop Protection and Food Research Centre Website : http://www.agr.gc.ca/science	City/*Ville*, Province : London, ON
Contact: **Dr. Sangeeta Dhaubhadel**	Email/*Courriel* : sangeeta.dhaubhadel@agr.gc.ca Phone/*Téléphone* : 1-519-457-1470 ext. 670
B – The Research Team/ *L'équipe de recherché*	
AAFC Supervisor/*Superviseur à AAC* : Dr. Sangeeta Dhaubhadel Other AAFC scientists/*Autres chercheurs d'AAC* : Dr. Frederic Marsolais University partners/*Partenaires universitaires* : Dr. Priti Krishna Industry partners/*Partenaires industriels* :	
C – Opportunity Description/ *Description de l'Opportunité*	
Objective/*Objectif* : Soybean seeds are a rich source of isoflavonoids, a group of plant natural compounds that are predominantly found in legumes. Several clinical studies have demonstrated the role of these compounds in human health and nutrition. We have shown that *CHS7* and *CHS8* genes play critical role in isoflavonoid synthesis. Recently, we have identified a transcription factor, TF989 that regulates *CHS8* gene expression and isoflavonoid biosynthesis. Our work suggests that there are other co-factors that may act together with TF989 to regulate isoflavonoid biosynthesis. We are interested in identifying the interacting proteins with TF989. The student is expected to join in this effort. Specifically, the student will use yeast two-hybrid approach to look for proteins that interact with TF989 and then characterize them. The duration of the project will be for 2 years. **Value of the Opportunity (issue, results, outcomes)/*Valeur de l'opportunité (problème, résultats, retombées*)**: The knowledge gained from this research may lead to new approaches to design/ select soybean cultivar with increased or decreased isoflavonoid levels, or to produce isoflavonoids in non-legume crops for human health and nutrition. Soybean is an important crop for both Canada and China, thus the outcome of the project will benefit both countries. The student is expected to author at least one publication.	

D – Describe the qualifications needed (academic, study, knowledge, skills, experiences, *etc.*), and the benefits to the candidate /*Décrire les qualifications requises (études, connaissances, compétences, expériences, etc) et les avantages pour les candidats*

The student is expected to join in our effort to look for the interacting partners for TF989 that is involved in the regulation of *CHS8* gene. Specifically, the student will use yeast two-hybrid approach to look for the interacting partners. Once candidate proteins are identified, their physical interactions with TF989 will be confirmed using biochemical and/or cell biology approaches. Subsequently, their functional relevance will be examined *in planta* using hairy root system in soybean.

Qualifications: Training and work experience with basic molecular biology, plant transformation and biochemical techniques are required. Experience in yeast two hybrid system is a plus but not required.

Benefits to Student: London Research centre is a state of art plant biotechnology/ genomics research facility. The student will have the opportunity to be trained broadly in molecular biology, protein biochemistry, and soybean genetics. The student will also have the opportunity to interact with other research groups within and outside the centre through joint lab meetings, collaborations, workshops and conferences.

OPPORTUNITY/*OPPORTUNITÉ* ID: 2010_London_06a Return to the List

A – Identification

Type of Candidate (check one or more)/*Type de candidats recherchés (choisir un ou plus)* :

- Graduate students / étudiants des cycles supérieurs: - Ph.D.
- I accept a candidate who wants to register in a Canadian university: (name)/*J'accepte un candidat qui veut s'inscrire dans une université canadienne (nom)* : University of Western Ontario
- Scientist from a university or a research organisation/*Chercheur d'une université ou d'un organisme de recherche*.

If necessary, specify country (or countries) of preference./*Si nécessaire, spécifier le ou les pays de préférence* :
Possibly from Chile, Taiwan, Korea, China or other countries and areas

Justify if this Opportunity cannot be offered to a Canadian/*Justifiez si cette Opportunité ne peut être offert à un Canadien :*
This position is intended for a candidate who holds a scholarship; no stipend is available.

OPPORTUNITY TITLE/ TITRE DE L'OPPORTUNITÉ : **Biological Activity and Chemical Identification of Agricultural Crop Residues Before and After Pyrolysis**

Foreigner's length of stay at AAFC, specify number of months (minimum and/or maximum)/ *Durée du séjour à AAC, spécifier le nombre de mois (minimal et/ou maximal)* : 24

Preferred start date before March 31, 2011/ *Date de préférence pour le début du séjour avant le 31 mars 2011*, specify/*spécifier* : September 2010

Research location in Canada / *Lieu de la recherche au Canada :* City/*Ville*, Province :
Southern Crop Protection and Food Research Centre London, ON
Website : http://www.agr.gc.ca/science

Contact:
Dr. Brian McGarvey
Email/*Courriel* : brian.mcgarvey@agr.gc.ca
Phone/*Téléphone* : 1-519-457-1470 ext. 233

B – The Research Team/ *L'équipe de recherché*

AAFC Supervisor/*Superviseur à AAC* : Dr. Brian McGarvey
Other AAFC scientists/*Autres chercheurs d'AAC* : Dr. Ian Scott
University partners/*Partenaires universitaires* : Dr. Cedric Briens, Dr. Franco Berruti, University of Western Ontario, London
Industry partners/*Partenaires industriels* :

C – Opportunity Description/ *Description de l'Opportunité*

Objective/*Objectif* :
The screening of plant biomass and bio-oils produced from the pyrolysis of biomass for pesticide activity and compound islation and identification.

Various plant extracts and bio-oils derived from the pyrolysis of crop residues, including canola, mustard and other crops, will be tested for biological activity using several important insect pests obtained from cultures maintained at our research centre. Extracts and bio-oils will be screened for insecticidal, antifeedant and repellent activity using appropriate bioassays. Methods for rapid

screening of insecticides will be employed and can be adapted for testing the plant extracts. The active components in the extracts will be isolated and identified through bioassay-guided fractionation. Extracts exhibiting activity will be fractionated by chemical methods and screened again to isolate active natural products. Structures of isolated active constituents will be determined using high performance liquid chromatography, gas chromatography and spectrometric techniques. Identified active constituents will be investigated further to determine whether they have potential to be used as biopesticides.

Value of the Opportunity (issue, results, outcomes)/*Valeur de l'opportunité (problème, résultats, retombées*):
This is a project of the Agricultural Biorefinery Innovation Network comprised of university professors and Agriculture and Agri-Food Canada researchers across Canada. Increased productivity by the addition of a student/scientist to the project would enable additional results and synergies to occur.
Biopesticides derived from plant material typically comprise a mixture of active components which may act by a variety of mechanisms. It has been shown that use of such biopesticides can delay the development of insecticide resistance. The availability of biopesticides is therefore expected to benefit agriculture in both Canada and China.

The expected outcome of this work is a value-added product from pyrolysis of waste crop residues with potential for use as a biopesticide. The student/scientist will conduct experiments, assemble the results, draft a manuscript, and carry this through to publication in an international scientific journal.

D – Describe the qualifications needed (academic, study, knowledge, skills, experiences, *etc.*), and the benefits to the candidate /*Décrire les qualifications requises (études, connaissances, compétences, expériences, etc) et les avantages pour les candidats*

The candidate must have a good knowledge of spoken and written English and university-level training in Chemistry, Biology, Biochemistry, or related disciplines. The candidate should be familiar with a modern chemistry laboratory and be capable of performing basic procedures such as: calculating concentrations and making solutions, using a balance, using liquid handling devices including pipettes, and keeping a laboratory notebook. Familiarity with software for word processing, spreadsheet, and presentations, is required. Familiarity and experience with liquid chromatography, gas chromatography and mass spectrometry would be a definite asset.

The candidate will gain useful knowledge and technical skills in entomology, pesticide toxicology, chromatography and mass spectrometry. The candidate will be trained in insecticide toxicology and chemical analysis and will have the opportunity to interact with other research groups through joint lab meetings and collaborations. The candidate is expected to participate in the publication of research results in scientific journals.

OPPORTUNITY/*OPPORTUNITÉ* ID: 2010_London_06b Return to the List

A – Identification

Type of Candidate (check one or more)/*Type de candidats recherchés (choisir un ou plus)* :

- Graduate students / étudiants des cycles supérieurs: - Ph.D.
- I accept a candidate who wants to register in a Canadian university: (name)/*J'accepte un candidat qui veut s'inscrire dans une université canadienne (nom)* : University of Western Ontario
- Scientist from a university or a research organisation/*Chercheur d'une université ou d'un organisme de recherche*.

If necessary, specify country (or countries) of preference./*Si nécessaire, spécifier le ou les pays de préférence* :
Possibly from Chile, Taiwan, Korea, China or other countries and areas

Justify if this Opportunity cannot be offered to a Canadian/*Justifiez si cette Opportunité ne peut être offert à un Canadien :*
This position is intended for a candidate who holds a scholarship; no stipend is available.

OPPORTUNITY TITLE/ TITRE DE L'OPPORTUNITÉ : **Metabolism of the Soybean-*Phytophthora sojae* Host-Pathogen Interaction – A Plant Metabolomics Study**

Foreigner's length of stay at AAFC, specify number of months (minimum and/or maximum)/ *Durée du séjour à AAC, spécifier le nombre de mois (minimal et/ou maximal)* :	24
Preferred start date before March 31, 2011/ *Date de préférence pour le début du séjour avant le 31 mars 2011*, specify/*spécifier* :	September 2010
Research location in Canada / *Lieu de la recherche au Canada :* Southern Crop Protection and Food Research Centre Website : http://www.agr.gc.ca/science	City/*Ville*, Province : London, ON

Contact:
Dr. Brian McGarvey
Email/*Courriel* : brian.mcgarvey@agr.gc.ca
Phone/*Téléphone* : 1-519-457-1470 ext. 233

B – The Research Team/ *L'équipe de recherché*

AAFC Supervisor/*Superviseur à AAC* : Dr. Brian McGarvey
Other AAFC scientists/*Autres chercheurs d'AAC* : Dr. Mark Gijzen
University partners/*Partenaires universitaires* :
Industry partners/*Partenaires industriels* :

C – Opportunity Description/ *Description de l'Opportunité*

Objective/*Objectif* :
This research is on a disease problem that affects all soybean growing areas. The disease is caused by the soil borne pathogen *Phytophthora sojae*. It produces a root and stalk rot of soybean that reduces the yield and quality of the crop. The objective of the research is to discover metabolic factors that characterize this host-pathogen interaction, for the purpose of developing better diagnostic and control measures.

The research is important to Canada and China because soybeans are a major crop in both countries, and root rot caused by *P. sojae* is a serious disease problem that results in crop loss. Many other crops, ornamental plants, and even natural environments are damaged by *Phytophthora* species, since these organisms are all destructive and invasive plant pathogens. The study of the interaction between *P. sojae* and soybean also provides a model for other *Phytophthora* diseases.

Value of the Opportunity (issue, results, outcomes)/*Valeur de l'opportunité (problème, résultats, retombées*):
The student/scientist will be engaged in plant metabolomics research, using gas chromatography-mass spectrometry and possibly liquid chromatography-mass spectrometry to analyze extracts of soybean seedlings which are either inoculated or non-inoculated with *P. sojae* zoospores. Chromatograms of infected and non-infected samples will be compared using multivariate statistical analysis to identify metabolites from both plant and pathogen whose abundance is affected during pathogenesis. Knowledge of increasing or decreasing levels of identified metabolites will be correlated with existing knowledge of gene expression in soybean during infection by *P. sojae*. A deeper understanding of the effect of pathogenesis on metabolism and the role of identified metabolites in initiation and development of disease is intended to contribute to development of improved diagnostic and disease control measures. The expected outcome for the student/scientist will be co-authorship on a publication derived from the research project.

The student/scientist will benefit from working in a modern analytical chemistry laboratory engaged in plant metabolomics research using chromatographic and spectrometric techniques and advanced data analysis methods. The organisms under study are economically important. The student/scientist will conduct experiments, assemble the results, draft a manuscript, and carry this through to publication in a major international journal.

D – Describe the qualifications needed (academic, study, knowledge, skills, experiences, *etc.*), and the benefits to the candidate /*Décrire les qualifications requises (études, connaissances, compétences, expériences, etc) et les avantages pour les candidats*

The candidate needs to have a good knowledge of spoken and written English in order to function safely in the laboratory, and university-level training in Chemistry, Biochemistry, Bioinformatics, or related disciplines. The candidate should be familiar with a modern chemistry laboratory and be capable of performing basic procedures such as: calculating concentrations and making solutions, using a balance and pH meter, using liquid handling devices including pipettes, and keeping a laboratory notebook. Familiarity with software for word processing, spreadsheet, and presentations is required. Familiarity and experience with liquid chromatography, gas chromatography and mass spectrometry would be a definite asset.

The student will gain useful knowledge and technical skills in chromatography, mass spectrometry, plant metabolomics and data analysis. The student will have the opportunity to interact with other research groups through joint lab meetings and collaborations. The student is expected to participate in the publication of research results in scientific journals.

OPPORTUNITY/*OPPORTUNITÉ* ID: 2010_London_07 Return to the List

A – Identification

Type of Candidate (check one or more)/*Type de candidats recherchés (choisir un ou plus)* :

- Graduate students / étudiants des cycles supérieurs: - Master's or equivalent / *Maîtrise ou équivalent* - Ph.D.
- Scientist from a university or a research organisation/*Chercheur d'une université ou d'un organisme de recherche*.

If necessary, specify country (or countries) of preference./*Si nécessaire, spécifier le ou les pays de préférence* :

Justify if this Opportunity cannot be offered to a Canadian/*Justifiez si cette Opportunité ne peut être offert à un Canadien :*
This position is intended for a candidate who holds a scholarship; no stipend is available.

OPPORTUNITY TITLE/ TITRE DE L'OPPORTUNITÉ : **Investigating natural insect repellents: the potential for enhancing host plant resistance**

Foreigner's length of stay at AAFC, specify number of months (minimum and/or maximum)/ *Durée du séjour à AAC, spécifier le nombre de mois (minimal et/ou maximal)* :	24
Preferred start date before March 31, 2011/ *Date de préférence pour le début du séjour avant le 31 mars 2011*, specify/*spécifier* :	September 2010
Research location in Canada / *Lieu de la recherche au Canada :* Southern Crop Protection and Food Research Centre Website : http://www.agr.gc.ca/science	City/*Ville*, Province : London, ON

Contact:
Dr. Ian Scott
Email/*Courriel* : ian.scott@agr.gc.ca
Phone/*Téléphone* : 1-519-457-1470 ext. 281

B – The Research Team/ *L'équipe de recherché*

AAFC Supervisor/*Superviseur à AAC* : Dr. Ian Scott
Other AAFC scientists/*Autres chercheurs d'AAC* : Drs. Abdelali Hannoufa, Brian McGarvey
University partners/*Partenaires universitaires* :
Industry partners/*Partenaires industriels* :

C – Opportunity Description/ *Description de l'Opportunité*

Objective/*Objectif* :
Ongoing research in Dr. Hannoufa's laboratory has demonstrated that over-expression of a carotenoid dioxygenase, CCD1, in the model plant Arabidopsis thaliana, produced plants that emit high levels of volatile β-ionones, which act as natural insect feeding deterrents. Through insect feeding experiments, we have determined that transgenic plants over-expressing CCD1 had acquired significant resistance to flea beetles. We propose to apply this insect control strategy to other crops, including legumes, fruits and vegetables. In Dr. Scott's laboratory, we will test commercially available β-ionones for their effect on a range of insects and other pests. For example, insect response will be monitored by measuring feeding inhibition, and whether this relates to an antifeedant or repellency effect. This will include choice tests with Colorado potato beetle adults, apterous adult aphids, cabbage looper caterpillars and other insects to calculate the percent feeding reduction and the settling inhibition index respectively. Behavioural changes in time spent feeding, resting, exploring, will also be monitored.

Value of the Opportunity (issue, results, outcomes)/*Valeur de l'opportunité (problème, résultats, retombées*):
This is an Agriculture and Agri-Food Canada research project (under the AAFC project: Generating Brassica Innovation from Arabidopsis Discoveries). Through the AAFC-MOE internship program, we expect to develop and establish long-term research collaborations with other laboratories, and the collaborative research will generate knowledge and technologies which will be of benefit to both Canada and the international community.
Under the internship program, the Ph. D. intern will gain knowledge and technical skills in research on entomology, chromatography and spectrometry. The student will be trained in techniques relevant to toxicology, molecular biology and chemical analyses. The student is expected to use knowledge and skills obtained through this internship program to develop relevant research programs in the future.

D – Describe the qualifications needed (academic, study, knowledge, skills, experiences, *etc.*), and the benefits to the candidate /*Décrire les qualifications requises (études, connaissances, compétences, expériences, etc) et les avantages pour les candidats*

The candidate must have a good knowledge of spoken and written English and university-level training in Chemistry, Biology, Biochemistry, or related disciplines. The candidate student should ideally have some background in analytical chemistry and plant-insect interactions. Knowledge of basic molecular and biochemical techniques will be an asset.
Familiarity with software for word processing, spreadsheet, and presentations, is required.

OPPORTUNITY/*OPPORTUNITÉ* ID: 2010_London_09 Return to the List

A – Identification

Type of Candidate (check one or more)/*Type de candidats recherchés (choisir un ou plus)* :

- Graduate students / étudiants des cycles supérieurs: - Master's or equivalent / *Maîtrise ou équivalent* - Ph.D.

- I accept a candidate who wants to register in a Canadian university: (name)/*J'accepte un candidat qui veut s'inscrire dans une université canadienne (nom)* : University of Western Ontario
- Scientist from a university or a research organisation/*Chercheur d'une université ou d'un organisme de recherche*.

If necessary, specify country (or countries) of preference./*Si nécessaire, spécifier le ou les pays de préférence* :

Justify if this Opportunity cannot be offered to a Canadian/*Justifiez si cette Opportunité ne peut être offert à un Canadien :*

OPPORTUNITY TITLE/ TITRE DE L'OPPORTUNITÉ : **Development of crop resistance to diseases and environmental stresses via biotechnology**	
Foreigner's length of stay at AAFC, specify number of months (minimum and/or maximum)/ *Durée du séjour à AAC, spécifier le nombre de mois (minimal et/ou maximal)* :	12-24
Preferred start date before March 31, 2011/ *Date de préférence pour le début du séjour avant le 31 mars 2011*, specify/*spécifier* :	September 2010
Research location in Canada / *Lieu de la recherche au Canada :* Southern Crop Protection and Food Research Centre Website : http://www.agr.gc.ca/science	City/*Ville*, Province : London, ON
Contact: **Dr. Lining Tian**	Email/*Courriel* : lining.tian@agr.ca.ca Phone/*Téléphone* : 1-519-457-1470 ext. 230

B – The Research Team/ *L'équipe de recherché*

AAFC Supervisor/*Superviseur à AAC* : Dr. Lining Tian
Other AAFC scientists/*Autres chercheurs d'AAC* : Dr. Hannoufa, Abdelali
University partners/*Partenaires universitaires* : Dr. V. Grbic
Industry partners/*Partenaires industriels* :

C – Opportunity Description/ *Description de l'Opportunité*

Objective/*Objectif* :
Diseases and environmental stresses affect plant growth and cause significant losses to crop yields. Study of plant genes and manipulation and control of gene expression can lead to crop resistance to diseases and abiotic stresses. In the past, we have studied several plant genes, such as, histone deacetylases (HDACs), translation initiation factors (eIFs). The research in model plants and selected crops indicate that these genes involve in relevant biological pathways and control of expression of these genes can provide plants with resistance to disease (e.g. plum pox virus) and environmental stresses (i.e., drought, low temperature).

Value of the Opportunity (issue, results, outcomes)/*Valeur de l'opportunité (problème, résultats, retombées*):
Further study of these and related genes in different crops is important for understanding their scientific mechanisms, pathways, and full functions in plants and has a great potential for development of plants with new traits for growth in adverse abiotic and biotic environmental conditions. The research will study and exploit HDACs and eIFs in several major crops, including soybean, corn and fruit trees. Model plant, such as *Arabidopsis thaliana*, *Nicotiana benthaminana*, will be used in the study for revealing of scientific mechanisms and for knowledge improvement. The research will study gene families, structures, expression profiles in different plant tissues and during plant development. The research will also investigate the interaction of these genes with other related genes and pathways. The transcription gene expression will be studied and technologies for control of gene expression will be developed. Biosafety on plant biotechnology will also be a research topic. Different molecular biology and biotechnology approaches and techniques will be used in the study. The research aims to develop and improve plant traits for sustainable crop production.

D – Describe the qualifications needed (academic, study, knowledge, skills, experiences, *etc.*), and the benefits to the candidate /*Décrire les qualifications requises (études, connaissances, compétences, expériences, etc) et les avantages pour les candidats*

The candidates should have good academic standing and record. The candidates should have basic and related knowledge and training in plant molecular biology, biochemistry, plant physiology and biotechnology. The candidates should be familiar with basic lab skills in related research areas. The candidates should have good communications skills in English.

The students will learn knowledge and skills in plant molecular biology and biotechnology. The students will receive in-depth training in plant biotechnology with focus on plant abiotic and biotic resistance. After the study and training, the students will have good knowledge and capability to conduct research in related research areas.

OPPORTUNITY/*OPPORTUNITÉ* ID: 2010_NSAC_01 Return to the List

A – Identification

Type of Candidate (check one or more)/*Type de candidats recherchés (choisir un ou plus)* :

- Graduate students / étudiants des cycles supérieurs: - Ph.D.
- I accept a candidate who wants to register in a Canadian university: (name)/*J'accepte un candidat qui veut s'inscrire dans une université canadienne (nom)* : Dalhousie University
- Scientist from a university or a research organisation/*Chercheur d'une université ou d'un organisme de recherche*.

If necessary, specify country (or countries) of preference./*Si nécessaire, spécifier le ou les pays de préférence* :

Justify if this Opportunity cannot be offered to a Canadian/*Justifiez si cette Opportunité ne peut être offert à un Canadien :*

OPPORTUNITY TITLE/ TITRE DE L'OPPORTUNITÉ : **Effect of pasture type and dietary fatty acid supplementation on production performance, meat quality, and energy metabolism of ruminant and poultry livestock**

Foreigner's length of stay at AAFC, specify number of months (minimum and/or maximum)/ *Durée du séjour à AAC, spécifier le nombre de mois (minimal et/ou maximal)* : 12-36

Preferred start date before March 31, 2011/
Date de préférence pour le début du séjour avant le 31 mars 2011, specify/*spécifier* :

Research location in Canada / *Lieu de la recherche au Canada :* City/*Ville*, Province :
Southern Crop Protection and Food Research Centre Truro, NS
Website : http://www.agr.gc.ca/science

Contact:
Dr. Yousef A. Papadopoulos
Email/*Courriel* : yousef.papadopoulos@agr.gc.ca
Phone/*Téléphone* : 1-902-896-2452

B – The Research Team/ *L'équipe de recherché*

AAFC Supervisor/*Superviseur à AAC* : Dr. Yousef A. Papadopoulos
Other AAFC scientists/*Autres chercheurs d'AAC* : Drs. John Duynisveld and Bruce Rathgeber
University partners/*Partenaires universitaires* : Dr. Kathleen Glover
Industry partners/*Partenaires industriels* : Sheep Producers Association of Nova Scotia and Cattleman Association of Nova Scotia

C – Opportunity Description/ *Description de l'Opportunité*

Objective/*Objectif* :
Altering the lipid content and fatty acid composition of foods to increase the proportion of beneficial polyunsaturated fatty acids such as CLA, DHA and EPA is an effective way to help consumers meet their nutritional requirements and increase market appeal and product sales. Forage-based feeding systems are central to ruminant livestock production in Canada and other reduction regions throughout the world and increasing legume content has been demonstrated to improve stand and animal productivity. Pasturing also offers the opportunity to increase the CLA and omega-3 fatty acid content of meat and in bovine, red clover has been shown to be more effective than other legume and grass species. With feed grain prices and transportation costs increasing, there will be increasing need for locally available alternative energy sources for poultry and other livestock production. Leaf alone from forage legume crops is high in protein and digestible NDF. Utilizing leaf material from these crops will yield a residual carbohydrate with higher protein and energy value similar to that of grain. Furthermore, legume leaves are high in phenolic compounds which were shown to provide a new window of opportunity for us to develop foods highly enriched in antioxidants, as well as, offer a new natural based parasite control therapy. Phase I of this research will compare two pasture types (red clover and tall fescue) for effects on ruminant livestock production and will also consider effects of dietary supplementation of CLA (derived from sunflower oil) and long chain omega-3 fatty acids (fish oil) or incomparison to a source of saturated fat (Megalac) during the finishing stages of production. Growth of livestock, feed intake, carcass composition, muscle and adipose fatty acid composition and energy metabolism will be studied.

Value of the Opportunity (issue, results, outcomes)/*Valeur de l'opportunité (problème, résultats, retombées*):
This project will provide producers with relevant information on the expected changes in fatty acid composition of muscle and adipose tissue and the carcass composition (leanness) when livestock graze red clover or grass-based pastures. This project also increases scientific knowledge in this area particularly as it considers the potential interaction between pasture species and dietary fatty acid supplement during finishing, for which very limited information is available. The candidate will be expected to participate in the design and the execution of this grazing/feeding trial. In addition to assisting the research farm staff in the evaluation of animal performance over two grazing seasons and during the fall feeding, the candidate will be responsible for evaluating animal metabolic status and carcass quality by collecting and analyzing blood samples and animal tissues. Furthermore, the student will

be responsible for the statistical analysis of the above data and drafting at least two scientific manuscripts.
D – Describe the qualifications needed (academic, study, knowledge, skills, experiences, *etc.*), and the benefits to the candidate /*Décrire les qualifications requises (études, connaissances, compétences, expériences, etc) et les avantages pour les candidats*
The candidate qualification should include good command of the English language, knowledge of animal husbandry, capability to conduct the above biochemical assays and able to work with ruminant livestock. The candidate will work with a dynamic group of researchers from Agriculture and Agri-Food Canada and the Nova Scotia Agricultural College in a research and educational institution which embraces the training of new researchers from Canada and international destinations.

OPPORTUNITY/*OPPORTUNITÉ* ID: 2010_Ottawa_01	Return to the List
A – Identification	
Type of Candidate (check one or more)/*Type de candidats recherchés (choisir un ou plus)* :	
• Graduate students / étudiants des cycles supérieurs:	- Ph.D.
• Scientist from a university or a research organisation/*Chercheur d'une université ou d'un organisme de recherche*.	
If necessary, specify country (or countries) of preference./*Si nécessaire, spécifier le ou les pays de préférence* :	
Justify if this Opportunity cannot be offered to a Canadian/*Justifiez si cette Opportunité ne peut être offert à un Canadien :*	
OPPORTUNITY TITLE/ TITRE DE L'OPPORTUNITÉ : **Breeding for early maturing and disease resistant corn**	
Foreigner's length of stay at AAFC, specify number of months (minimum and/or maximum)/ *Durée du séjour à AAC, spécifier le nombre de mois (minimal et/ou maximal)* :	12-24
Preferred start date before March 31, 2011/ *Date de préférence pour le début du séjour avant le 31 mars 2011*, specify/*spécifier* :	October 2010
Research location in Canada / *Lieu de la recherche au Canada :* Eastern Cereal and Oilseed Research Centre Website : http://www.agr.gc.ca/science	City/*Ville*, Province : Ottawa, ON
Contact: **Dr. Lana Reid**	Email/*Courriel* : lana.reid@agr.gc.ca Phone/*Téléphone* : 1-613-759-1619
B – The Research Team/ *L'équipe de recherché*	
AAFC Supervisor/*Superviseur à AAC* : Dr. Lana Reid Other AAFC scientists/*Autres chercheurs d'AAC* : Xiaoyang Zhu University partners/*Partenaires universitaires* : Industry partners/*Partenaires industriels* :	
C – Opportunity Description/ *Description de l'Opportunité*	
Objective/*Objectif* : To allow a student an opportunity to work in the Canadian public corn breeding industry with the intent of facilitating the exchange of corn germplasm and technology between Canada and the student's country. Initial co-operative projects will involve the evaluation of corn germplasm from student's country in Canada and vice versa. Some molecular characterization of the germplasm will also be done if the suitable student candidate is accepted. **Value of the Opportunity (issue, results, outcomes)/*Valeur de l'opportunité (problème, résultats, retombées*)**: Increased corn germplasm and corn breeding technology exchange. Both countries will obtain new sources of earliness and disease resistance. At ECORC, the student will learn how to evaluate corn for early maturity and resistance to 8 different diseases.	
D – Describe the qualifications needed (academic, study, knowledge, skills, experiences, *etc.*), and the benefits to the candidate /*Décrire les qualifications requises (études, connaissances, compétences, expériences, etc) et les avantages pour les candidats*	
Student must have a Master's degree in plant breeding or a closely related field and have knowledge in corn breeding and corn pathology.	

OPPORTUNITY/*OPPORTUNITÉ* ID: 2010_Ottawa_02	Return to the List
A – Identification	
Type of Candidate (check one or more)/*Type de candidats recherchés (choisir un ou plus)* :	
• Graduate students / étudiants des cycles supérieurs:	- Ph.D.
• I accept a candidate who wants to register in a Canadian university: (name)/*J'accepte un candidat qui veut s'inscrire dans une université canadienne (nom)* : University of Ottawa	

- Scientist from a university or a research organisation/*Chercheur d'une université ou d'un organisme de recherche*.

If necessary, specify country (or countries) of preference./*Si nécessaire, spécifier le ou les pays de préférence* :
China, although candidates from Canada or other countries will also be considered

Justify if this Opportunity cannot be offered to a Canadian/*Justifiez si cette Opportunité ne peut être offert à un Canadien :*

OPPORTUNITY TITLE/ TITRE DE L'OPPORTUNITÉ : **Identification of genes contributing to resistance to Fusarium head blight (FHB) of wheat**

Foreigner's length of stay at AAFC, specify number of months (minimum and/or maximum)/ *Durée du séjour à AAC, spécifier le nombre de mois (minimal et/ou maximal)* :	12-36
Preferred start date before March 31, 2011/ *Date de préférence pour le début du séjour avant le 31 mars 2011*, specify/*spécifier* :	February 2011
Research location in Canada / *Lieu de la recherche au Canada :* Eastern Cereal and Oilseed Research Centre Website : http://www.agr.gc.ca/science	City/*Ville*, Province : Ottawa, ON
Contact: **Dr. Thérèse Ouellet**	Email/*Courriel* : therese.ouellet@agr.gc.ca Phone/*Téléphone* : 1-613-759-1658

B – The Research Team/ *L'équipe de recherché*

AAFC Supervisor/*Superviseur à AAC* : Dr. Thérèse Ouellet
Other AAFC scientists/*Autres chercheurs d'AAC* : Dr. Shea Miller
University partners/*Partenaires universitaires* : Dr. John Arnason
Industry partners/*Partenaires industriels* : Ontario Wheat Marketting and Producers Board

C – Opportunity Description/ *Description de l'Opportunité*

Objective/*Objectif* :
Characterize selected candidate genes associated with resistance to FHB to evaluate their role in FHB resistance, using molecular biology techniques such as quantitative PCR, gene silencing, etc.

Value of the Opportunity (issue, results, outcomes)/*Valeur de l'opportunité (problème, résultats, retombées)*:
The knowledge generated by the work proposed will contribute to the development of novel strategies to manage *Fusarium* diseases of cereal crops and to improve the stability and safety of grain production. The procedures and strategies learned during the collaborative project will also be applied to closely related wheat projects when the student will go back to the research group in its country of origin. This will foster collaboration between the two research groups and speed up research progress.

D – Describe the qualifications needed (academic, study, knowledge, skills, experiences, *etc.*), and the benefits to the candidate /*Décrire les qualifications requises (études, connaissances, compétences, expériences, etc) et les avantages pour les candidats*

Acceptable candidates include students currently engaged in a PhD program, postdoctoral fellows and junior scientists. Prior experience in plant biology and in molecular biology procedures, including DNA and RNA isolation, gene cloning, measurement of mRNA expression, PCR analysis and bioinformatics softwares are required. Proficient reading and writing in English are also required.

OPPORTUNITY/*OPPORTUNITÉ* ID: 2010_Ottawa_06 Return to the List

A – Identification

Type of Candidate (check one or more)/*Type de candidats recherchés (choisir un ou plus)* :

- Graduate students / étudiants des cycles supérieurs: - Ph.D.

- Scientist from a university or a research organisation/*Chercheur d'une université ou d'un organisme de recherche*.

If necessary, specify country (or countries) of preference./*Si nécessaire, spécifier le ou les pays de préférence* :
China, India, Italy

Justify if this Opportunity cannot be offered to a Canadian/*Justifiez si cette Opportunité ne peut être offert à un Canadien :*

OPPORTUNITY TITLE/ TITRE DE L'OPPORTUNITÉ : **Identification of optical signals for improving N and water use efficiencies in field crops**	
Foreigner's length of stay at AAFC, specify number of months (minimum and/or maximum)/ *Durée du séjour à AAC, spécifier le nombre de mois (minimal et/ou maximal)* :	24
Preferred start date before March 31, 2011/ *Date de préférence pour le début du séjour avant le 31 mars 2011*, specify/*spécifier* :	April 2010
Research location in Canada / *Lieu de la recherche au Canada :* Eastern Cereal and Oilseed Research Centre Website : http://www.agr.gc.ca/science	City/*Ville*, Province : Ottawa, ON
Contact: **Dr. Bao-Luo Ma**	Email/*Courriel* : Baoluo.Ma@agr.gc.ca Phone/*Téléphone* : 1-613-759-1521

B – The Research Team/ *L'équipe de recherché*

AAFC Supervisor/*Superviseur à AAC* : Dr. Bao-Luo Ma
Other AAFC scientists/*Autres chercheurs d'AAC* : Dr. Carlos Monreal
University partners/*Partenaires universitaires* : McGill University, Dr. Don Smith, Dr. Joann Whalen
Industry partners/*Partenaires industriels* :

C – Opportunity Description/ *Description de l'Opportunité*

Objective/*Objectif* :
To investigate the response of plant optical traits to N deficiency and water deficit induced stresses, the biosynthesis, transportation and excretion of root exudates of wheat, canola and maize grown in soil-less media and a soil of Ontario in growth chambers or the greenhouse. These experiments will use stable isotope (^{13}C and ^{15}N) techniques and optical sensing instruments for monitoring the location of synthesis, mechanism of transport and place for excretion of exudates in the root of the three crops. It is expected to better understand the relations between root exudation, canopy reflectance and the uptake of nitrogen (N) from fertilizers, and to identify physiological/morphological traits associated with efficient use of water and N resources.

Value of the Opportunity (issue, results, outcomes)/*Valeur de l'opportunité (problème, résultats, retombées*):
The visitors will get trained with modern crop physiology techniques and instruments, our research team will benefit from fresh ideas and/or assistance in carrying out our planned projects. The involvement of foreign students/visiting scientists would expand the goal and speed up the projects progress.

D – Describe the qualifications needed (academic, study, knowledge, skills, experiences, *etc.*), and the benefits to the candidate /*Décrire les qualifications requises (études, connaissances, compétences, expériences, etc) et les avantages pour les candidats*

Enrolled in his/her PhD study, or is a research scientist/professor and participate in crop physiology research projects in his/her employment; speaks and writes fluent English; trained with solid background in plant and soil sciences.

OPPORTUNITY/*OPPORTUNITÉ* ID:	2010_Ottawa_07	Return to the List

A – Identification

Type of Candidate (check one or more)/*Type de candidats recherchés (choisir un ou plus)* :

- Graduate students / étudiants des cycles supérieurs: - Ph.D.
- Scientist from a university or a research organisation/*Chercheur d'une université ou d'un organisme de recherche*.

If necessary, specify country (or countries) of preference./*Si nécessaire, spécifier le ou les pays de préférence* :
China

Justify if this Opportunity cannot be offered to a Canadian/*Justifiez si cette Opportunité ne peut être offert à un Canadien :*

OPPORTUNITY TITLE/ TITRE DE L'OPPORTUNITÉ : **Germplasm enhancement for Fusarium head blight and stem rust resistance in wheat**	
Foreigner's length of stay at AAFC, specify number of months (minimum and/or maximum)/ *Durée du séjour à AAC, spécifier le nombre de mois (minimal et/ou maximal)* :	12
Preferred start date before March 31, 2011/ *Date de préférence pour le début du séjour avant le 31 mars 2011*, specify/*spécifier* :	April 2010

Research location in Canada / *Lieu de la recherche au Canada :* Eastern Cereal and Oilseed Research Centre Website : http://www.agr.gc.ca/science	City/*Ville*, Province : Ottawa, ON
Contact: **Dr. George Fedak**	Email/*Courriel* : George.fedak@agr.gc.ca Phone/*Téléphone* : 1-613-759-1393

B – The Research Team/ *L'équipe de recherché*

AAFC Supervisor/*Superviseur à AAC* : Dr. George Fedak
Other AAFC scientists/*Autres chercheurs d'AAC* : Dr. Carlos Monreal
University partners/*Partenaires universitaires* : McGill University, Dr. Don Smith, Dr. Joann Whalen
Industry partners/*Partenaires industriels* :

C – Opportunity Description/ *Description de l'Opportunité*

Objective/*Objectif* :
Ug99 is a new race of stem rust of wheat and barley, that originated in Uganda, is spreading as predicted and is now a threat to all cereal-growing regions of the world. Most of the cultivars of wheat and barley being grown, are susceptible to the disease. There is an urgent need to identify, introgress and deploy new genes for resistance. This will involve interspecific hybridization with species such as rye, wild Aegilops species and wild grasses. ECORC is well equipped to conduct research on introgression of genes for resistance to Ug99. A fully equipped cytogenetic facility,growth rooms, greenhouses, plus facilities for DNA extraction and amplification. ECORC is also in the process of starting up a level 3 containment facility for screening plant materials for Ug99 resistance. This will be only the second facility of it's kind in Canada and third in the world. The germplasm thus developed will be unique in the world and be available to both parties.
The other choice for the candidate will be the participation in continuing studies on resistance to Fusarium head blight. A number of genes from interspecific sources have already been deployed at our centre. Other combinations are still being manipulated. These include the resistance from *Th. repens* and *L. ponticum*. A good deal of cytogenetic, marker and PCR work still needs to be done to diminish the size of the introgressed fragment and tag it with molecular markers. Candidates will gain experience in the latest molecular cytogenetic technologies, eg. Ph mutants, GISH analysis, PCR and marker technologies. In addition, candidates will gain experience in manuscript preparation for scientific journals and posters for workshops.

D – Describe the qualifications needed (academic, study, knowledge, skills, experiences, *etc.*), and the benefits to the candidate /*Décrire les qualifications requises (études, connaissances, compétences, expériences, etc) et les avantages pour les candidats*

Candidates must be currently enrolled in PhD programs as per the MOE-AAFC program. They should have a sufficient working knowledge of basic cytogenetic techniques and methodologies, plus PCR and molecular marker technologies.
The candidates will enhance their knowledge of interspecific hybridization, gene introgression and gene deployment. They will work towards the production of unique combinations of genetic material that will be useful to both countries.

OPPORTUNITY/*OPPORTUNITÉ* ID: 2010_Ottawa_08 Return to the List

A – Identification

Type of Candidate (check one or more)/*Type de candidats recherchés (choisir un ou plus)* :

- Graduate students / étudiants des cycles supérieurs: - Ph.D.
- I accept a candidate who wants to register in a Canadian university: (name)/*J'accepte un candidat qui veut s'inscrire dans une université canadienne (nom)* : University of Guelph, University of Manitoba, McGill University or University of Ottawa
- Scientist from a university or a research organisation/*Chercheur d'une université ou d'un organisme de recherche*.

If necessary, specify country (or countries) of preference./*Si nécessaire, spécifier le ou les pays de préférence* :

Justify if this Opportunity cannot be offered to a Canadian/*Justifiez si cette Opportunité ne peut être offert à un Canadien :*

OPPORTUNITY TITLE/ TITRE DE L'OPPORTUNITÉ : **Effect of soil and crop management on sustainability of soil productivity**

Foreigner's length of stay at AAFC, specify number of months (minimum and/or maximum)/ *Durée du séjour à AAC, spécifier le nombre de mois (minimal et/ou maximal)* : 12-24

Preferred start date before March 31, 2011/ *Date de préférence pour le début du séjour avant le 31 mars 2011*, specify/*spécifier* : Fall 2010

Research location in Canada / *Lieu de la recherche au Canada :* Eastern Cereal and Oilseed Research Centre Website : http://www.agr.gc.ca/science	City/*Ville*, Province : Ottawa, ON
Contact: **Dr. Neil McLaughlin**	Email/*Courriel* : neil.mclaughlin@agr.gc.ca Phone/*Téléphone* : 1-613-759-1534

B – The Research Team/ *L'équipe de recherché*

AAFC Supervisor/*Superviseur à AAC* : Dr. Neil McLaughlin
Other AAFC scientists/*Autres chercheurs d'AAC* : Dr. Craig Drury (AAFC Harrow)
University partners/*Partenaires universitaires* : Dr. Ying Chen, (University of Manitoba), Dr. Claude Laguë (University of Ottawa)
Industry partners/*Partenaires industriels* : Kongsilde Ltd.

C – Opportunity Description/ *Description de l'Opportunité*

Objective/*Objectif* :
To determine the effect of soil and crop management (crop rotation, residue treatment, tillage practices etc.) on soil attributes (soil physical properties, tillage energy, organic matter etc.) which contribute to the sustainability of soil productivity.

Value of the Opportunity (issue, results, outcomes)/*Valeur de l'opportunité (problème, résultats, retombées)*:
Soil degradation under conventional farming practices is a serious problem in both countries, and results in loss of soil productivity. Traditional practices of intensive tillage and monoculture crop production leads to loss in soil organic matter and increased soil strength making it more difficult for crop roots to penetrate the soil to reach nutrients. The project will contribute to an understanding of the interaction of soil and crop management on soil parameters such as organic matter and soil strength which are key to maintaining soil productivity. Soil and crop management systems need to be developed to protect and enhance key soil attributes to ensure long term productivity potential.

The project will result in a better understanding of the interaction of tillage, organic amendments, cropping strategies and soil attributes. This will contribute to development of best management practices (BMP) for sustainable crop production systems in both countries.

D – Describe the qualifications needed (academic, study, knowledge, skills, experiences, *etc.*), and the benefits to the candidate /*Décrire les qualifications requises (études, connaissances, compétences, expériences, etc) et les avantages pour les candidats*

Qualifications: The student must have training in agriculture crop production, be familiar with agricultural machinery and field cultural practices, and must be willing to work in an agricultural field environment.

Benefits to the student: The student will have the opportunity to work in a multidisciplinary environment with engineers and soil and crop scientists, learn about field experimental methods, data analysis, manuscript writing, and western agriculture.

Dr. McLaughlin has many years experience working with soil and crops scientists, and he provides a unique engineering and machinery perspective to soils and crops field experiments in Canada, and recently, in China. Dr. McLaughlin is an excellent teacher, and actively seeks out opportunities for students to learn. He has extensive editorial experience, and has helped many graduate students develop writing skills. The student will have the opportunity to interact with research personnel, farmers, and the general public and learn English and western culture.

OPPORTUNITY/*OPPORTUNITÉ* ID: 2010_Ottawa_09 Return to the List

A – Identification

Type of Candidate (check one or more)/*Type de candidats recherchés (choisir un ou plus)* :

- Graduate students / étudiants des cycles supérieurs: - Ph.D.
- I accept a candidate who wants to register in a Canadian university: (name)/*J'accepte un candidat qui veut s'inscrire dans une université canadienne (nom)* :
- Scientist from a university or a research organisation/*Chercheur d'une université ou d'un organisme de recherche*.

If necessary, specify country (or countries) of preference./*Si nécessaire, spécifier le ou les pays de préférence* :
China

Justify if this Opportunity cannot be offered to a Canadian/*Justifiez si cette Opportunité ne peut être offert à un Canadien :*
Any student with funding is OK

OPPORTUNITY TITLE/ TITRE DE L'OPPORTUNITÉ : **Genetic and cytogenetic studies in oat**	
Foreigner's length of stay at AAFC, specify number of months (minimum and/or maximum)/ *Durée du séjour à AAC, spécifier le nombre de mois (minimal et/ou maximal)* :	24
Preferred start date before March 31, 2011/ *Date de préférence pour le début du séjour avant le 31 mars 2011*, specify/*spécifier* :	
Research location in Canada / *Lieu de la recherche au Canada :* Eastern Cereal and Oilseed Research Centre Website : http://www.agr.gc.ca/science	City/*Ville*, Province : Ottawa, ON
Contact: **Dr. Nicholas Tinker**	Email/*Courriel* : nick.tinker@agr.gc.ca Phone/*Téléphone* : 1-613-759-1398

B – The Research Team/ *L'équipe de recherché*

AAFC Supervisor/*Superviseur à AAC* : Dr. Nicholas Tinker
Other AAFC scientists/*Autres chercheurs d'AAC* : Dr. George Fedak
University partners/*Partenaires universitaires* :
Industry partners/*Partenaires industriels* :

C – Opportunity Description/ *Description de l'Opportunité*

Objective/*Objectif* :
The candidate will conduct genetic and cytogenetic studies in oat. Specific objectives are :

1) Analyse and characterize genome sequence from an existing library of oat chromosome-21-specific DNA probes. Identify overlap with EST sequence and genomic sequence from two of our ongoing projects at AAFC.
2) Participate in an AAFC genomics project to assist in the design and testing of allele-specific SNP markers for oat. The candidate will focus on markers from chromosome 21, map these, validate their locations, and develop the first model chromosome-specific map in oat.
3) The candidate will attempt to develop an in-situ PCR fluorescent tagging system for oat chromosomes. If successful, this will be used to assign allele-specific SNP primers to specific chromosome arms of oat. If this is not successful, the candidate will conduct analysis of SNPs on selected aneuploid stocks that are available from a collaborator (Eric Jellen, BYU, Utah).
4) The candidate will characterize translocations and chromosome stability in a selected set oat germplasm accessions using (a) observation of meiotic behaviour in crosses and (b) florescent in situ probes, possibly those developed in part 3.

Value of the Opportunity (issue, results, outcomes)/*Valeur de l'opportunité (problème, résultats, retombées*):
These studies will complement ongoing A-Base and AAFC Genomics projects led by the AAFC supervisor, and will allow detailed and specific characterizations of the oat genome. This information will be valuable in the interpretation and utilization of genomic studies in oat.

D – Describe the qualifications needed (academic, study, knowledge, skills, experiences, *etc.*), and the benefits to the candidate /*Décrire les qualifications requises (études, connaissances, compétences, expériences, etc) et les avantages pour les candidats*

The candidate must have graduate-level training in plant genetics and genomics, and practical experience in DNA analysis and cytogenetic techniques.

OPPORTUNITY/*OPPORTUNITÉ* ID: 2010_Ottawa_10 Return to the List

A – Identification

Type of Candidate (check one or more)/*Type de candidats recherchés (choisir un ou plus)* :

- Graduate students / étudiants des cycles supérieurs: - Master's or equivalent / *Maîtrise ou équivalent* - Ph.D.
- I accept a candidate who wants to register in a Canadian university: (name)/*J'accepte un candidat qui veut s'inscrire dans une université canadienne (nom)* :
- Scientist from a university or a research organisation/*Chercheur d'une université ou d'un organisme de recherche*.

If necessary, specify country (or countries) of preference./*Si nécessaire, spécifier le ou les pays de préférence* :

Justify if this Opportunity cannot be offered to a Canadian/*Justifiez si cette Opportunité ne peut être offert à un Canadien :*

OPPORTUNITY TITLE/ TITRE DE L'OPPORTUNITÉ : **Biodiversity of economically important soil bacteria as affected by agricultural practices**

Foreigner's length of stay at AAFC, specify number of months (minimum and/or maximum)/ *Durée du séjour à AAC, spécifier le nombre de mois (minimal et/ou maximal)* : 12-24

Preferred start date before March 31, 2011/ *Date de préférence pour le début du séjour avant le 31 mars 2011*, specify/*spécifier* : July 2010

Research location in Canada / *Lieu de la recherche au Canada :* City/*Ville*, Province :
Eastern Cereal and Oilseed Research Centre Ottawa, ON
Website : http://www.agr.gc.ca/science

Contact: Email/*Courriel* : eden.bromfield@agr.gc.ca
Dr. Eden Bromfield Phone/*Téléphone* : 1-613-759-1731

B – The Research Team/ *L'équipe de recherché*

AAFC Supervisor/*Superviseur à AAC* : Dr. Eden Bromfield
Other AAFC scientists/*Autres chercheurs d'AAC* : Dr. JamesTambong (ECORC)
University partners/*Partenaires universitaires* : Brian Driscoll , McGill University
Industry partners/*Partenaires industriels* :

C – Opportunity Description/ *Description de l'Opportunité*

Objective/*Objectif* :
To evaluate the biodiversity of economically important bacteria (with special reference to symbiotic nitrogen fixers) in agricultural soils relative to natural ecosystems using culture independent molecular technologies.

Value of the Opportunity (issue, results, outcomes)/*Valeur de l'opportunité (problème, résultats, retombées)*:
Recent research findings using molecular phylogenetic approaches suggest that agricultural practises such as tillage, fertilizer and pesticide use can significantly affect the structure of bacterial populations residing in soils as well as reduce the biodiversity of bacteria that are beneficial for crop production.
The rhizobia are a diverse group of soil bacteria that are of considerable economic importance. In symbiotic association with legume crops they have the potential to fix nitrogen from the atmosphere in amounts sufficient to reduce the dependency of agriculture on fertilizer nitrogen. The manufacture of nitrogen fertilizer is energy intensive, costly and depletes non-renewable fossil fuels. Moreover, its manufacture and use results in the release of greenhouse gases and other pollutants that seriously degrade the quality of the environment (air, soil, water). In contrast, symbiotically fixed N is beneficial for soil fertility while minimizing the costs and adverse environmental impacts associated with the use and manufacture of chemical fertilizer.
The purpose is to evaluate the impact of agricultural practises (tillage, crop rotation) on the biodiversity of various bacterial genera comprising the rhizobia (e.g. *Bradyrhizobia, Ensifer, Mesorhizobium, Rhizobium, Burkholderia, Devosia* etc) in soils cultivated with legume crops relative to natural woodland ecosystems harbouring native legume species.
Culture independant phylogenetic techniques (e.g. pyro-sequencing and PCR- based cloning of 16Sr RNA, *nod* (nodulation) and/or protein encoding (housekeeping) genes) will be employed to assess bacterial diversity using specific primers and total DNA extracted from soil samples. Phylogenetic analysis and assessment of relative diversity to be done using Bioinformatics programs such as Mothur and UniFrac. DNA sequences of novel bacteria to be deposited in Public databases. Results to be published in International Scientific Journals.

D – Describe the qualifications needed (academic, study, knowledge, skills, experiences, *etc.*), and the benefits to the candidate /*Décrire les qualifications requises (études, connaissances, compétences, expériences, etc) et les avantages*

pour les candidats
Academic qualifications, skills: Minimum of a bachelors degree in biological sciences with practical experience and skills in bacteriology, ecology, molecular (DNA sequencing, PCR, cloning etc) and phylogenetic analyses. Benefits to candidate: Conduct original agriculturally significant research and receive training in molecular, ecological, bacteriological, and phylogenetic techniques. Publish manuscripts in scientific journals. Fulfill requirements of Masters/Doctoral degrees etc.

OPPORTUNITY/*OPPORTUNITÉ* ID: 2010_Ottawa_11	Return to the List
A – Identification	
Type of Candidate (check one or more)/*Type de candidats recherchés (choisir un ou plus)* : • Graduate students / étudiants des cycles supérieurs: - Ph.D. • I accept a candidate who wants to register in a Canadian university: (name)/*J'accepte un candidat qui veut s'inscrire dans une université canadienne (nom)* : • Scientist from a university or a research organisation/*Chercheur d'une université ou d'un organisme de recherche.*	
If necessary, specify country (or countries) of preference./*Si nécessaire, spécifier le ou les pays de préférence* : Justify if this Opportunity cannot be offered to a Canadian/*Justifiez si cette Opportunité ne peut être offert à un Canadien :* One of the objectives of this work is to promote Canadian RadarSAT2 science and tech to China	
OPPORTUNITY TITLE/ TITRE DE L'OPPORTUNITÉ : **Fertilizer Optimization and Nutrient Management at Watershed and Landscape Scale**	
Foreigner's length of stay at AAFC, specify number of months (minimum and/or maximum)/ *Durée du séjour à AAC, spécifier le nombre de mois (minimal et/ou maximal)* :	12-24
Preferred start date before March 31, 2011/ *Date de préférence pour le début du séjour avant le 31 mars 2011*, specify/*spécifier* :	April 2010
Research location in Canada / *Lieu de la recherche au Canada :* Canadian Soil Information Service (CanSIS)/Eastern Cereal and Oilseed Research Centre Website : http://www.agr.gc.ca/science	City/*Ville*, Province : Ottawa, ON
Contact: **Dr. Xiaoyuan Geng**	Email/*Courriel* : xiaoyuan.geng@agr.gc.ca Phone/*Téléphone* : 1-613-759-1895
B – The Research Team/ *L'équipe de recherché*	
AAFC Supervisor/*Superviseur à AAC* : Dr. Xiaoyuan Geng Other AAFC scientists/*Autres chercheurs d'AAC* : Dr. Heather McNair University partners/*Partenaires universitaires* : Prof. Scott Mitchell, Carleton University Industry partners/*Partenaires industriels* :	
C – Opportunity Description/ *Description de l'Opportunité*	
Objective/*Objectif* : To research and develop use cases of agriculture nutrients management using modeling and digital soil property data; To collaborate with other project areas to study and develop soil property retrieval solutions using RadarSat 2 data. **Value of the Opportunity (issue, results, outcomes)/*Valeur de l'opportunité (problème, résultats, retombées)***: Digital soil property data at national, regional, watershed and on farm level has been highly demanded due to adaptation, system analysis using models, integrated agricultural management practices and precision farming etc. requirements. While traditional soil survey does carry valuable expert knowledge which is important for digital soil property data production, the data along with its resolution and structure do not meet the need anymore. We have been financially funded through several channels such as the Canadian Space Agency and AAFC sustainable agriculture environmental system (SAGES) projects to conduct soil property retrieval research using remotely sensed data especially using RadarSat 2 data. While this research is still on going work, we also expect to demonstrate the values of this new digital soil data source for agricultural decision making and applications through selected modeling use cases. This planned research and development work will focus on nutrient management.	
D – Describe the qualifications needed (academic, study, knowledge, skills, experiences, *etc.*), and the benefits to the candidate /*Décrire les qualifications requises (études, connaissances, compétences, expériences, etc) et les avantages pour les candidats*	

Ph. D candidates who have passed candidacy and required English test with background (education and some experiences) of soil science, biogeochemistry, agri-chemistry, geomatics (remote sensing and GIS) and/or other earth science and environmental science. Assets qualifications: experience of using GIS, remote sensing, and statistics software such as R for research work; experience of watershed scale modeling and field work; experience of agriculture related nutrients cycling research; knowledge of Canadian soil classification and US soil taxonomy; team player and interpersonal skills.

OPPORTUNITY/*OPPORTUNITÉ* ID: 2010_Ottawa_12a Return to the List

A – Identification

Type of Candidate (check one or more)/*Type de candidats recherchés (choisir un ou plus)* :

- Graduate students / étudiants des cycles supérieurs: - Ph.D.
- I accept a candidate who wants to register in a Canadian university: (name)/*J'accepte un candidat qui veut s'inscrire dans une université canadienne (nom)* :
- Scientist from a university or a research organisation/*Chercheur d'une université ou d'un organisme de recherche*.

If necessary, specify country (or countries) of preference./*Si nécessaire, spécifier le ou les pays de préférence* :

Justify if this Opportunity cannot be offered to a Canadian/*Justifiez si cette Opportunité ne peut être offert à un Canadien :*

OPPORTUNITY TITLE/ TITRE DE L'OPPORTUNITÉ : **Deriving biochemical descriptors for field crops using hyperspectral reflectance**

Foreigner's length of stay at AAFC, specify number of months (minimum and/or maximum)/ *Durée du séjour à AAC, spécifier le nombre de mois (minimal et/ou maximal)* : 12-24 months

Preferred start date before March 31, 2011/ *Date de préférence pour le début du séjour avant le 31 mars 2011*, specify/*spécifier* : Summer 2010

Research location in Canada / *Lieu de la recherche au Canada :* City/*Ville*, Province :
Eastern Cereal and Oilseed Research Centre Ottawa, Ontario
Website : http://www.agr.gc.ca/science

Contact: Email/*Courriel* : elizabeth.pattey@agr.gc.ca
Dr. Elizabeth Pattey Phone/*Téléphone* : 1-613-759-1523

B – The Research Team/ *L'équipe de recherché*

AAFC Supervisor/*Superviseur à AAC* : Dr. Elizabeth Pattey
Other AAFC scientists/*Autres chercheurs d'AAC* : Dr. Heather McNairn
University partners/*Partenaires universitaires* : Dr. Baoxin Hu, York University (Toronto, ON, Canada)
Industry partners/*Partenaires industriels* :

C – Opportunity Description/ *Description de l'Opportunité*

Objective/*Objectif* :
Major ecological processes, such as photosynthesis, evapotranspiration, primary production and decomposition, are related to nutrient status and growth conditions, characterized by canopy biophysical and biochemical descriptors. Hyperspectral remote sensing is a useful tool in detecting the interaction of light with leaf or canopy bio-chemical components. The objective of the proposed work will be using hyperspectral data collected over crop canopy and leaf to study crop biochemistry, such as chlorophyll, nitrogen and lignin content, and water status.

Value of the Opportunity (issue, results, outcomes)/*Valeur de l'opportunité (problème, résultats, retombées*):
Detecting crop biochemistry using optical remote sensing technique is challenging, as the detected signal is determined by both chemical and structural properties of a canopy. Yet remote sensing provides a prompt and non-destructive way to achieving this goal. Hyperspectral signatures will be analyzed to develop algorithms for crop leaf or canopy biochemical content estimation. The results will be important in understanding crop functioning relevant to water and nutrient availability and use efficiency, as well as biomass production and allocation.

D – Describe the qualifications needed (academic, study, knowledge, skills, experiences, *etc.*), and the benefits to the candidate /*Décrire les qualifications requises (études, connaissances, compétences, expériences, etc) et les avantages pour les candidats*

During the work, the incumbent will participate in a multi-disciplinary team which include experienced research scientists in

micrometeorology, crop modeling and remote sensing.

The incumbent should have, or is pursuing, a graduate degree. A strong background in physics and mathematics, with experience in optical remote sensing and knowledge in spectral and statistical analysis is required. Knowledge in canopy radiative transfer modeling is highly desirable, although not mandatory.

OPPORTUNITY/*OPPORTUNITÉ* ID: 2010_Ottawa_12b Return to the List

A – Identification

Type of Candidate (check one or more)/*Type de candidats recherchés (choisir un ou plus)* :

- Graduate students / étudiants des cycles supérieurs: - Master's or equivalent / *Maîtrise ou équivalent* - Ph.D.
- I accept a candidate who wants to register in a Canadian university: (name)/*J'accepte un candidat qui veut s'inscrire dans une université canadienne (nom)* : McGill University
- Scientist from a university or a research organisation/*Chercheur d'une université ou d'un organisme de recherche*.

If necessary, specify country (or countries) of preference./*Si nécessaire, spécifier le ou les pays de préférence* :

Justify if this Opportunity cannot be offered to a Canadian/*Justifiez si cette Opportunité ne peut être offert à un Canadien :*

OPPORTUNITY TITLE/ TITRE DE L'OPPORTUNITÉ : **Quantifying and reducing agricultural particulate matter emissions**

Foreigner's length of stay at AAFC, specify number of months (minimum and/or maximum)/ *Durée du séjour à AAC, spécifier le nombre de mois (minimal et/ou maximal)* : 12-24 months

Preferred start date before March 31, 2011/
Date de préférence pour le début du séjour avant le 31 mars 2011, specify/*spécifier* :

Research location in Canada / *Lieu de la recherche au Canada :*
Eastern Cereal and Oilseed Research Centre
Website : http://www.agr.gc.ca/science

City/*Ville*, Province :
Ottawa, Ontario

Contact:
Dr. Elizabeth Pattey

Email/*Courriel* : elizabeth.pattey@agr.gc.ca
Phone/*Téléphone* : 1-613-759-1523

B – The Research Team/ *L'équipe de recherché*

AAFC Supervisor/*Superviseur à AAC* : Dr. Elizabeth Pattey
Other AAFC scientists/*Autres chercheurs d'AAC* : Dr. Ray Desjardins
University partners/*Partenaires universitaires* : Dr. Ian Strachan, McGill University
Industry partners/*Partenaires industriels* :

C – Opportunity Description/ *Description de l'Opportunité*

Objective/*Objectif* :
Particulate Matter (PM) has long been recognized as an air pollutant due to its adverse health and environmental impacts. PM decreases visibility, influences climate by altering the surface energy balance, and contributes to stratospheric ozone depletion, acid rain and smog. The emission of PM from agricultural operations is an emerging air quality issue, especially for agricultural workers and animals. The Agricultural Particulate Matter Emissions Indicator (APMEI) has been developed in Canada to estimate the PM contribution from agricultural operations and to assess emission reduction measures. In the APMEI, only primary PM emissions from wind erosion, land preparation, crop harvest, fertilizer and chemical applications, grain handling, pollen and animal feeding operations were calculated and compared for the census years of 1981-2006. In 2006, PM emissions from agricultural operations were estimated to represents approximately 9% of TSP, 11% of PM_{10} and 11% of $PM_{2.5}$ emissions in Canada. PM emissions from wind erosion and land preparation account for most of PM emissions from agricultural operations in Canada, with 77% being TSP, 75% PM_{10} and 70% being $PM_{2.5}$ in 2006. Although air quality and PM emissions are of interest there are very few experimental data supporting such an encompassing PM emissions inventory for agriculture. The indicator is limited by the quality of activity data and the corresponding emission factors. The research project proposed to fill a knowledge gap on PM emissions related to land preparation and possibly harvest. PM emissions will be backcalculated based on measurements of PM from tapered element oscillating microbalance and particle counters as well as wind velocity measurements from sonic anemometers. Several dispersion models will be tested. The impact of environmental conditions such as soil/plant properties, wind speed, air humidity and conditions of tractor and machinery operation will be studied, in order to develop recommendation for minimizing PM emissions and develop a simple model for quantifying PM emissions related to land preparation and harvest.

Value of the Opportunity (issue, results, outcomes)/*Valeur de l'opportunité (problème, résultats, retombées)*:
This will benefit provincial and national environmental inventories in agriculture.
Such a work will benefit both Canadian and foreign country agriculture by reducing PM emission to the atmosphere, soil erosion, exposure of crop producers and rural inhabitants to PM. The foreigh country and Canada will share mutual benefits of jointly training highly qualified personnel, as the measuring techniques will be applicable to other situations of relevance for both countries.

D – Describe the qualifications needed (academic, study, knowledge, skills, experiences, *etc.*), and the benefits to the candidate /*Décrire les qualifications requises (études, connaissances, compétences, expériences, etc) et les avantages pour les candidats*

The intern will participate to the development of the experimental plan, search and evaluation of the literature on the topic, the evaluation of the instrumentation, to data acquisition during the field campaigns, to the metadata documentation, the data analyses, model simulation and improvement, and preparation of manuscripts.
We are looking for an enthusiastic candidate with a strong background in to micrometeorology modelling and instrumentation. Knowledge of agriculture, cropping systems and air quality issues are definitely an asset.
The intern will join a dynamic team that will be able to assist him or her through the various stages of scientific research and will have access to a well-equipped laboratory (instrumentation and software) and to the data of the instrumented machinery.

OPPORTUNITY/*OPPORTUNITÉ* ID: 2010_Ottawa_13 Return to the List

A – Identification

Type of Candidate (check one or more)/*Type de candidats recherchés (choisir un ou plus)* :

- Graduate students / étudiants des cycles supérieurs: - Master's or equivalent / *Maîtrise ou équivalent* - Ph.D.
- I accept a candidate who wants to register in a Canadian university: (name)/*J'accepte un candidat qui veut s'inscrire dans une université canadienne (nom)* :
- Scientist from a university or a research organisation/*Chercheur d'une université ou d'un organisme de recherche*.

If necessary, specify country (or countries) of preference./*Si nécessaire, spécifier le ou les pays de préférence* :
China and Brazil

Justify if this Opportunity cannot be offered to a Canadian/*Justifiez si cette Opportunité ne peut être offert à un Canadien :*
This and similar opportunities are available to Canadians through my NSERC Discovery grant at Carleton University. This MOU offers an excellent way to offer training to non-Canadians that could otherwise not benefit from working in my lab or in Canada.

OPPORTUNITY TITLE/ TITRE DE L'OPPORTUNITÉ : **Systematics of *Pipunculidae* (*Diptera*)**

Foreigner's length of stay at AAFC, specify number of months (minimum and/or maximum)/ *Durée du séjour à AAC, spécifier le nombre de mois (minimal et/ou maximal)* : 4-12

Preferred start date before March 31, 2011/ *Date de préférence pour le début du séjour avant le 31 mars 2011*, specify/*spécifier* : Anytime from 1 April 2010 to 31 Oct 2012

Research location in Canada / *Lieu de la recherche au Canada :* City/*Ville*, Province :
Eastern Cereal and Oilseed Research Centre Ottawa, ON
Website : http://www.agr.gc.ca/science

Contact: Email/*Courriel* : jeffrey.skevington@agr.gc.ca
Dr. Jeff Skevington Phone/*Téléphone* : 1-613-759-1647

B – The Research Team/ *L'équipe de recherché*

AAFC Supervisor/*Superviseur à AAC* : Dr. Jeff Skevington
Other AAFC scientists/*Autres chercheurs d'AAC* : Dr. Jeffrey Cumming
University partners/*Partenaires universitaires* : Carleton University, Dr. Stewart Peck; University of Guelph, Dr. Stephen Marshall
Industry partners/*Partenaires industriels* :

C – Opportunity Description/ *Description de l'Opportunité*

Objective/*Objectif* :
I work on the systematics of Pipunculidae and Syrphidae (Diptera). Candidates may work on either group of flies. My research is global in nature but particularly deficient in China and Brazil. Working on a project with a student in one of these countries will enhance my own research program while also offering important training to the candidate. I am a world expert on both families and the CNC is a focal node for global research on these flies. The research project will incorporate country level knowledge into a global context. For example, revision of the Pipunculidae of China would be put into context with the fauna of the rest of eastern

Asia. We will explore all known morphological character sets and combine these data with DNA data to obtain robust species concept hypotheses. Chinese material will be compared with our extensive holdings from Europe and east Asia as well as with loans from other collections. We also have the entire Smithsonian Pipunculidae collection at CNC under a long term agreement. Pipunculidae are important parasitoids of pest leafhoppers and planthoppers (Auchenorrhyncha). Syrphidae are the sister group of Pipunculidae and are much more varied in their larval habits. Many are predators of aphids, some are phytophagous pests and others are saprophages, ant inquilines and even parasitoids. Most adult syrphids are important pollinators.

Value of the Opportunity (issue, results, outcomes)/*Valeur de l'opportunité (problème, résultats, retombées*):
I have chosen to focus this opportunity on students in China and Brazil for a reason. These two countries have very active systematics programs, including strong leadership in Diptera research. Despite this active research, there are very difficult obstacles to conducting research in both countries. Exchange of specimens and ideas between researchers in these countries and the rest of the world is very limited and has lead to very insular taxonomic and phylogenetic concepts. This opportunity will provide a basis for overcoming this. The student visiting my lab will be able to work with specimens from around the world, employ new molecular techniques in their research, explore developing phylogenetic methodologies and attend international meetings (most importantly, I will pay (from my NSERC) for them to attend the International Congress of Dipterology in Costa Rica in August 2010). They will have an excellent opportunity to interact with my other colleagues in the Diptera Unit as well as the 6 other graduate students in my lab.

D – Describe the qualifications needed (academic, study, knowledge, skills, experiences, *etc.*), and the benefits to the candidate /*Décrire les qualifications requises (études, connaissances, compétences, expériences, etc) et les avantages pour les candidats*

The candidate must have a background in systematic entomology. This should include coursework on insects and biodiversity. At a minimum they will have completed an honours project (BSc) or equivalent on some aspect of systematic entomology. Preferably they will be enrolled in a graduate degree program in systematic entomology. Their focus must be on Syrphidae or Pipunculidae. They should be competent at working with insect specimens and have experience with morphological studies of flies. No molecular genetics background is required. We will provide that training here. The student will benefit by having direct access to the world's largest collections of Syrphidae and Pipunculidae and by having direct access to a global expert on these families as well as to other North American Dipterists. They will obtain training in morphological research, molecular methods, phylogenetic analysis, and have access to one of the best systematic entomology libraries in the world. In addition to having access to CNC scientists and other resources, they will also have access to Carleton University and University of Guelph staff and equipment (my students and I have office space and equipment available at both universities through my adjunct status at these institutions).

OPPORTUNITY/*OPPORTUNITÉ* ID: 2010_Ottawa_14 Return to the List

A – Identification

Type of Candidate (check one or more)/*Type de candidats recherchés (choisir un ou plus)* :

- Graduate students / étudiants des cycles supérieurs: - Ph.D.
- I accept a candidate who wants to register in a Canadian university: (name)/*J'accepte un candidat qui veut s'inscrire dans une université canadienne (nom)* : Univ. of Ottawa, Carleton Univ., Univ. of Waterloo
- Scientist from a university or a research organisation/*Chercheur d'une université ou d'un organisme de recherche*.

If necessary, specify country (or countries) of preference./*Si nécessaire, spécifier le ou les pays de préférence* :
China, India, Italy

Justify if this Opportunity cannot be offered to a Canadian/*Justifiez si cette Opportunité ne peut être offert à un Canadien :*

OPPORTUNITY TITLE/ TITRE DE L'OPPORTUNITÉ : **Prokaryotic microbial population dynamics affecting nutrient cycling in fertilized agricultural soil**

Foreigner's length of stay at AAFC, specify number of months (minimum and/or maximum)/ *Durée du séjour à AAC, spécifier le nombre de mois (minimal et/ou maximal)* : 12-24

Preferred start date before March 31, 2011/
Date de préférence pour le début du séjour avant le 31 mars 2011, specify/*spécifier* : April 2010

Research location in Canada / *Lieu de la recherche au Canada :*
Eastern Cereal and Oilseed Research Centre
Website : http://www.agr.gc.ca/science

City/*Ville*, Province :
Ottawa, ON

Contact:
Dr. Yiu-Kwok Chan
Email/*Courriel* : Yiu-Kwok.Chan@agr.gc.ca
Phone/*Téléphone* : 1-613-759-1663

B – The Research Team/ *L'équipe de recherché*

AAFC Supervisor/*Superviseur à AAC* : Dr. Yiu-Kwok Chan
Other AAFC scientists/*Autres chercheurs d'AAC* : Dr. Bao-Luo Ma
University partners/*Partenaires universitaires* : Josh Neufeld, Univ. of Waterloo
Industry partners/*Partenaires industriels* :

C – Opportunity Description/ *Description de l'Opportunité*

Objective/*Objectif* :
To determine prokaryotic microbial population dynamics affecting nutrient cycling in manure-applied agricultural soil under long-term annual crop rotation.

Value of the Opportunity (issue, results, outcomes)/*Valeur de l'opportunité (problème, résultats, retombées)*:
Nitrogen (N) amendment by manure application in conjunction with legume rotation is deemed economical and environmentally sustainable for maize production compared to chemical N fertilizer application. However, N availability from manure mineralization is lowered by bacteria and archaea via ammonia (NH_3) oxidation to anionic N oxides (nitrite and nitrate), which can be carried in agriculture run-offs to cause water pollution, or further reduced by denitrifying bacteria and archaea to the greenhouse gas nitrous oxide (N_2O). Moreover, anaerobiosis imposed by waterlogged conditions may also result in methane (CH_4) production and oxidation. Excess CH_4 can be emitted as greenhouse gas but may also be coupled to the denitrification of N oxides.
To assess the microbial populations and their dynamics, microcosm experiments will initially be set up with field soils to monitor marker (e.g. 16S rRNA) and functional (*amoA, nirK, mcrA*) gene abundance, which is representative of the bacterial and archaea and their C and N transformation activities involved under various environmental factors. Gene amplification, cloning, nucleotide sequencing and isotope tracer techniques will be used to identify microbial phylotypes to determine their diversity and dominance.

Understanding the interplay of these key soil bacterial and archaeal processes in C and N nutrient cycling and their controlling factors is essential for predicting impacts and guiding agri-environmental applications. It helps in developing management strategies and practices to enhance plant nutrient availability and reduce pollution potential, improving soil structure and maintaining a sustainable agriculture system.

D – Describe the qualifications needed (academic, study, knowledge, skills, experiences, *etc.*), and the benefits to the candidate /*Décrire les qualifications requises (études, connaissances, compétences, expériences, etc) et les avantages pour les candidats*

The incumbent is required to have completed a B.Sc. or M.Sc. degree within the last 3 years with an above-average standing, and is currently enrolled in a Ph.D. program in biological sciences in an accredited university. In the case of a non-native English speaker, certified (e.g. TOEFL) practical knowledge in oral and written communications in the English language is essential. The preferred candidate should have received undergraduate course credits in the general science subjects including chemistry, biology, genetics, ecology, and statistics or their related subjects. Laboratory research experience in using modern analytical techniques and computer software for biochemistry, microbiology, molecular biology, soil biology and biochemistry or plant science is an asset. Personal suitability includes diligence, organization and reporting skills, the ability to tackle complex problems independently and under guidance, and compatibility in coordination with fellow research workers in team work.
The successful candidate will develop and gain valuable analytical skills for experimental design and research planning in solving modern microbial ecology problems by the cultivation-independent approach. Such training opens opportunities to extended microbiological investigations since presently only about 1% of existing microbes are amenable to isolation and cultivation as independent entities.

OPPORTUNITY/*OPPORTUNITÉ* ID: 2010_Ottawa_15 Return to the List

A – Identification

Type of Candidate (check one or more)/*Type de candidats recherchés (choisir un ou plus)* :

- Graduate students / étudiants des cycles supérieurs: - Ph.D.
- Scientist from a university or a research organisation/*Chercheur d'une université ou d'un organisme de recherche*.

If necessary, specify country (or countries) of preference./*Si nécessaire, spécifier le ou les pays de préférence* :

Justify if this Opportunity cannot be offered to a Canadian/*Justifiez si cette Opportunité ne peut être offert à un Canadien :*

OPPORTUNITY TITLE/ TITRE DE L'OPPORTUNITÉ : **Molecular characterization and identification of bacterial strains, potential biopesticdes for sustainable agriculture**

Foreigner's length of stay at AAFC, specify number of months (minimum and/or maximum)/ *Durée du séjour à AAC, spécifier le nombre de mois (minimal et/ou maximal)* : 24

Preferred start date before March 31, 2011/
Date de préférence pour le début du séjour avant le 31 mars 2011, specify/*spécifier* :

Research location in Canada / *Lieu de la recherche au Canada :* City/*Ville*, Province :
Eastern Cereal and Oilseed Research Centre Ottawa, ON
Website : http://www.agr.gc.ca/science

Contact: Email/*Courriel* : james.tambong@agr.gc.ca
Dr. James Tambong Phone/*Téléphone* : 1-613-715-5398

B – The Research Team/ *L'équipe de recherché*

AAFC Supervisor/*Superviseur à AAC* : Dr. James Tambong
Other AAFC scientists/*Autres chercheurs d'AAC* : Dr. Allen Xue
University partners/*Partenaires universitaires* : Prof. Monica Hofte, Ghent University, Belgium
Industry partners/*Partenaires industriels* :

C – Opportunity Description/ *Description de l'Opportunité*

Objective/*Objectif* :
1) Generate 16S rRNA, gacA, recA and gyrA gene sequences from 300 bacterial strains and perform phylogenetic analyses to determine molecular diversity. 2) Exploit the bacterial diversity to identify effective biopesticides against major fungal plant pathogens.

Value of the Opportunity (issue, results, outcomes)/*Valeur de l'opportunité (problème, résultats, retombées*):
Corn and soybean are major economic crops in Canada and China. Canada annually produces more than 8 million metric tons of grain corn and 5 million metric tons of silage corn; a combined value of almost $2 billion. China is the world's second largest corn producer after the United States, accounting for 20 percent of the world's production. Historically and over a long period, soybean production in China ranked first in the world.

The productions of corn and soybean are highly dependent on agricultural inputs such as pesticides. Due to adverse effects of chemical pesticides on the environment and public health, the global priority in agriculture has been the development of low-risk, environmentally and economically sustainable pest control tools and practices, including biopesticides. Soil microorganisms are critical to the maintenance of soil function in both natural and managed agricultural soils. In addition, population of bacteria associated with the crops play key roles in suppressing soilborne plant diseases. Considerable research is underway globally to exploit the potential of one such group of bacteria that belong to fluorescent pseudomonad leading to new industries and market opportunities. The overall goal of this project is to exploit bacterial diversity for sustainability of emerging biopesticide industries.

Expected Outcome: Gain insight of community structure and antagonistic potential of AAFC bacterial isolates by combining phylogenetic and functional gene-based analyses. Identification of effective biopesticide(s) against major soilborne fungal pathogens of corn and soybean.

D – Describe the qualifications needed (academic, study, knowledge, skills, experiences, *etc.*), and the benefits to the candidate /*Décrire les qualifications requises (études, connaissances, compétences, expériences, etc) et les avantages pour les candidats*

Masters of Science degree with at least one year in a Ph.D program in biology or microbiology. Ability to read and write in English.

Benefits to student: Gain practical insight of molecular tools used to assess bacterial biodiversity for potential application in agriculture.

OPPORTUNITY/*OPPORTUNITÉ* ID: 2010_Ottawa_16 Return to the List

A – Identification

Type of Candidate (check one or more)/*Type de candidats recherchés (choisir un ou plus)* :

- Graduate students / étudiants des cycles supérieurs: - Ph.D.

- Scientist from a university or a research organisation/*Chercheur d'une université ou d'un organisme de recherche*.

If necessary, specify country (or countries) of preference./*Si nécessaire, spécifier le ou les pays de préférence* :
China

Justify if this Opportunity cannot be offered to a Canadian/*Justifiez si cette Opportunité ne peut être offert à un Canadien :*

OPPORTUNITY TITLE/ TITRE DE L'OPPORTUNITÉ : **Assessment and Management of China-Canada Science and Technology Cooperation**

Foreigner's length of stay at AAFC, specify number of months (minimum and/or maximum)/ *Durée du séjour à AAC, spécifier le nombre de mois (minimal et/ou maximal)* :	18-24
Preferred start date before March 31, 2011/ *Date de préférence pour le début du séjour avant le 31 mars 2011*, specify/*spécifier* :	
Research location in Canada / *Lieu de la recherche au Canada :* International Scientific Cooperation Bureau Website : http://www.agr.gc.ca/science	City/*Ville*, Province : Ottawa, ON
Contact: **Dr. Jianqiang (Joe) Zhou**	Email/*Courriel* : joe.zhou@agr.gc.ca Phone/*Téléphone* : 1-613-759-1744

B – The Research Team/ *L'équipe de recherché*

AAFC Supervisor/*Superviseur à AAC* : Dr. Jianqiang (Joe) Zhou, Deputy Director, Scientific Relations for China/Asia
Other AAFC scientists/*Autres chercheurs d'AAC* :
University partners/*Partenaires universitaires* :
Industry partners/*Partenaires industriels* :

C – Opportunity Description/ *Description de l'Opportunité*

Since 1982, Agriculture and Agri-food Canada (AAFC) has signed a MOU with China Ministry of Agriculture (MOA) on agricultural cooperation. AAFC has established 6 Science and Innovation Centers in China and these centers provide solid platform to effectively implement bilateral cooperation. While, AAFC-MOE Ph.D. student program has been carrying out since 2005 caused both governments high attention. Based on the scientific cooperation successful, assessment and management of China-Canada S & T program is essential to further strategy preparation. In this project we will assess the background and the current situation of Canada-China S & T cooperation in agriculture, management mechanism to offer both contries to be reference of policy making and markit accessing. We would like to supervise a PhD student on Economic Management to conduct research on "Assessment and Management of China-Canada Agri-S & T Cooperation".

Objective/*Objectif* :
1) To collect China policy, Canada –China agri-products trade and agriculture cooperation information.
2) To study S & T cooperation promoting bilateral relations and trend development.
3) Mechanism of building the innovation centre with Chinese industries and academic departments.

Value of the Opportunity (issue, results, outcomes)/*Valeur de l'opportunité (problème, résultats, retombées*):
This projects deals with assessment and management of China-Canada S & T agricultural cooperation. Both sides need official documents to value the results achieved on ISCB_AAFC-China program. The research will help promote trade, policy making and better relations.

The research will contribute to management knowledge through assessing presented China-Canada agricultural S & T projects. New models will help study in international collaboration for mutual benefit.

D – Describe the qualifications needed (academic, study, knowledge, skills, experiences, *etc.*), and the benefits to the candidate /*Décrire les qualifications requises (études, connaissances, compétences, expériences, etc) et les avantages pour les candidats*

English Imperative; graduate student from Economic Management, or a closely related field, such as policy research, agricultural strategic research.

OPPORTUNITY/*OPPORTUNITÉ* ID: 2010_Québec_02 Return to the List

A – Identification

Type of Candidate (check one or more)/*Type de candidats recherchés (choisir un ou plus)* :

- Graduate students / étudiants des cycles supérieurs: - Ph.D.
- Scientist from a university or a research organisation/*Chercheur d'une université ou d'un organisme de recherche*.

If necessary, specify country (or countries) of preference./*Si nécessaire, spécifier le ou les pays de préférence* :
China

Justify if this Opportunity cannot be offered to a Canadian/*Justifiez si cette Opportunité ne peut être offert à un Canadien :*

OPPORTUNITY TITLE/ TITRE DE L'OPPORTUNITÉ : **Soil Nitrogen Availability in no-till Versus Conventional Tillage Following Freezing and Thawing Cycles**

Foreigner's length of stay at AAFC, specify number of months (minimum and/or maximum)/ *Durée du séjour à AAC, spécifier le nombre de mois (minimal et/ou maximal)* : 15

Preferred start date before March 31, 2011/ *Date de préférence pour le début du séjour avant le 31 mars 2011*, specify/*spécifier* : 15 March 2011

Research location in Canada / *Lieu de la recherche au Canada :* City/*Ville*, Province :
Soils and Crops Research and Development Centre Québec, QC
Website : http://www.agr.gc.ca/science

Contact:
Dr. Noura Ziadi
Email/*Courriel* : noura.ziadi@agr.gc.ca
Phone/*Téléphone* : 1-418-210-5052

B – The Research Team/ *L'équipe de recherché*

AAFC Supervisor/*Superviseur à AAC* : Dr. Noura Ziadi
Other AAFC scientists/*Autres chercheurs d'AAC* : Dr. Roger Lalande, Mr. Bernard Gagnon
University partners/*Partenaires universitaires* : Joann Whalen from McGill University
Industry partners/*Partenaires industriels* :

C – Opportunity Description/ *Description de l'Opportunité*

Objective/*Objectif* :
Alteration of the trends of soil freeze-thaw cycles (FTC), with climate change, will impacts not only road infrastructures and constructions as generally observed, but also a wide range of soil processes important for ecosystems functioning. Little is known about the physical effects of FTC on residues and the subsequent release of their cell contents in the soil environment. It is therefore important to understand how different trends in FTC due to climate change will affect nitrogen (N) status in more stable and long term cropping systems such as conservation tillage.

The general objective of this project is to understand the effects of FTC on soil N biochemistry in corn-soybean rotations under different management practices. More specifically, the objective of this study is to evaluate the effects of seasons and repeated FTC on soil N availability in the topsoil of no-till (NT) and conventional tillage (CT) systems. Objective will be achieved using a long term site (corn-soybean rotation) established since 1992 in Quebec, Canada. The effect of long term N fertilization, no tillage, and FTC on soil N availability, transformation and distribution will be investigated. Soil cores (0–5 cm) will be collected in spring 2011 in plots receiving mineral N fertilizer (36) and will be subjected to various FTC treatments under controlled conditions based on Messiga et al. (2009).

Value of the Opportunity (issue, results, outcomes)/*Valeur de l'opportunité (problème, résultats, retombées*):
This one-year project will start on March 2011 and will be an exceptional opportunity to train a Chinese student on soil analyses. This study will help in improving our understanding of the effects of climate change in the N released from cultivated soils and crop residues after FTC. The long term effect (1992-2011) of mineral N fertilization and cultural practices on soil N availability is an innovative aspect of this project. This project fits directly with several approved AAFC studies (A- Base and SAGES projects). The proposed project will also be an excellent opportunity for both Dr. Zhengyi Hu from China and Dr. Ziadi to strengthen their research potential and continue their collaboration initiated on 2006.

D – Describe the qualifications needed (academic, study, knowledge, skills, experiences, *etc.*), and the benefits to the candidate /*Décrire les qualifications requises (études, connaissances, compétences, expériences, etc) et les avantages pour les candidats*

The selected student should be registered in a Ph. D. program on soil and sustainable agriculture or environment and Natural

resources or equivalent in a Chinese recognized university. He/She should have a good knowledge of methods of soil and plant analyses, and of statistical data analyses.
The project will be an excellent opportunity for the student to be trained with a multidisciplinary team in the area of soil science, soil fertility, and crop agronomy. He/She will have the opportunity to interact/discuss with other students and other scientists from AAFC and at least two others universities (Laval and McGill). This program will be a good opportunity for the candidate to develop contacts in Canada for potential future collaborations. He/She will be trained in the laboratory using the latest equipment and will have the opportunity to learn about Canadian agriculture. A scientific paper will be prepared during this training.

OPPORTUNITY/*OPPORTUNITÉ* ID:	2010_Québec_04a	Return to the List

A – Identification

Type of Candidate (check one or more)/*Type de candidats recherchés (choisir un ou plus)* :

- Graduate students / étudiants des cycles supérieurs: - Ph.D.
- I accept a candidate who wants to register in a Canadian university: (name)/*J'accepte un candidat qui veut s'inscrire dans une université canadienne (nom)* : Université Laval
- Scientist from a university or a research organisation/*Chercheur d'une université ou d'un organisme de recherche*.

If necessary, specify country (or countries) of preference./*Si nécessaire, spécifier le ou les pays de préférence* :

Justify if this Opportunity cannot be offered to a Canadian/*Justifiez si cette Opportunité ne peut être offert à un Canadien :*

OPPORTUNITY TITLE/ TITRE DE L'OPPORTUNITÉ : **Invasive plants and agricultural landscapes**

Foreigner's length of stay at AAFC, specify number of months (minimum and/or maximum)/ *Durée du séjour à AAC, spécifier le nombre de mois (minimal et/ou maximal)* :	20
Preferred start date before March 31, 2011/ *Date de préférence pour le début du séjour avant le 31 mars 2011*, specify/*spécifier* :	October 2010
Research location in Canada / *Lieu de la recherche au Canada :* Soils and Crops Research and Development Centre Website : http://www.agr.gc.ca/science	City/*Ville*, Province : Québec, QC

Contact:
Dr. Marie-Josée Simard
Email/*Courriel* : marie-josee.simard@agr.gc.ca
Phone/*Téléphone* : 1-418-210-5044

B – The Research Team/ *L'équipe de recherché*

AAFC Supervisor/*Superviseur à AAC* : Dr. Marie-Josée Simard
Other AAFC scientists/*Autres chercheurs d'AAC* : Dr. Stephen Darbyshire
University partners/*Partenaires universitaires* : Claude Lavoie
Industry partners/*Partenaires industriels* :

C – Opportunity Description/ *Description de l'Opportunité*

Objective/*Objectif* :
The general objective of this project is to evaluate the impact of road networks on the distribution of invasive plants in the agricultural landscape.

Value of the Opportunity (issue, results, outcomes)/*Valeur de l'opportunité (problème, résultats, retombées)*:
A striking number of invasive species are plants and the economic loss attributed to these plants in North America has been estimated at more than $40 billion annually. Canadian landscapes, including agricultural land are not spared from these invasions. Darbyshire (2002) estimated that 1-2 new species of weeds become established in Canada every year and that this rate is increasing. Road networks could be contributing to the spread of species into crops and agricultural landscape (hedgerows). Documenting the historical and actual spread of species like Pastinaca sativa in Canada would provide information on the dynamics involved in the spread of roadside weeds in agro-ecosystems.

Results would be achieved by 1) analysing data from herbarium records following the methodology in Lavoie et al. 2005 and 2) analysing data from surveys of field edges and roadsides and evaluating the potential use of hyperspectral data. Therefore, two papers would be prepared during this training: 1) Evaluation of Pastinaca sativa spread using historical herbarium records and 2) Effect of roadside proximity on the abundance of invasive plants in field hedgerows.

The research will be very useful in understanding and preventing the future spread of invasive plants. The research will also provide guidelines for hedgerow management to producers and roadside vegetation management.

D – Describe the qualifications needed (academic, study, knowledge, skills, experiences, *etc.*), and the benefits to the candidate /*Décrire les qualifications requises (études, connaissances, compétences, expériences, etc) et les avantages pour les candidats*

The student should be registered in a Ph.D. program in weed science, biology (botany) or related plant science program in a recognized Chinese university. The selected student should have a good knowledge of plant taxonomy, data collection and statistical analysis. The selected student should also have some experience in mapping (GIS) and weed identification.

The project will be an excellent opportunity for the student to learn about Canadian weeds and landscapes. The student would visit the Agriculture and Agri-Food Canada herbarium in Ottawa and the herbarium at Université Laval (Québec). He or she would collaborate with a weed scientist (Marie-Josée Simard), a botanist with an international reputation (Stephen Darbyshire) and an ecologist of plant invasions (Claude Lavoie). He or she would also assist Marie-Josée Simard's team during weed surveys around the province of Québec.

OPPORTUNITY/*OPPORTUNITÉ* ID: 2010_Québec_04b Return to the List

A – Identification

Type of Candidate (check one or more)/*Type de candidats recherchés (choisir un ou plus)* :

- Graduate students / étudiants des cycles supérieurs: - Ph.D.
- I accept a candidate who wants to register in a Canadian university: (name)/*J'accepte un candidat qui veut s'inscrire dans une université canadienne (nom)* : Université Laval
- Scientist from a university or a research organisation/*Chercheur d'une université ou d'un organisme de recherche*.

If necessary, specify country (or countries) of preference./*Si nécessaire, spécifier le ou les pays de préférence* :

Justify if this Opportunity cannot be offered to a Canadian/*Justifiez si cette Opportunité ne peut être offert à un Canadien :*

OPPORTUNITY TITLE/ TITRE DE L'OPPORTUNITÉ : **Traits associated with woolly cupgrass invasion**

Foreigner's length of stay at AAFC, specify number of months (minimum and/or maximum)/ *Durée du séjour à AAC, spécifier le nombre de mois (minimal et/ou maximal)* : 20

Preferred start date before March 31, 2011/ *Date de préférence pour le début du séjour avant le 31 mars 2011*, specify/*spécifier* : October 2010

Research location in Canada / *Lieu de la recherche au Canada :* City/*Ville*, Province :
Soils and Crops Research and Development Centre Québec, QC
Website : http://www.agr.gc.ca/science

Contact:
Dr. Marie-Josée Simard
Email/*Courriel* : marie-josee.simard@agr.gc.ca
Phone/*Téléphone* : 1-418-210-5044

B – The Research Team/ *L'équipe de recherché*

AAFC Supervisor/*Superviseur à AAC* : Dr. Marie-Josée Simard
Other AAFC scientists/*Autres chercheurs d'AAC* : Dr. Stephen Darbyshire, Dr. Yves Castonguay
University partners/*Partenaires universitaires* :
Industry partners/*Partenaires industriels* :

C – Opportunity Description/ *Description de l'Opportunité*

Objective/*Objectif* :
The general objective of this project is to assess genetically based differences in size, fecundity and phenology of life history traits and between native (Chinese) and introduced (invasive in Canada) genotypes of weeds.

Value of the Opportunity (issue, results, outcomes)/*Valeur de l'opportunité (problème, résultats, retombées)*:
Eriochloa villosa is an anuunal grass of East Asian origin (China and bordering countries). It is an important weed of corn and soybean crops now present in 11 U. S. states particularly in corn production areas. It is not consistently controlled by herbicides, increasing production costs by 18%. The spread of the species could have an estimated impact of up to 285 million $/year in Canada (CFIA 2008). It was discovered in Canada for the first time in 2001 in the province of Québec. In 2005, the species was

added to the Weeds Seeds Act. In 2007 it was found at two other locations. In 2008 and 2009 it was found on a fourth (2008) and fifth (2009) farm. At team of 13 participants including national (Canadian Food Inspection Agency) and provincial (Québec Ministry of Agriculture) experts are now on the *E. villosa* case.

The invasiveness of the species would be evaluated by 1) Comparing its phenology and fitness in the greenhouse to that of other agricultural weeds that occupy similar niches (annual grases prevalent in row crops) and 2) Comparing quantitative traits of the species in its native (China) and introduces range (Canada-US) in a reciprocal common garden experiment to determine if there are genetically based differences that suggest that the species has adapted to Norht Amereican conditions, i.e. evolution of competitive ability (EICA) hypothesis. Therefore, two papers would be prepared during this training: 1) Comparative phenology of new and established weeds and 2) Genetically based differences between native and invasive *Eriochola villosa* poputions.

The research will be very useful in understanding and preventing the future spread of invasive plants. The research will also provide guidelines for the management of *Eriochola villosa*.

D – Describe the qualifications needed (academic, study, knowledge, skills, experiences, *etc.*), and the benefits to the candidate /*Décrire les qualifications requises (études, connaissances, compétences, expériences, etc) et les avantages pour les candidats*

The student should be registered in a Ph.D. program in weed science, biology (botany) or related plant science program in a recognized Chinese university. The selected student should have a good knowledge of plant data collection and statistical analysis. The selected student should also have experience in the establishement of experimental plots in fields.

The project will be an excellent opportunity for the student to learn about weeds, invasive plants and weed management in Cnaada. The student would be part of a multidisciplinary team and collaborative with regulatory agencies, Canadian and U.S. researchers, as well as provincial agronomists. The student would be the Canadian contact to establish potential research plots – collaboration in China on this plan that is native to China.

OPPORTUNITY/*OPPORTUNITÉ* ID: 2010_Québec_05 Return to the List

A – Identification

Type of Candidate (check one or more)/*Type de candidats recherchés (choisir un ou plus)* :

- Graduate students / étudiants des cycles supérieurs: - Ph.D.
- Scientist from a university or a research organisation/*Chercheur d'une université ou d'un organisme de recherche*.

If necessary, specify country (or countries) of preference./*Si nécessaire, spécifier le ou les pays de préférence* :

Justify if this Opportunity cannot be offered to a Canadian/*Justifiez si cette Opportunité ne peut être offert à un Canadien :*

OPPORTUNITY TITLE/ TITRE DE L'OPPORTUNITÉ : **Impact of climate change on Canadian grassland systems**

Foreigner's length of stay at AAFC, specify number of months (minimum and/or maximum)/ *Durée du séjour à AAC, spécifier le nombre de mois (minimal et/ou maximal)* : 12-24

Preferred start date before March 31, 2011/ *Date de préférence pour le début du séjour avant le 31 mars 2011*, specify/*spécifier* : September 2010

Research location in Canada / *Lieu de la recherche au Canada :* City/*Ville*, Province :
Soils and Crops Research and Development Centre Québec, QC
Website : http://www.agr.gc.ca/science

Contact:
Dr. Annick Bertrand
Email/*Courriel* : annick.bertrand@agr.gc.ca
Phone/*Téléphone* : 1-418-210-5005

B – The Research Team/ *L'équipe de recherché*

AAFC Supervisor/*Superviseur à AAC* : Dr. Annick Bertrand
Other AAFC scientists/*Autres chercheurs d'AAC* : Dr. Gilles Bélanger, Dr. Yves Castonguay, Dr. Gaëtan Tremblay
University partners/*Partenaires universitaires* :
Industry partners/*Partenaires industriels* :

C – Opportunity Description/ *Description de l'Opportunité*

Objective/*Objectif* :

The student will be involved in a project to assess the impact of climate change on Canadian grassland systems, as part of a cross-Canada project within the framework of the program "Sustainable Agricultural Environmental Systems (SAGES)", involving prominent scientists in agronomy, physiology, biochemistry, and animal nutrition. More specifically, the project involves experimentations that will be conducted under controlled conditions to study the impact of several factors (CO_2, temperature, water stress) on several Canadian forage species. Crop growth, morphological and chemical characteristics, and nutritive value will be determined.

Value of the Opportunity (issue, results, outcomes)/*Valeur de l'opportunité (problème, résultats, retombées)*:
This research project will provide essential information for the development of adaptation strategies to the challenge and opportunities of climate change for Canadian grasslands and rangelands. The new knowledge generated by this project will be disseminated through scientific papers and communications at scientific meetings, and will be integrated in a model of growth and nutritive value of forage crops.

D – Describe the qualifications needed (academic, study, knowledge, skills, experiences, *etc.*), and the benefits to the candidate /*Décrire les qualifications requises (études, connaissances, compétences, expériences, etc) et les avantages pour les candidats*

The student must have obtained a M.Sc. (or the equivalent) in plant biology, agronomy, or in a related field. He/she should have a good knowledge of methods of plant analyses and statistical analyses, and some experience in the conduct of experiments. The project will be an excellent opportunity for the student to be trained with a multidisciplinary in the area of crop physiology, biochemistry, agronomy, and nutritive value of forage crops. He/she will be trained in the laboratory using the latest equipment and will have the opportunity of carrying out experiments under controlled conditions.

OPPORTUNITY/*OPPORTUNITÉ* ID: 2010_Québec_06 Return to the List

A – Identification

Type of Candidate (check one or more)/*Type de candidats recherchés (choisir un ou plus)* :

- Graduate students / étudiants des cycles supérieurs: - Ph.D.
- Scientist from a university or a research organisation/*Chercheur d'une université ou d'un organisme de recherche*.

If necessary, specify country (or countries) of preference./*Si nécessaire, spécifier le ou les pays de préférence* :
China

Justify if this Opportunity cannot be offered to a Canadian/*Justifiez si cette Opportunité ne peut être offert à un Canadien :*

OPPORTUNITY TITLE/ TITRE DE L'OPPORTUNITÉ : **Agri-Environmental Study for Wheat and Corn Productivity as Affected by Soil Texture and Nitrogen Fertilization**

Foreigner's length of stay at AAFC, specify number of months (minimum and/or maximum)/ *Durée du séjour à AAC, spécifier le nombre de mois (minimal et/ou maximal)* : 12

Preferred start date before March 31, 2011/ *Date de préférence pour le début du séjour avant le 31 mars 2011*, specify/*spécifier* : November 2010

Research location in Canada / *Lieu de la recherche au Canada :* City/*Ville*, Province :
Pedology and Precision Agriculture Laboratories Québec, QC
Website : http://www.agr.gc.ca/science

Contact:
Dr. Athyna Cambouris
Email/*Courriel* : Athyna.Cambouris@agr.gc.ca
Phone/*Téléphone* : 1-418-648-7749 ext. 29

B – The Research Team/ *L'équipe de recherché*

AAFC Supervisor/*Superviseur à AAC* : Dr. Athyna Cambouris
Other AAFC scientists/*Autres chercheurs d'AAC* : Dr. Noura Ziadi, Dr Michel Nolin & Dr Nicolas Tremblay
University partners/*Partenaires universitaires* :
Industry partners/*Partenaires industriels* : Synagri Inc.

C – Opportunity Description/ *Description de l'Opportunité*

Objective/*Objectif* :
In corn (*Zea mays* L.) and spring milling wheat (*Triticum aestivum* L.) productions, adequate nitrogen (N) fertilization should be adjusted to optimize productivity (yield and quality) and minimize negative environmental impacts of N addition. The site specific effect of the soil surface texture is unfortunately ignored in most corn and wheat N fertilization studies even if it could influence N

use efficiency and leaching potential. Furthermore, the site specific effect could be very helpful in determining specific agro-environmental N rates for crops.

Our objective will be to evaluate the effect of soil texture and N fertilization on soil water nitrate concentration (SWNC) and residual soil nitrate (RSN) in corn and wheat produced in eastern Canada.
Collected data from experiments conducted between 2004 and 2006 in eastern Canada will be used.
Indeed, four site-years for each crop were conducted in different soil surface textures for three years. Suction lysimeters at 60-cm-depth were installed in each plot to collect and analyse SWNC during the three growing seasons to compare the potential of nitrate leaching for different N rates and soil texture. Soil water was collected 24 hours after an important (intensity and quantity) precipitation. The RSN was determined in each experimental site under both cultures.

Value of the Opportunity (issue, results, outcomes)/*Valeur de l'opportunité (problème, résultats, retombées*):
This project will provide critical information about both in-season and after harvest N leaching in order to minimise the negative environmental impact of N fertilization. The project will give the opportunity for a young Chinese scientist to become familiar with the challenge of N fertilization and its double impact on productivity and environmental losses.

D – Describe the qualifications needed (academic, study, knowledge, skills, experiences, *etc.*), and the benefits to the candidate /*Décrire les qualifications requises (études, connaissances, compétences, expériences, etc) et les avantages pour les candidats*

The project will be an excellent opportunity for the scientist to be trained in the area of agri-environmental fertilization of soil and agronomy. He/She will have the opportunity to interact/discuss with other post-doctoral fellows/students and other scientists from AAFC. This program will be a good opportunity for the candidate to develop contacts in Canada for potential future collaborations The project is scheduled from November 2010 to October 2011.

The selected scientist should have a Ph.D. in soil science or on soil and sustainable agriculture or environment and Natural resources or equivalent in a Chinese recognized university.
The selected scientist should have a good knowledge of methods of soil and plant analyses, and of statistical data analyses (SAS, Proc Mixed). Excellent scientific writing skills would be an asset. Two scientific manuscripts will be prepared during this period.

OPPORTUNITY/*OPPORTUNITÉ* ID: 2010_Saskatoon_02 Return to the List

A – Identification

Type of Candidate (check one or more)/*Type de candidats recherchés (choisir un ou plus)* :

- Graduate students / étudiants des cycles supérieurs: - Ph.D.
- Scientist from a university or a research organisation/*Chercheur d'une université ou d'un organisme de recherche*.

If necessary, specify country (or countries) of preference./*Si nécessaire, spécifier le ou les pays de préférence* :

Justify if this Opportunity cannot be offered to a Canadian/*Justifiez si cette Opportunité ne peut être offert à un Canadien :*

OPPORTUNITY TITLE/ TITRE DE L'OPPORTUNITÉ : **Developing doubled haploid technology for crucifer crops**

Foreigner's length of stay at AAFC, specify number of months (minimum and/or maximum)/ *Durée du séjour à AAC, spécifier le nombre de mois (minimal et/ou maximal)* : 12-18

Preferred start date before March 31, 2011/ *Date de préférence pour le début du séjour avant le 31 mars 2011*, specify/*spécifier* : April 2010

Research location in Canada / *Lieu de la recherche au Canada :* City/*Ville*, Province :
Saskatoon Research Centre Saskatoon, SK
Website : http://www.agr.gc.ca/science

Contact: Email/*Courriel* : ginette.seguin-swartz@agr.gc.ca
Dr. Ginette Séguin-Swartz Phone/*Téléphone* : 1-306-956-7262

B – The Research Team/ *L'équipe de recherché*

AAFC Supervisor/*Superviseur à AAC* : Dr. Ginette Séguin-Swartz
Other AAFC scientists/*Autres chercheurs d'AAC* : Dr. Bifang Cheng and Dr. Kevin Falk
University partners/*Partenaires universitaires* :
Industry partners/*Partenaires industriels* :

C – Opportunity Description/ *Description de l'Opportunité*

Objective/*Objectif* :
The objective is to develop doubled haploid (DH) technology for oilseed crucifers important to Canada, such as Sinapis alba (yellow mustard) and Camelina sativa (false flax), which are currently recalcitrant to this technique. DH technology, based on the ability of immature pollen grains (microspores) to develop into plants, is routinely used in crucifer crops, such as Brassica napus (canola) and Brassica juncea (brown mustard), to produce homozygous lines for breeding, genetic and genomics studies.

Value of the Opportunity (issue, results, outcomes)/*Valeur de l'opportunité (problème, résultats, retombées)*:
Yellow mustard and false flax are currently recalcitrant to DH technology. Our laboratory has been able to produce a few DH lines in S. alba and a few DH plants in C. sativa, but the number of lines and plants remains too small for practical use in research and breeding programs. Further improvement of the technology is urgently needed to increase the frequency of microspore embryogenesis and to render the technique applicable to a wide range of genotypes in both species. DH technology allows the production of pure lines with novel, fixed desirable characteristics in a single generation, bypassing potentially many generations of inbreeding that are required to fix traits. The development of DH technology suitable for a wide variety of germplasm of yellow mustard and false flax will substantially accelerate germplasm and cultivar development in these species, hence making a positive impact on the mustard and false flax industry and research community.

D – Describe the qualifications needed (academic, study, knowledge, skills, experiences, *etc.*), and the benefits to the candidate /*Décrire les qualifications requises (études, connaissances, compétences, expériences, etc) et les avantages pour les candidats*

Minimum academic requirement: M.Sc. degree (or equivalent) with knowledge and/or expertise in plant biology (plant breeding, crop science, or plant genetics).
Benefits to candidate: Opportunity to work at AAFC's premier centre for oilseed crucifer breeding research, located in close proximity to the University of Saskatchewan, the Plant Biotechnology Institute of the National Research Council of Canada, and several oilseed industry leading companies. The Saskatoon Research Centre features 1) modern plant breeding, agronomy, oilseed quality analysis, cytogenetics, genomics, bioinformatics, and marker-assisted selection laboratories; 2) a fully equipped plant biotechnology laboratory and staff with extensive experience in doubled haploid production; 3) modern plant growing facilities (growth chambers and greenhouses) to raise plant material; 4) access to the extensive holdings of the Canadian Library of Agriculture, and 5) state-of-the-art informatics services. The candidate will acquire a solid background in aseptic technology, in

vitro microspore culture technology and medium design, plant regeneration technology, ploidy analysis and cytological techniques.

OPPORTUNITY/*OPPORTUNITÉ* ID:	2010_Saskatoon_03	Return to the List

A – Identification

Type of Candidate (check one or more)/*Type de candidats recherchés (choisir un ou plus)* :

- Graduate students / étudiants des cycles supérieurs: - Master's or equivalent / *Maîtrise ou équivalent* - Ph.D.
- Scientist from a university or a research organisation/*Chercheur d'une université ou d'un organisme de recherche*.

If necessary, specify country (or countries) of preference./*Si nécessaire, spécifier le ou les pays de préférence* :

Justify if this Opportunity cannot be offered to a Canadian/*Justifiez si cette Opportunité ne peut être offert à un Canadien :*
Available to a Canadian student providing they can obtain funding.

OPPORTUNITY TITLE/ TITRE DE L'OPPORTUNITÉ : **Biocontrol agents on canola clubroot pathogen**

Foreigner's length of stay at AAFC, specify number of months (minimum and/or maximum)/ *Durée du séjour à AAC, spécifier le nombre de mois (minimal et/ou maximal)* :	24-36
Preferred start date before March 31, 2011/ *Date de préférence pour le début du séjour avant le 31 mars 2011*, specify/*spécifier* :	September 2010
Research location in Canada / *Lieu de la recherche au Canada :* University of Saskatchewan Website : http://www.agr.gc.ca/science	City/*Ville*, Province : Saskatoon, SK
Contact: **Dr. Russell Hynes**	Email/*Courriel* : russell.hynes@agr.gc.ca Phone/*Téléphone* : 1-306-956-7638

B – The Research Team/ *L'équipe de recherché*

AAFC Supervisor/*Superviseur à AAC* : Dr. Russell Hynes, also Adjunct Prof. University of Saskatchewan
Other AAFC scientists/*Autres chercheurs d'AAC* : Drs. Gary Peng, Susan Boyetchko
University partners/*Partenaires universitaires* : Darren Korber, Dept. of Food & Bioproduct Science, University of Saskatchewan
Industry partners/*Partenaires industriels* : Becker Underwood Inc., Saskatoon

C – Opportunity Description/ *Description de l'Opportunité*

Proposed research. We propose to address key questions for advancing biocontrol agents for product development. 1. Investigate colonization of the canola rhizosphere and entry of endophytic biocontrol agents into the canola root in relation to application timing and clubroot control efficacy; 2. Develop formulation and delivery strategies for biocontrol agents/products for practical application of clubroot biocontrol in canola cropping systems.

Objective/*Objectif* :
To reveal the mode of action of promising biocontrol microorganisms on the canola clubroot pathogen and apply this information to a formulation and delivery strategy for management of this disease. This has implications on product registration with Health Canada and product development.

Value of the Opportunity (issue, results, outcomes)/*Valeur de l'opportunité (problème, résultats, retombées*):
The value of this opportunity and of this research program are to i) develop formulation and application technologies for biopesticides for plant disease management in field crops, ii) promote the transfer of this technology to the agriculture industry sector. The candidate has the opportunity to conduct research in a first class research laboratory, interact with internationally respected and knowledgeable research scientists and receive training on biopesticide product development and registration.

Graduate student candidate will receive training in handling bacteria and fungi, plant cultivation, and biopesticide formulation development including operating the following equipment extruder, spheronizer, fluidization bed dryer and particle sizer (Mastersizer 2000 laser scanning system).

D – Describe the qualifications needed (academic, study, knowledge, skills, experiences, *etc.*), and the benefits to the candidate /*Décrire les qualifications requises (études, connaissances, compétences, expériences, etc) et les avantages pour les candidats*

The internship program is a MSc with possible shift to Ph.D. candidacy, based on course and laboratory competency, at the University of Saskatchewan (U of S). It involves course work at the graduate level in the disciplines related to biopesticides and

bioproducts (i.e. applied microbiology, weed science, and statistics) and laboratory training in designing experiments and using a range of state-of-the-art instrumentation.

Candidate qualifications must include a B.Sc. or equivalent degree from a recognized university in microbiology or plant pathology, English language proficiency (minimum TOFEL mark 80%)as outlined by the College of Graduate Studies and Research at the U of S, and the minimum admission requirements for international students of the College of Graduate Studies and Research at the U of S (www.usask.ca/cgsr).

The candidate will benefit by:

- Graduating with a MSc or Ph.D., which will provide knowledge and experience in plant pathology and the development of biopesticides using a variety of strategies and techniques.
- Acquiring in-depth understanding of biopesticide industry and R&D tools
- Learning how to prepare and submit scientific publications
- Working in a research team
- Becoming more proficient at working in second language (written and oral skills) and appreciating another culture

OPPORTUNITY/*OPPORTUNITÉ* ID:	2010_Saskatoon_04	Return to the List

A – Identification

Type of Candidate (check one or more)/*Type de candidats recherchés (choisir un ou plus)* :

- Graduate students / étudiants des cycles supérieurs: - Ph.D.
- Scientist from a university or a research organisation/*Chercheur d'une université ou d'un organisme de recherche*.

If necessary, specify country (or countries) of preference./*Si nécessaire, spécifier le ou les pays de préférence* :

Justify if this Opportunity cannot be offered to a Canadian/*Justifiez si cette Opportunité ne peut être offert à un Canadien :*

OPPORTUNITY TITLE/ TITRE DE L'OPPORTUNITÉ : **Molecular characterization of wheat adaptation genes**

Foreigner's length of stay at AAFC, specify number of months (minimum and/or maximum)/ *Durée du séjour à AAC, spécifier le nombre de mois (minimal et/ou maximal)* :	12-24
Preferred start date before March 31, 2011/ *Date de préférence pour le début du séjour avant le 31 mars 2011*, specify/*spécifier* :	April 2010
Research location in Canada / *Lieu de la recherche au Canada :* Saskatoon Research Centre Website : http://www.agr.gc.ca/science	City/*Ville*, Province : Saskatoon, SK

Contact: **Dr. Yong-Bi Fu**	Email/*Courriel* : yong-bi.fu@agr.gc.ca Phone/*Téléphone* : 1-306-956-7642

B – The Research Team/ *L'équipe de recherché*

AAFC Supervisor/*Superviseur à AAC* : Dr. Yong-Bi Fu
Other AAFC scientists/*Autres chercheurs d'AAC* : Dr. Ron DePauw, SPARC, Swift Current, SK
University partners/*Partenaires universitaires* :
Industry partners/*Partenaires industriels* :

C – Opportunity Description/ *Description de l'Opportunité*

Objective/*Objectif* :
The overall goal is to enhance the utilization and conservation of diverse wheat germplasm for sustainable wheat improvement to climate change. The specific objectives are 1) to infer the genetic basis of wheat adaptation by characterizing adaptation genes and categorizing unique adaptation alleles and 2) to develop effective strategies for searching unique wheat germplasm of wide adaptation.

Value of the Opportunity (issue, results, outcomes)/*Valeur de l'opportunité (problème, résultats, retombées)*:
Wheat is one of the most important staple crops world-wide. Wheat genetic improvement depends largely on genetic variability available in the adapted wheat gene pool. Molecular characterization of diverse wheat germplasm provides essential information for understanding the genetic basis of wheat adaptation and useful guidance to utilization of wheat germplasm for further genetic improvement. Recently, a number of wheat genes associated with adaptation to environment stresses such as drought, salinity, winter hardiness, early maturity, have been cloned. However, there is lack of detailed characterization of these adaptation genes in improved wheat gene pools. Research effort is warranted to characterize and categorize the unique adaptation alleles for

sustainable wheat improvement to various environment stresses. Expected outcomes include the scientific information on wheat adaptation genes, a list of genetically unique wheat germplasm, and scientific publications.
D – Describe the qualifications needed (academic, study, knowledge, skills, experiences, *etc.*), and the benefits to the candidate /*Décrire les qualifications requises (études, connaissances, compétences, expériences, etc) et les avantages pour les candidats*
The Internship Program: The candidate is expected to conduct molecular research supervised by the research scientist by planting wheat seeds in greenhouse, collecting leave tissue, extracting DNAs, performing sequence analysis of various adaptation genes, analyzing sequence data with advanced bioinformatics tools, and publishing scientific findings. Qualifications: The candidate should pursue or hold a PhD degree in molecular biology or plant genetic from a recognized university, is proficient in English, and is motivated to do independent scientific research. Benefits to visitor: Saskatoon Research Centre is a state of art plant biotechnology/ genomics research facility. The candidate will have the opportunity to gain research experience in plant genomics and bioinformatics. The candidate will also have the opportunity to interact with other research groups within and outside the centre through joint lab meetings, collaborations, workshops and conferences.

OPPORTUNITY/*OPPORTUNITÉ* ID: 2010_SJSR_01a Return to the List

A – Identification

Type of Candidate (check one or more)/*Type de candidats recherchés (choisir un ou plus)* :

- Graduate students / étudiants des cycles supérieurs: - Master's or equivalent / *Maîtrise ou équivalent* - Ph.D.
- I accept a candidate who wants to register in a Canadian university: (name)/*J'accepte un candidat qui veut s'inscrire dans une université canadienne (nom)* : McGill University
- Scientist from a university or a research organisation/*Chercheur d'une université ou d'un organisme de recherche*.

If necessary, specify country (or countries) of preference./*Si nécessaire, spécifier le ou les pays de préférence* :

Justify if this Opportunity cannot be offered to a Canadian/*Justifiez si cette Opportunité ne peut être offert à un Canadien :*
Available to a Canadian student providing they can obtain funding.

OPPORTUNITY TITLE/ TITRE DE L'OPPORTUNITÉ : **Development of disease resistant fruit lines for niche marketing (fresh cut, juice and ice cider)**

Foreigner's length of stay at AAFC, specify number of months (minimum and/or maximum)/ *Durée du séjour à AAC, spécifier le nombre de mois (minimal et/ou maximal)* : 24-36

Preferred start date before March 31, 2011/ *Date de préférence pour le début du séjour avant le 31 mars 2011*, specify/*spécifier* : January 2011

Research location in Canada / *Lieu de la recherche au Canada :* City/*Ville*, Province :
Horticulture Research and Development Centre St-Jean-sur-Richelieu, QC
Website : http://www.agr.gc.ca/science

Contact:
Dr. Shahrokh Khanizadeh
Email/*Courriel* : shahrokh.khanizadeh@agr.gc.ca
Phone/*Téléphone* : 1-450-515-2058

B – The Research Team/ *L'équipe de recherché*

AAFC Supervisor/*Superviseur à AAC* : Dr. Shahrokh Khanizadeh
Other AAFC scientists/*Autres chercheurs d'AAC* : Drs. M-T Charles, Rong Cao, Jason McCallum
University partners/*Partenaires universitaires* : Danielle J. Donnelly/McGill University
Industry partners/*Partenaires industriels* : Fraise d'Ile d"Orleans, Lareault Inc., Phytoclone Inc.

C – Opportunity Description/ *Description de l'Opportunité*

The proposed research is aligned with several AAFC priorities including opportunities for agriculture from bioresources, Enhancement of human health through nutrition and innovative products, enhancement of economic benefits to stakeholders and targets the environmental health by developing disease resistant cultivars. It will support the strawberry and apple production and the marketing industry of the northern climate and contribute to the diversification and expansion of the industry by developing unique fruits.

The proposed research consists of short and long term priorities. The short term priorities are fundamental research to develop techniques to accelerate the breeding process with participation of graduate students, post doctorate and visiting fellows, including invited trainees or internships. The long term goal of this proposal is to develop new lines for fruit ice wine and fruit wine, and increase the level of polyphenols in strawberry and raspberry cultivars to increase/change their polyphenolic composition to develop lines suitable for processing and/or fresh market.

There has been an increase in processed food and diversification of many fruit crops including processed, semi-processed and off season fruits, nationally and internationally. Consumers have higher purchasing power and demand fresher, healthier and more nutritious foods, yet at the same time want more convenience, off season and fast foods. The industry searches for new products and niche marketing, opportunities to address the consumer needs. The market is normally saturated with low price produced or imported fruits and a new product adapted to our climate such as ice cider, fruit juice, dried and sliced fruits, or, off season strawberries and raspberries can help to improve the industry and make it more competitive.

Objective/*Objectif* :
Develop methodology/technique to reduce time from crossing to naming by using novel techniques like chlorophyll florescence or chemical composition, e.g. phytochemical, sugar and acidity vs disease resistance & fruit quality as a biochemical marker to select disease resistant lines with long shelf life for processing and/or fresh market.

Value of the Opportunity (issue, results, outcomes)/*Valeur de l'opportunité (problème, résultats, retombées*):

The outcome of the proposal will ensure safe, nutritious and quality food for consumers while reducing environmental impacts and use of pesticides and, will also reduce risks through diversification and adaptation of new lines while all together help the growers/industries to be more competitive and get a higher dollar return.

D – Describe the qualifications needed (academic, study, knowledge, skills, experiences, *etc.*), and the benefits to the candidate /*Décrire les qualifications requises (études, connaissances, compétences, expériences, etc) et les avantages pour les candidats*

The internship program will be on developing fruit crops for processing with emphases on chemical composition in relation to fruit quality, shelf life and disease resistance. The priorities are on performing fundamental research to develop techniques to accelerate the breeding process, including development of off season fruits by selecting early or late variety using chlorophyll florescence (CF). The selected candidate will continue the work done by other visiting scholars (see list of publication), learn fruit culture and get some experience in physiology and chemistry. He/she should be willing to work in the field as well as in a laboratory and should be able to use HPLC, electrophoresis and other laboratory equipment. The candidate will work on part of a large breeding program and learn how to do the crossing and selections and look for characteristics helping to breed a new line for processing (fresh, dried fruit slices, juice & cider). The candidate will also have the opportunity to visit and work with other Centers and universities with whom we will collaborate during her/his internship.

OPPORTUNITY/*OPPORTUNITÉ* ID: 2010_SJSR_01b Return to the List

A – Identification

Type of Candidate (check one or more)/*Type de candidats recherchés (choisir un ou plus)* :

- Graduate students / étudiants des cycles supérieurs: - Master's or equivalent / *Maîtrise ou équivalent* - Ph.D.
- I accept a candidate who wants to register in a Canadian university: (name)/*J'accepte un candidat qui veut s'inscrire dans une université canadienne (nom)* : McGill University
- Scientist from a university or a research organisation/*Chercheur d'une université ou d'un organisme de recherche*.

If necessary, specify country (or countries) of preference./*Si nécessaire, spécifier le ou les pays de préférence* :

Justify if this Opportunity cannot be offered to a Canadian/*Justifiez si cette Opportunité ne peut être offert à un Canadien :*
Available to a Canadian student providing they can obtain funding.

OPPORTUNITY TITLE/ TITRE DE L'OPPORTUNITÉ : **Development of winter hardy disease resistant thornless *Rubus* cultivars with long shelf-life, rich in phytonutrient**

Foreigner's length of stay at AAFC, specify number of months (minimum and/or maximum)/ *Durée du séjour à AAC, spécifier le nombre de mois (minimal et/ou maximal)* : 24-36

Preferred start date before March 31, 2011/ *Date de préférence pour le début du séjour avant le 31 mars 2011*, specify/*spécifier* : January 2011

Research location in Canada / *Lieu de la recherche au Canada :* City/*Ville*, Province :
Horticulture Research and Development Centre St-Jean-sur-Richelieu, QC
Website : http://www.agr.gc.ca/science

Contact: Email/*Courriel* : shahrokh.khanizadeh@agr.gc.ca
Dr. Shahrokh Khanizadeh Phone/*Téléphone* : 1-450-515-2058

B – The Research Team/ *L'équipe de recherché*

AAFC Supervisor/*Superviseur à AAC* : Dr. Shahrokh Khanizadeh
Other AAFC scientists/*Autres chercheurs d'AAC* : Drs. M-T Charles, Rong Cao, Jason McCallum, Chaim Kempler
University partners/*Partenaires universitaires* : Danielle J. Donnelly/McGill University
Industry partners/*Partenaires industriels* : Fraise d'Ile d"Orleans, Lareault Inc., Phytoclone Inc.

C – Opportunity Description/ *Description de l'Opportunité*

Objective/*Objectif* :
Rubus plants including raspberry are very important for table and processing purposes. Canadian production of raspberries was about 0.13 million metric tons in 2007 (FAO 2009). It is essential to develop improved *Rubus* cultivars under Canadian environment for various traits. The current study aims to develop thornless *Rubus* cultivars with long shelf-life, high phytonutrient content, good sensory qualities, and high disease resistance levels through selection among somaclones regenerated using somatic embryogenesis technology. Hundreds of somaclones will be produced in vitro through isolation from the chimeric tissues of the *Rubus* cultivars, adapted in the greenhouse, and field evaluated for thornlessness and phytonutrient traits. Selection process

will be first done based on plant growth in culture, vigor in the greenhouse, and performance in the field. Post-harvest fruit characteristics including yield, disease response to surrounding pathogens, and phytonutrients will be examined. Somaclones selected for improved traits will be further field-tested to confirm the improved traits and test for stability. Application of the somatic embryogenesis technology for *Rubus* improvement will reduce time required to release a new cultivar and facilitate development of thornlessness.

D – Describe the qualifications needed (academic, study, knowledge, skills, experiences, *etc.*), and the benefits to the candidate /*Décrire les qualifications requises (études, connaissances, compétences, expériences, etc) et les avantages pour les candidats*

The candidate should have a MSc, PhD degree or post Doc (researcher) or being completing their graduate studies from a University with knowledge of tissue culture, plant breeding and laboratory experience willing to do a part of the work in field. The candidate will gain immense experience in plant improvement techniques including crossing, selection among somaclones, and release of a new cultivar. Also, he will be engaged in writing manuscript articles and presenting the work in different international conferences. The candidate will work on part of a large breeding program and learn how to do the crossing and selections and look for characteristics helping to breed a new line. The candidate will also have the opportunity to visit and work with other Centers and universities with whom we will collaborate during her/his internship.

OPPORTUNITY/*OPPORTUNITÉ* ID: 2010_StHyacinthe_03 Return to the List

A – Identification

Type of Candidate (check one or more)/*Type de candidats recherchés (choisir un ou plus)* :

- Graduate students / étudiants des cycles supérieurs: - Ph.D.
- Scientist from a university or a research organisation/*Chercheur d'une université ou d'un organisme de recherche*.

If necessary, specify country (or countries) of preference./*Si nécessaire, spécifier le ou les pays de préférence* :

Justify if this Opportunity cannot be offered to a Canadian/*Justifiez si cette Opportunité ne peut être offert à un Canadien :*

OPPORTUNITY TITLE/ TITRE DE L'OPPORTUNITÉ : **Beef, Pork and the Chinese Canadian Community**

Foreigner's length of stay at AAFC, specify number of months (minimum and/or maximum)/ *Durée du séjour à AAC, spécifier le nombre de mois (minimal et/ou maximal)* : 12-24

Preferred start date before March 31, 2011/ *Date de préférence pour le début du séjour avant le 31 mars 2011*, specify/*spécifier* : September 2010

Research location in Canada / *Lieu de la recherche au Canada :* City/*Ville*, Province :
Food Research and Development Centre Saint-Hyacinthe, QC
Website : http://www.agr.gc.ca/science

Contact: Email/*Courriel* : tania.ngapo@agr.gc.ca
Dr. Tania Manu NGAPO Phone/*Téléphone* : 1-450-768-3300

B – The Research Team/ *L'équipe de recherché*

AAFC Supervisor/*Superviseur à AAC* : Dr. Tania Manu NGAPO
Other AAFC scientists/*Autres chercheurs d'AAC* :
University partners/*Partenaires universitaires* : Nanjing University, China; North Dakota State University, USA
Industry partners/*Partenaires industriels* :

C – Opportunity Description/ *Description de l'Opportunité*

Objective/*Objectif* :
The objectives of the project are two-fold:
1. To study the beef- and pork-related habits of the Mandarin speaking Chinese community in Montreal, with an emphasis on time/generation since immigration.
2. To learn of and describe Chinese processed beef and pork products that are not found and/or manufactured in Canada, but are sought after by members of this community.

Value of the Opportunity (issue, results, outcomes)/*Valeur de l'opportunité (problème, résultats, retombées)*:
In China, pork is an integral staple of the Chinese diet, with more than half the population eating pork ≥3 times a week. Beef is also a significant dietary component, but eaten less often than pork due to cultural, price and availability differences. The Chinese community in Canada is estimated at more than 1 million with an average of 30,000 arriving every year. The large and growing population of avid meat eaters represents a significant potential for the Canadian fresh meat industry. But do these eating habits change once emigrating from China? Is beef consumed relatively more often with the greater availability and financial accessibility? Does pork continue to play a significant role in the Chinese diet? Are there Chinese cuts and processed products that are not being exploited? Do these cuts and processed meats have relevance in the Canadian domestic market? Are studies undertaken on the Chinese community in Canada transposable to the Chinese market which is rapidly losing its capacity to fill its demand for both pork and beef? Answers to some of these questions could highlight a potential domestic market for the meat industry that may translate to even greater potential in the global market. Hence the proposal to study eating habits of the Chinese community in Montreal.

D – Describe the qualifications needed (academic, study, knowledge, skills, experiences, *etc.*), and the benefits to the candidate /*Décrire les qualifications requises (études, connaissances, compétences, expériences, etc) et les avantages pour les candidats*

Qualifications required are a background in meat science and statistical analyses, knowledge of Chinese culture and fluency in Mandarin. A student at PhD level minimum is required in order that the study can be undertaken with increasing autonomy during the two years in Canada and such that should time permit, the study could continue in China upon the students return. The student has specifically asked to work in this research domain as a part of his PhD thesis allowing him to learn new research techniques and new applications in statistical methods of analyses. This scheme would also provide the opportunity for the

student to undertake research in a foreign laboratory, in a domain that he does not have access to at his university and to meet researchers that he would perhaps otherwise not have the chance to meet.

OPPORTUNITY/*OPPORTUNITÉ* ID: 2010_StHyacinthe_04a Return to the List

A – Identification

Type of Candidate (check one or more)/*Type de candidats recherchés (choisir un ou plus)* :

- Graduate students / étudiants des cycles supérieurs: - Ph.D.
- I accept a candidate who wants to register in a Canadian university: (name)/*J'accepte un candidat qui veut s'inscrire dans une université canadienne (nom)* : McGill University
- Scientist from a university or a research organisation/*Chercheur d'une université ou d'un organisme de recherche*.

If necessary, specify country (or countries) of preference./*Si nécessaire, spécifier le ou les pays de préférence* :
Chile, India, Brazil, Italy, Egypt

Justify if this Opportunity cannot be offered to a Canadian/*Justifiez si cette Opportunité ne peut être offert à un Canadien :*
Canadian students can also apply if they have their own funding.

OPPORTUNITY TITLE/ TITRE DE L'OPPORTUNITÉ : **Molecular and structural properties of bioactive and allergenic food proteins and peptides**

Foreigner's length of stay at AAFC, specify number of months (minimum and/or maximum)/ *Durée du séjour à AAC, spécifier le nombre de mois (minimal et/ou maximal)* : 12-36

Preferred start date before March 31, 2011/ *Date de préférence pour le début du séjour avant le 31 mars 2011*, specify/*spécifier* : September 2010

Research location in Canada / *Lieu de la recherche au Canada :* City/*Ville*, Province :
Food Research and Development Centre Saint-Hyacinthe, QC
Website : http://www.agr.gc.ca/science

Contact: Email/*Courriel* : joyce.boye@agr.gc.ca
Dr. Joyce Boye Phone/*Téléphone* : 1-450-768-3232

B – The Research Team/ *L'équipe de recherché*

AAFC Supervisor/*Superviseur à AAC* : Dr. Joyce Boye
Other AAFC scientists/*Autres chercheurs d'AAC* :
University partners/*Partenaires universitaires* :
Industry partners/*Partenaires industriels* :

C – Opportunity Description/ *Description de l'Opportunité*

Objective/*Objectif* :
Food proteins and peptides are essential sources of nutrient in the diet. Many plant proteins also possess bioactive properties that may be beneficial to health. At the same time some proteins may also act as enzyme inhibitors which may be beneficial (e.g., angiotensin 1 enzyme inhibition) or detrimental (e.g., trypsin inhibition). Proteins may also act as allergens which can result in serious health consequences. The mechanisms involved in these beneficial or detrimental effects are the subject of the current research investigation. The specific objective of the research proposed are as follows: (a) Study the effects of different food processing conditions and techniques and protein modification treatments on the bioactivity, allergenicity, physico-chemical and structural properties of selected food proteins and food allergens. (b) Study of ligand-analyte interactions influencing bioactivity.

Value of the Opportunity (issue, results, outcomes)/*Valeur de l'opportunité (problème, résultats, retombées*):
Value of the opportunity: The candidate will have the opportunity to join a dynamic scientific research team at Agriculture and Agri-Food Canada working in the area of value-added food processing as well as the identification, detection and development of intervention strategies for the control of food allergens along the food chain.

Equipment available at the research centre: Surface plasmon resonance, bioplex multiplex flow cytometer, preparative and analytical HPLC (size-exclusion, reverse-phase), preparative and analytical 2D electrophoresis, LC-MS, FTIR, DSC, immunotesting apparatus (ELISA, immunoblotting), a variety of equipment for measurement of functional properties, in vitro simulated gastrointestinal tract, food product development facilities, pilot plant facilities for extraction, separation, processing.

Expected outcomes: The candidate will prepare project reports that will be used to prepare scientific manuscripts for publication. The candidate may also be expected to attend national and international conferences to present research results.

D – Describe the qualifications needed (academic, study, knowledge, skills, experiences, *etc.*), and the benefits to the candidate /*Décrire les qualifications requises (études, connaissances, compétences, expériences, etc) et les avantages pour les candidats*

Academic Qualification: Candidate must have a Masters or Ph Degree in any of the following areas or related fields: Food Science, Biochemistry, Chemical/Biochemical engineering.

Language requirements: Knowledge of French or English is essential.

Knowledge: Candidate must demonstrate some knowledge in at least two of the following areas: food science, food chemistry, food processing, food analysis.

Skills: Candidate must have the ability to work in a research laboratory.

Experience: The candidate must have experience working in a research laboratory in the area of food science, chemical engineering or biochemistry or related fields. Must have experience in writing project reports and research papers.
.
Abilities: Ability to conduct independent research and report on results. Must be able to work as part of a team. Must have good scientific writing skills.

Personal suitability: Trustworthy, good interpersonal skills, highly motivated.

OPPORTUNITY/*OPPORTUNITÉ* ID: 2010_StHyacinthe_04b Return to the List

A – Identification

Type of Candidate (check one or more)/*Type de candidats recherchés (choisir un ou plus)* :

- Graduate students / étudiants des cycles supérieurs: - Ph.D.
- I accept a candidate who wants to register in a Canadian university: (name)/*J'accepte un candidat qui veut s'inscrire dans une université canadienne (nom)* : McGill University
- Scientist from a university or a research organisation/*Chercheur d'une université ou d'un organisme de recherche*.

If necessary, specify country (or countries) of preference./*Si nécessaire, spécifier le ou les pays de préférence* :
Chile, India, Brazil, Italy, Egypt

Justify if this Opportunity cannot be offered to a Canadian/*Justifiez si cette Opportunité ne peut être offert à un Canadien :*
Canadian students can also apply if they have their own funding.

OPPORTUNITY TITLE/ TITRE DE L'OPPORTUNITÉ : **Development of novel hypoallergenic food products with enhanced biofunctional properties**

Foreigner's length of stay at AAFC, specify number of months (minimum and/or maximum)/ *Durée du séjour à AAC, spécifier le nombre de mois (minimal et/ou maximal)* : 12-36

Preferred start date before March 31, 2011/ *Date de préférence pour le début du séjour avant le 31 mars 2011*, specify/*spécifier* : September 2010

Research location in Canada / *Lieu de la recherche au Canada :* City/*Ville*, Province :
Food Research and Development Centre Saint-Hyacinthe, QC
Website : http://www.agr.gc.ca/science

Contact: Email/*Courriel* : joyce.boye@agr.gc.ca
Dr. Joyce Boye Phone/*Téléphone* : 1-450-768-3232

B – The Research Team/ *L'équipe de recherché*

AAFC Supervisor/*Superviseur à AAC* : Dr. Joyce Boye
Other AAFC scientists/*Autres chercheurs d'AAC* :
University partners/*Partenaires universitaires* :
Industry partners/*Partenaires industriels* :

C – Opportunity Description/ *Description de l'Opportunité*

Objective/*Objectif* :
Food allergy is a growing problem in many countries around the world. Allergic reactions are caused by culprit proteins in specific

foods that bind to antibodies in sensitized individuals. Food allergic individuals require alternatives foods that do not contain these allergenic proteins but that have excellent nutritional, functional and sensory properties. The objectives of the proposed work are as follows: (a) Identify potential non-allergenic or hypoallergenic alternative sources of proteins with enhanced bioactive properties and study their nutritional, physico-chemical, and functional properties. (b) Investigate the allergenic potential of these foods and their cross-reactivities with other known allergens. (c) Develop processes for protein extraction, ingredient fractionation and the production of functional/nutritional alternative foods and/or food ingredients using the selected foods and evaluate their overall, functional, nutritional, sensory, and rheological properties.

Value of the Opportunity (issue, results, outcomes)/*Valeur de l'opportunité (problème, résultats, retombées*):
Value of the opportunity: The candidate will have the opportunity to join a dynamic scientific research team at Agriculture and Agri-Food Canada working in the area of value-added food processing and the identification, detection and development of intervention strategies for the control of food allergens along the food chain.

Equipment available at the research centre: Surface plasmon resonance, bioplex multiplex flow cytometer, preparative and analytical HPLC (size-exclusion, reverse-phase), preparative and analytical 2D electrophoresis, LC-MS, FTIR, DSC, immunotesting apparatus (ELISA, immunoblotting), a variety of equipment for measurement of functional properties, in vitro simulated gastrointestinal tract, food product development facilities, pilot plant facilities for extraction, separation, processing.

Expected outcomes: The candidate will prepare project reports that will be used to prepare scientific manuscripts for publication. The candidate may also be expected to attend national and international conferences to present research results.

D – Describe the qualifications needed (academic, study, knowledge, skills, experiences, *etc.*), and the benefits to the candidate /*Décrire les qualifications requises (études, connaissances, compétences, expériences, etc) et les avantages pour les candidats*

Academic Qualification: Candidate must have a Masters or Ph Degree in any of the following areas or related fields: Food Science, Biochemistry, Chemical/Biochemical engineering.

Language requirements: Knowledge of French or English is essential.

Knowledge: Candidate must demonstrate some knowledge in at least two of the following areas: food science, food chemistry, food processing, food analysis.

Skills: Candidate must have the ability to work in a research laboratory.

Experience: The candidate must have experience working in a research laboratory in the area of food science, chemical engineering or biochemistry or related fields. Must have experience in writing project reports and research papers.
.
Abilities: Ability to work independently and report on results. Must be able to work as part of a team. Must have good scientific writing skills.

Personal suitability: Trustworthy, good interpersonal skills, highly motivated.

OPPORTUNITY/*OPPORTUNITÉ* ID: 2010_Summerland_01 Return to the List

A – Identification

Type of Candidate (check one or more)/*Type de candidats recherchés (choisir un ou plus)* :

- Graduate students / étudiants des cycles supérieurs: - Master's or equivalent / *Maîtrise ou équivalent* - Ph.D.
- I accept a candidate who wants to register in a Canadian university: (name)/*J'accepte un candidat qui veut s'inscrire dans une université canadienne (nom)* : UBC, Carleton and/or other universities
- Scientist from a university or a research organisation/*Chercheur d'une université ou d'un organisme de recherche*.

If necessary, specify country (or countries) of preference./*Si nécessaire, spécifier le ou les pays de préférence* :
Mexico, Latin American Countries, Brazil, Argentina, Taiwan, China, India

Justify if this Opportunity cannot be offered to a Canadian/*Justifiez si cette Opportunité ne peut être offert à un Canadien :*

OPPORTUNITY TITLE/ TITRE DE L'OPPORTUNITÉ : **Developing platform(s) to elucidate the synergy of bioactive phytochemicals from fruits and other crops and bioproducts**

Foreigner's length of stay at AAFC, specify number of months (minimum and/or maximum)/ *Durée du séjour à AAC, spécifier le nombre de mois (minimal et/ou maximal)* : 12-24

Preferred start date before March 31, 2011/
Date de préférence pour le début du séjour avant le 31 mars 2011, specify/*spécifier* :

Research location in Canada / *Lieu de la recherche au Canada :*
Pacific Agri-Food Research Centre
Website : http://www.agr.gc.ca/science

City/*Ville*, Province :
Summerland, BC

Contact:
Dr. B. Dave Oomah

Email/*Courriel* : dave.oomah@agr.gc.ca
Phone/*Téléphone* : 1-250-494-6399

B – The Research Team/ *L'équipe de recherché*

AAFC Supervisor/*Superviseur à AAC* : Dr. B. Dave Oomah
Other AAFC scientists/*Autres chercheurs d'AAC* :
University partners/*Partenaires universitaires* : Dr. Farah Hosseinian
Industry partners/*Partenaires industriels* :

C – Opportunity Description/ *Description de l'Opportunité*

Objective/*Objectif* :
This project is aimed at utilizing synergies that may arise in combining two or more bioactives obtained from locally grown crops on functionality and bioactivity required for the functional foods and nutraceutical markets.

Value of the Opportunity (issue, results, outcomes)/*Valeur de l'opportunité (problème, résultats, retombées)*:
Value: Bioactives are increasingly being produced in several countries as ingredients for the functional foods and nutraceutical markets. Combination of these phytochemicals are beginning to appear in new food products; however their use is limited by inadequate knowledge of the synergistic (often deleterious or antagonistic) effects with other phytochemicals and/or food components

Consumers today, particularly baby boomers, understand the connection between overall food consumption and maintaining a healthy lifestyle. One way consumers are making sure the foods they consume are healthy is by closely monitoring both positive and negative ingredients in their foods and understanding the impact these ingredients may have on their present and future health. Although functional foods are known to provide health benefits and potentially reduce risks of diseases, their interactions with macro and micro components of foods and/or common non-prescription (over the counter) drugs have not been adequately investigated. For example, green tea is known for its health benefits in reducing the risks of many diseases. However, recent studies [(Golden, E. B., P. Y. Lam, et al. (2009) "Green tea polyphenols block the anticancer effects of bortezomib and other boronic acid-based proteasome inhibitors." Blood: blood-2008-07-171389)] suggest that components of green tea block cancer drug benefits by binding the drug and stopping it from reaching its target in cancer cells.

Our previous research indicates that combination of botanicals is not proportionately additive in antioxidant activity used as a measure of their bioactivity. The long term objective of this research is to understand the mechanism underlying the synergy of phytochemicals present in functional foods. This will be achieved by focussing on three short term objectives: (1) elucidate antioxidant synergy of phenolic enriched products such as grape seed extract; (2) investigate anti-inflammatory synergy of oils derived from Canadian oilseed crops; and (3) elucidate antimicrobial synergy of fruit constituents.

D – Describe the qualifications needed (academic, study, knowledge, skills, experiences, *etc.*), and the benefits to the candidate /*Décrire les qualifications requises (études, connaissances, compétences, expériences, etc) et les avantages pour les candidats*

Qualification: The applicant is expected to have some basic knowledge and training in food science/ food chemistry/analytical chemistry/biochemistry

Benefits: The individual will be exposed to new techniques currently used in our laboratory, potential scientific publication/s and/or other output and deliverables.

OPPORTUNITY/*OPPORTUNITÉ* ID: 2010_Summerland_03 Return to the List

A – Identification

Type of Candidate (check one or more)/*Type de candidats recherchés (choisir un ou plus)* :

- Graduate students / étudiants des cycles supérieurs: - Ph.D.
- Scientist from a university or a research organisation/*Chercheur d'une université ou d'un organisme de recherche*.

If necessary, specify country (or countries) of preference./*Si nécessaire, spécifier le ou les pays de préférence* :

Justify if this Opportunity cannot be offered to a Canadian/*Justifiez si cette Opportunité ne peut être offert à un Canadien :*

OPPORTUNITY TITLE/ TITRE DE L'OPPORTUNITÉ : **Development of baculoviruses as environmentally sustainable insect control agents and genomic analyses of viral genes**

Foreigner's length of stay at AAFC, specify number of months (minimum and/or maximum)/ *Durée du séjour à AAC, spécifier le nombre de mois (minimal et/ou maximal)* : 12-48

Preferred start date before March 31, 2011/
Date de préférence pour le début du séjour avant le 31 mars 2011, specify/*spécifier* :

Research location in Canada / *Lieu de la recherche au Canada :* City/*Ville*, Province :
Pacific Agri-Food Research Centre Summerland, BC
Website : http://www.agr.gc.ca/science

Contact:
Dr. David A. Theilmann
Email/*Courriel* : David.Theilmann@agr.gc.ca
Phone/*Téléphone* : 1-250-494-6395

B – The Research Team/ *L'équipe de recherché*

AAFC Supervisor/*Superviseur à AAC* : Dr. David A. Theilmann
Other AAFC scientists/*Autres chercheurs d'AAC* : Dr. Martin Erlandson, Saskatoon Research Centre
University partners/*Partenaires universitaires* :
Industry partners/*Partenaires industriels* :

C – Opportunity Description/ *Description de l'Opportunité*

Objective/*Objectif* :
Development of baculoviruses as environmentally sustainable insect control agents and genomic analyses of viral genes that influence or determine host-range and viral infectivity.

Project: Baculoviruses have been proven to provide effective control of economically important pest insects and are being utilized around the world. We have isolated a number of baculoviruses that infect and kill the bertha army worm (*Mamestra configurata*) an economic pest of Canola (Rape seed, *Brassica napus*) and have developed a significant genomic database that forms the foundation for the molecular analyses of viral genes involved in viral host range and virulence and oral infectivity (*pif* factors). Our immediate goal is to determine the function of viral ODV structural proteins that are required for this infectivity of BAW midguts by the baculovirus MacoNPV-A, the most virulent bertha army worm baculoviruses we have characterized. This project will participate in a large-scale, systematic genomic approach to the analysis of baculovirus genes required for bertha army worm midgut infection. This will include the functional characterization MacoNPV-A genes and homologous genes in the archetype baculovirus AcMNPV. As no tissue culture system is available for MacoNPV, we will create chimeric *Autographa californica* MNPV (AcMNPV)-MacoNPV viruses. A bacterial bacmid of the archetype AcMNPV virus will be used to investigate the function of each MacoNPV-A gene and the AcMNPV homologs. Viral proteins known or predicted to be structural components of the ODV, and therefore may be required for midgut infection, will be systematically knocked-out. Methods to be utilized will be bacmid gene

knock-outs using bacterial genetics, site-directed mutagenesis, invertebrate cell culture, confocal and electron microscopy and *in vivo* bioassays.

Value of the Opportunity (issue, results, outcomes)/*Valeur de l'opportunité (problème, résultats, retombées*):
The project will lead to the development of insect control agents that are sustainable and do not harm the environment.

D – Describe the qualifications needed (academic, study, knowledge, skills, experiences, *etc.*), and the benefits to the candidate /*Décrire les qualifications requises (études, connaissances, compétences, expériences, etc) et les avantages pour les candidats*

PhD students should be enrolled in programs that have required training in virology, molecular biology or biochemistry. In addition, knowledge of insect biology would be an asset. Post-doctoral researchers should already have virology molecular biology or biochemistry experience and an interest in crop protection.

OPPORTUNITY/*OPPORTUNITÉ* ID: 2010_Summerland_04 Return to the List

A – Identification

Type of Candidate (check one or more)/*Type de candidats recherchés (choisir un ou plus)* :

- Graduate students / étudiants des cycles supérieurs: - Ph.D.
- Scientist from a university or a research organisation/*Chercheur d'une université ou d'un organisme de recherche*.

If necessary, specify country (or countries) of preference./*Si nécessaire, spécifier le ou les pays de préférence* :
All countries of interest with priority to existing collaborations (Brazil/S. America, China, Europe)

Justify if this Opportunity cannot be offered to a Canadian/*Justifiez si cette Opportunité ne peut être offert à un Canadien :*

OPPORTUNITY TITLE/ TITRE DE L'OPPORTUNITÉ : **Spatial ecology and management of pests in perennial crops**

Foreigner's length of stay at AAFC, specify number of months (minimum and/or maximum)/ *Durée du séjour à AAC, spécifier le nombre de mois (minimal et/ou maximal)* : 6-24

Preferred start date before March 31, 2011/
Date de préférence pour le début du séjour avant le 31 mars 2011, specify/*spécifier* :

Research location in Canada / *Lieu de la recherche au Canada :* City/*Ville*, Province :
Pacific Agri-Food Research Centre Summerland, BC
Website : http://www.agr.gc.ca/science

Contact:
Dr. Howard Thistlewood
Email/*Courriel* : howard.thistlewood@agr.gc.ca
Phone/*Téléphone* : 1-250-494-6419

B – The Research Team/ *L'équipe de recherché*

AAFC Supervisor/*Superviseur à AAC* : Dr. Howard Thistlewood
Other AAFC scientists/*Autres chercheurs d'AAC* : D. Neilsen and S. Smith, Geomatics (GIS) Unit, PARC; Other partners in related Abase and SAGES projects, AAFC
University partners/*Partenaires universitaires* : Prof. Jason Pither (Biology), or Prof. Sylvia Esterby, Paramjit Gill (Statistics) or Prof. Rebecca Tyson (Mathematics), at University of British Columbia – Okanagan, in Kelowna, B.C.;
Prof. Nusha Keyghobadi (Biology), University of Western Ontario, in London, ON
Industry partners/*Partenaires industriels* : Okanagan-Kootenay Sterile Insect Release Program, B.C.; BC Fruit Growers Association, Okanagan Tree Fruit Company, and others.

C – Opportunity Description/ *Description de l'Opportunité*

PARC Summerland is the Canadian centre for management of fruit pests in arid areas, with research on fruit flies and on sterile insect technique/SIT (codling moth), state-of-the-art GIS, and experience analysing topography, land use, micro-climates, and count data. Together with enthusiastic collaborators, new methods are being developed.

Objective/*Objectif* :
Form part of studies on area-wide management of pest insects, to enable the sustainable and safe production of horticultural crops in a region of varied land use and varied terrain. Study insect management, measuring insect position and movement, applying GIS and molecular tools, to improve results in area-wide pest control of fruit flies or moths, including SIT.
Study projects and methods, plan and conduct field-work at Summerland, conduct analyses, review constructively, summarize for publication. Travel or stay at the University of BC – Okanagan nearby, or University of Western Ontario, depending on the project

need.

Value of the Opportunity (issue, results, outcomes)/*Valeur de l'opportunité (problème, résultats, retombées)*:
PARC Summerland has a state-of-the-art GIS unit dedicated for research purposes and several scientists are working on SIT, insect management in challenging terrain, land use, micro-climates, and associated analyses. Suitable projects are from relatively short-term (half-year) to PhD-related (two year) in length, and can provide solutions that are applicable to many problems internationally, and of interest to quarantine agencies and area-wide management projects, world-wide.

Value also lies in increased understanding of management and ecology of pests in highly varied terrain and landscapes, or of micro-climates within a mountainous region, or of new molecular or GIS technology to enhance sustainable horticulture. Production of highly qualified personnel with state of the art skills in one or more of: SIT, understanding insect movement in mixed landscapes, analysis and modelling of large data sets, using GIS tools and products, or understanding insect development and micro-climates within an arid climate. Safeguarding the public investment in a cooperative industry-government $60 million area-wide management program that has reduced harsh insecticide use by approx. 75%.

D – Describe the qualifications needed (academic, study, knowledge, skills, experiences, *etc.*), and the benefits to the candidate /*Décrire les qualifications requises (études, connaissances, compétences, expériences, etc) et les avantages pour les candidats*

Qualifications: Proficient in spoken and written English, with analytical or computer skills. Entomologist/acarologist or related science with knowledge of insect management, or a mathematical ecologist. Prefer training or experience in one of: spatial ecology or Geographic Information Systems, molecular or genetic tools, microclimatic data, modelling of movement and invasion, or SIT.

Benefits: To enhance skills of students or colleagues in university or government laboratories. Opportunity to develop understanding of insect management or skills with molecular, modelling, or GIS-based technology in spatial and landscape ecology. Gain experience working with GIS and land use, micro-climates, spatio-temporal insect counts; mark-release-recapture experiments; agent-based modelling; or molecular probes (microsatellite DNA) of moths or flies. Publish peer-reviewed papers in a broad range of publications. The collaborating Universities are highly rated in Canada and internationally.

OPPORTUNITY/*OPPORTUNITÉ* ID: 2010_Summerland_06 Return to the List

A – Identification

Type of Candidate (check one or more)/*Type de candidats recherchés (choisir un ou plus)* :

- Graduate students / étudiants des cycles supérieurs: - Master's or equivalent / *Maîtrise ou équivalent* - Ph.D.
- Scientist from a university or a research organisation/*Chercheur d'une université ou d'un organisme de recherche*.

If necessary, specify country (or countries) of preference./*Si nécessaire, spécifier le ou les pays de préférence* :

Justify if this Opportunity cannot be offered to a Canadian/*Justifiez si cette Opportunité ne peut être offert à un Canadien :*

OPPORTUNITY TITLE/ TITRE DE L'OPPORTUNITÉ : **Functional analysis of polyphenol oxidase (PPO) genes in potatoes and apples**

Foreigner's length of stay at AAFC, specify number of months (minimum and/or maximum)/ *Durée du séjour à AAC, spécifier le nombre de mois (minimal et/ou maximal)* : 6-24

Preferred start date before March 31, 2011/
Date de préférence pour le début du séjour avant le 31 mars 2011, specify/*spécifier* :

Research location in Canada / *Lieu de la recherche au Canada :* City/*Ville*, Province :
Pacific Agri-Food Research Centre Summerland, BC
Website : http://www.agr.gc.ca/science

Contact:
Dr. Yu Xiang
Email/*Courriel* : yu.xiang@agr.gc.c
Phone/*Téléphone* : 1-250-494-6428

B – The Research Team/ *L'équipe de recherché*

AAFC Supervisor/*Superviseur à AAC* : Dr. Yu Xiang
Other AAFC scientists/*Autres chercheurs d'AAC* :
University partners/*Partenaires universitaires* :

Industry partners/*Partenaires industriels* :

C – Opportunity Description/ *Description de l'Opportunité*

Objective/*Objectif*, Value of the Opportunity (issue, results, outcomes)/*Valeur de l'opportunité (problème, résultats, retombées*):

Polyphenol oxidases (PPO) are a major class of enzymes that cause browning phenomena in many foods of plant origin, such as apples and potatoes. PPO catalyzes the oxidation of phenolic compounds to quinones, and the subsequent non-enzymatic quinone polymerizations lead to form brown pigments in plants and result in deterioration and loss of food quality. Different methods have been used to control or manipulate PPO activities for reducing browning reactions, but the efficacy is always a challenging for researchers in agricultural food industry, because there are multiple forms of PPO genes in most plants and their expressions are often tissue specific and developmentally controlled, as well as very little is known regarding which of these genes involve in browning reaction and how they interact in plants. In this proposal, we propose to investigate the function of different PPO genes in potatoes and apples by knockdown of the PPO genes individually or in cluster utilizing artificial microRNA technology developed in our laboratories. Artificial microRNA is a newly developed technique based on microRNA backbones and demonstrated to provide higher specificity, fewer off-target effects, tissue-specific expression and almost no side effect than previous siRNA methods. Through the research, we anticipate to finding which PPO genes are vital for browning oxidation in potatoes and apples, and providing novel information for designing new strategies in effective reduction of browning reactions by modulating PPO gene activities. The artificial microRNA technology developed in the research will also be able to apply in other functional genomics study.

D – Describe the qualifications needed (academic, study, knowledge, skills, experiences, *etc.*), and the benefits to the candidate /*Décrire les qualifications requises (études, connaissances, compétences, expériences, etc) et les avantages pour les candidats*

The intern will be expected to participate in the research project described above under direct guidance from a scientist team made up of disciplines in molecular biology, crop breading and plant biotechnology. The student is expected to have strong interest in the study of functional genomics and have basic background in molecular biology and plant science. The student will obtain high quality training for conducting research in molecular biology, functional genomics, transient and stable plant transformation, and plant tissue culture under the guidance of scientists from a multidisciplinary team. The student's research will generate new value for agricultural food industry. The student will also gain experience in international collaborative research.

OPPORTUNITY/*OPPORTUNITÉ* ID: 2010_Swift Current_03 Return to the List

A – Identification

Type of Candidate (check one or more)/*Type de candidats recherchés (choisir un ou plus)* :

- Graduate students / étudiants des cycles supérieurs: - Master's or equivalent / *Maîtrise ou équivalent* - Ph.D.
- I accept a candidate who wants to register in a Canadian university: (name)/*J'accepte un candidat qui veut s'inscrire dans une université canadienne (nom)* : University of Saskatchewan
- Scientist from a university or a research organisation/*Chercheur d'une université ou d'un organisme de recherche*.

If necessary, specify country (or countries) of preference./*Si nécessaire, spécifier le ou les pays de préférence* :

Justify if this Opportunity cannot be offered to a Canadian/*Justifiez si cette Opportunité ne peut être offert à un Canadien :*

OPPORTUNITY TITLE/ TITRE DE L'OPPORTUNITÉ : **Forage and range plant reproductive adaptation to changing climates**

Foreigner's length of stay at AAFC, specify number of months (minimum and/or maximum)/ *Durée du séjour à AAC, spécifier le nombre de mois (minimal et/ou maximal)* : 12-24

Preferred start date before March 31, 2011/ *Date de préférence pour le début du séjour avant le 31 mars 2011*, specify/*spécifier* : June 2010

Research location in Canada / *Lieu de la recherche au Canada :* City/*Ville*, Province :
Semiarid Prairie Agricultural Research Centre Swift Current, SK
Website : http://www.agr.gc.ca/science

Contact: Email/*Courriel* : mike.schellenberg@agr.gc.ca
Dr. Michael P. Schellenberg Phone/*Téléphone* : 1-306-778-7247

B – The Research Team/ *L'équipe de recherché*

AAFC Supervisor/*Superviseur à AAC* : Dr. Michael P. Schellenberg
Other AAFC scientists/*Autres chercheurs d'AAC* : Dr. Grant McLeod, Dr. Chantal Hamel, Dr. Herb Cutforth
University partners/*Partenaires universitaires* : Dr. Eric Lamb, Dr Yuguang Bai
Industry partners/*Partenaires industriels* : Dr. BT Biligetu (NSERC-Post Doc)

C – Opportunity Description/ *Description de l'Opportunité*

Objective/*Objectif* :
Temperature and moisture impact on native plant seed materials and seed production to development mitigation approaches for climate change; specifically the potential for increased aridity.

Value of the Opportunity (issue, results, outcomes)/*Valeur de l'opportunité (problème, résultats, retombées*):
Duration: A student would need 24 months to unravel the needed information.
Benefit: Knowledge gained will benefit Canada and participating country in mitigating potentially negative effects of climate change. By knowing plant species reproductive response to environmental changes appropriate species and genetic makeup can be selected for the anticipated environment as well as development of methodologies for retaining key plant species. When appropriate species are selected improved environmental conditions would result; for example reduced desertification, continued access to forage for livestock, etc. Project will aid in continued exchange of science between the nations.

D – Describe the qualifications needed (academic, study, knowledge, skills, experiences, *etc.*), and the benefits to the candidate /*Décrire les qualifications requises (études, connaissances, compétences, expériences, etc) et les avantages pour les candidats*

Student will be expected to become familiar with the literature, design and run experiments, write papers, and present results at meetings. The intern would meet researchers involved preservation of plant gene resources, conservation of native habitat, and research colleagues at other facilities.

Qualifications: Good communication skills in English, appropriate level of English according to set standard, background in ecology, seed ecology, rangelands, plant physiology.

Benefit to Student: The student will develop skills and understanding necessary for future career. One would anticipate develop of a network of colleagues of similar interests. The student would be working with a group of qualified scientists. Individual would be working at the only research facility in Canada located in the semiarid prairie. The Centre has the only ecological variety program,

only research program examining the potential of shrubs for forage, and one of few looking at native prairie re-establishment. The Centre has a long history in development of perennial crops for the semiarid environment.

OPPORTUNITY/*OPPORTUNITÉ* ID: 2010_Swift Current_04 Return to the List

A – Identification

Type of Candidate (check one or more)/*Type de candidats recherchés (choisir un ou plus)* :

- Graduate students / étudiants des cycles supérieurs: - Master's or equivalent / *Maîtrise ou équivalent* - Ph.D.
- I accept a candidate who wants to register in a Canadian university: (name)/*J'accepte un candidat qui veut s'inscrire dans une université canadienne (nom)* : University of Saskatchewan
- Scientist from a university or a research organisation/*Chercheur d'une université ou d'un organisme de recherche*.

If necessary, specify country (or countries) of preference./*Si nécessaire, spécifier le ou les pays de préférence* :

Justify if this Opportunity cannot be offered to a Canadian/*Justifiez si cette Opportunité ne peut être offert à un Canadien :*

OPPORTUNITY TITLE/ TITRE DE L'OPPORTUNITÉ : **Effect of different native and tame pasture systems on forage and beef production on semiarid prairie and their contribution to soil and air quality**

Foreigner's length of stay at AAFC, specify number of months (minimum and/or maximum)/ *Durée du séjour à AAC, spécifier le nombre de mois (minimal et/ou maximal)* : 12-24

Preferred start date before March 31, 2011/ *Date de préférence pour le début du séjour avant le 31 mars 2011*, specify/*spécifier* : May 2010

Research location in Canada / *Lieu de la recherche au Canada :* Semiarid Prairie Agricultural Research Centre
Website : http://www.agr.gc.ca/science
City/*Ville*, Province : Swift Current, SK

Contact: **Dr. Alan Iwaasa**
Email/*Courriel* : Alan.iwaasa@agr.gc.ca
Phone/*Téléphone* : 1-306-778-7251

B – The Research Team/ *L'équipe de recherché*

AAFC Supervisor/*Superviseur à AAC* : Dr. Alan Iwaasa
Other AAFC scientists/*Autres chercheurs d'AAC* : Dr. Brian McConkey, Dr. Hong Wang, Dr. Mike Schellenberg, Dr. Grant McLeod
University partners/*Partenaires universitaires* :
Industry partners/*Partenaires industriels* : Dr. Bart Lardner (Western Beef Development Centre)

C – Opportunity Description/ *Description de l'Opportunité*

Objective/*Objectif* :
1) Determine cattle grazing production on different pasture types (native and tame forages) in the semiarid prairie, and; 2) Evaluate the impact grazing cattle have on GHG emissions and soil organic carbon sequestration changes among different native and tame pastures.

Value of the Opportunity (issue, results, outcomes)/*Valeur de l'opportunité (problème, résultats, retombées)*:
Duration: A student would need 24 months to unravel the needed information.
Benefit: Knowledge gained will benefit both Canada and China in developing environmental beneficial and sustainable grazing systems that utilizes perennial native and tame forages. The grasslands in Canada resemble those of China in their form and functions. Thus, determination of potential strategies to mitigate the negative effects of greenhouse gas (GHG) emissions and climate changes will be a benefit to both countries. This project will aid in the continued exchanged and development of scientific collaboration between countries.

D – Describe the qualifications needed (academic, study, knowledge, skills, experiences, *etc.*), and the benefits to the candidate /*Décrire les qualifications requises (études, connaissances, compétences, expériences, etc) et les avantages pour les candidats*

Student will be expected to become familiar with the literature, research design/experiment and run experiments, write reports, technical summaries, assist in technology transfer of information to industry and producer collaborators (field days/tours), preparation and contribution to scientific manuscripts and present results at scientific meetings (poster and/or oral presentations).

Qualifications: Student will be a member of our integrated research team and is expected to have 1) in-depth knowledge of

forage/plant science and grazing/ruminant nutrition, 2) very good English communication skills in both oral and written, and 3) good skills in conducting laboratory and field experiments under semiarid growing conditions. The student will be motivated to become familiar with new technologies and concepts and exposure to a number of other AAFC researchers and facilities.

Benefit to Student: The student will develop skills and understanding necessary for future career. One would anticipate develop of a network of colleagues of similar interests. The student would be working with a group of qualified scientists. Individual would be working at the only research facility in Canada located in the semiarid prairie. The student will broaden his/her experience by exposure to grasslands in another part of the world, which allows them to understand unifying principles pertaining to environmental benefits and development of sustainable grazing systems that are common to all grasslands. The student will acquire a better working knowledge of the English language.

OPPORTUNITY/*OPPORTUNITÉ* ID: 2010_Swift Current_05a	Return to the List
A – Identification	
Type of Candidate (check one or more)/*Type de candidats recherchés (choisir un ou plus)* :	
• Graduate students / étudiants des cycles supérieurs:	- Ph.D.
• Scientist from a university or a research organisation/*Chercheur d'une université ou d'un organisme de recherche*.	
If necessary, specify country (or countries) of preference./*Si nécessaire, spécifier le ou les pays de préférence* : India, Italy, Brazil, Chile	
Justify if this Opportunity cannot be offered to a Canadian/*Justifiez si cette Opportunité ne peut être offert à un Canadien :*	
OPPORTUNITY TITLE/ TITRE DE L'OPPORTUNITÉ : **Development and validation of molecular tools for disease resistance breeding in durum wheat**	
Foreigner's length of stay at AAFC, specify number of months (minimum and/or maximum)/ *Durée du séjour à AAC, spécifier le nombre de mois (minimal et/ou maximal)* :	24
Preferred start date before March 31, 2011/ *Date de préférence pour le début du séjour avant le 31 mars 2011*, specify/*spécifier* :	June 2010
Research location in Canada / *Lieu de la recherche au Canada :* Semiarid Prairie Agricultural Research Centre Website : http://www.agr.gc.ca/science	City/*Ville*, Province : Swift Current, SK
Contact: **Dr. A. K. Singh**	Email/*Courriel* : Asheesh.Singh@agr.gc.ca Phone/*Téléphone* : 1-306-778-7256
B – The Research Team/ *L'équipe de recherché*	
AAFC Supervisor/*Superviseur à AAC* : Dr. A. K. Singh Other AAFC scientists/*Autres chercheurs d'AAC* : Drs. R. Knox, R. DePauw, M. Fernandez, J. Gilbert, T. Fetch, B. McCallum, J. Menzies University partners/*Partenaires universitaires* : Dr. C. Pozniak, CDC-University of Saskatchewan Industry partners/*Partenaires industriels* :	
C – Opportunity Description/ *Description de l'Opportunité*	
Objective/*Objectif* : The objective of this project will be to identify new sources of resistance to fungal pathogens, and then utilize existing and new molecular marker information to tag these resistance genes. **Value of the Opportunity (issue, results, outcomes)/*Valeur de l'opportunité (problème, résultats, retombées)***: Project background and rationale: Durum wheat is the fourth largest crop in Canada and an important world crop, and diseases are major obstacles to produce high yield and quality crop. Identification of genetic resistance in durum wheat germplasm can positively impact profitability and sustainability of Canadian durum and stabilize international market because Canadian durum occupies the largest share of the world export markets. The focus of this research will be rusts; leaf spot diseases; and common root rot. Outcome expected: Our research groups at Agriculture and Agri-Food Canada and the University of Saskatchewan has genotyped using molecular markers an association mapping population consisting of diverse durum genotypes and several bi-parental mapping populations. Evaluation of disease resistance in this diverse set of germplasm will be useful to identify disease	

resistance genes and linked DNA markers. This research will characterize the complement of disease resistance genes existing in the Canadian germplasm pool. Disease screening will be conducted in the greenhouse and field conditions in multi-location, -replicated trials. The proposed disease evaluation will help identify sources of resistance; and coupled with extensive molecular data already compiled, will permit association genetic studies to identify useful markers/genes. This will be beneficial for breeders to use as a source of disease resistance through conventional breeding and marker assisted breeding. The outcomes of this project will be the identification of new sources of disease resistance to several pathogens that can be used in cultivar development efforts in Canada and worldwide. The subsequent output of new cultivars with disease resistance will be available to producers, thus improving profitability, reducing current inputs for disease control and lowering the impact of chemical use on the environment.

D – Describe the qualifications needed (academic, study, knowledge, skills, experiences, *etc.*), and the benefits to the candidate /*Décrire les qualifications requises (études, connaissances, compétences, expériences, etc) et les avantages pour les candidats*

We have done extensive genotyping with molecular markers of the bi-parental and association mapping populations and have started disease screening. The selected candidate will work on some molecular genotyping (using gel and capillary electrophoresis) and screen for disease reaction in the field and greenhouse. Candidate will also be involved in the statistical analysis including linkage and association mapping, and publication writing. There is flexibility for the student to incorporate new ideas in the broader scope of disease resistance breeding.

Experience/education in plant breeding/genetics/biotechnology is required. It is desirable to have background in molecular markers, breeding, pathology and statistics. Candidate must be able to communicate in English.
The student will be provided the opportunity to do QTL and association mapping analysis, and to work as a part of a multi-disciplinary team, and will have freedom to contribute new ideas, and write publications from their project. Experience will be gained in the field of plant breeding, disease resistance, plant genetics, quantitative genetics, and statistical analysis.

OPPORTUNITY/*OPPORTUNITÉ* ID: 2010_Swift Current_05b Return to the List

A – Identification

Type of Candidate (check one or more)/*Type de candidats recherchés (choisir un ou plus)* :

- Graduate students / étudiants des cycles supérieurs: - Ph.D.
- Scientist from a university or a research organisation/*Chercheur d'une université ou d'un organisme de recherche*.

If necessary, specify country (or countries) of preference./*Si nécessaire, spécifier le ou les pays de préférence* :
Italy, India, Brazil and Chile

Justify if this Opportunity cannot be offered to a Canadian/*Justifiez si cette Opportunité ne peut être offert à un Canadien :*

OPPORTUNITY TITLE/ TITRE DE L'OPPORTUNITÉ : **Gluten properties of Canadian durum wheat**

Foreigner's length of stay at AAFC, specify number of months (minimum and/or maximum)/ *Durée du séjour à AAC, spécifier le nombre de mois (minimal et/ou maximal)* : 24

Preferred start date before March 31, 2011/
Date de préférence pour le début du séjour avant le 31 mars 2011, specify/*spécifier* : June 2010

Research location in Canada / *Lieu de la recherche au Canada :* City/*Ville*, Province :
Semiarid Prairie Agricultural Research Centre Swift Current, SK
Website : http://www.agr.gc.ca/science

Contact:
Dr. A. K. Singh
Email/*Courriel* : Asheesh.Singh@agr.gc.ca
Phone/*Téléphone* : 1-306-778-7256

B – The Research Team/ *L'équipe de recherché*

AAFC Supervisor/*Superviseur à AAC* : Dr. A. K. Singh
Other AAFC scientists/*Autres chercheurs d'AAC* : Drs. R. Knox, R. DePauw
University partners/*Partenaires universitaires* : Dr. C. Pozniak, CDC-University of Saskatchewan
Industry partners/*Partenaires industriels* :

C – Opportunity Description/ *Description de l'Opportunité*

Objective/*Objectif* :
The objective of this project will be to study the gluten properties in Canadian durum wheat.

Value of the Opportunity (issue, results, outcomes)/*Valeur de l'opportunité (problème, résultats, retombées)*:
Project background and rationale: Durum wheat is an important Crop in Canada and worldwide. Majority of Canadian crop is destined to export markets and its success depends on producing a high quality crop. Protein content and quality (gluten properties) are important quality parameters. Within durum wheat a sub-type of extra strong gluten properties exists with caters to specific markets and commands premium as a superior product (pasta textural quality for long pasta) and as a blend with weaker gluten cultivars. The protein quality of this type is different from conventional durum types, which are grown on majority of Canadian acres. Canadian durum breeding program have created crosses between the two gluten types, and the resultant progeny has shown a wide range of gluten strength including intermediate strength to the two types and variable dough extensibility and rheological properties. Currently, several methods are used to assess gluten properties but it is not clear how these correlate to each other and to the pasta product quality. Research is needed to develop appropriate measures of gluten associated rheological properties that better predict end-use functionality of pasta products.

Outcome expected: Our research groups at Agriculture and Agri-Food Canada and the University of Saskatchewan have been actively breeding for conventional gluten types and have also been targeting the extra-strong gluten. This study will include diverse genotypes based on a range of gluten strength and properties and measured together with different instruments and techniques (for example, gluten index, mixograph, SDS, glutograph, alveograph) from a range of agro-climatic locations. Gluten components will also be detected using spectroscopy techniques. Elasticity and extensibility will be studied for comparison of Canadian genotypes relative to each other. The outcome of this research will be an enhanced understanding of the utility of various equipment for measuring gluten strength and role of gluten components on elasticity and extensibility and their role on end-use suitability. There may be an opportunity to conduct molecular mapping on important QTL regulating the gluten strength properties.

D – Describe the qualifications needed (academic, study, knowledge, skills, experiences, *etc.*), and the benefits to the candidate /*Décrire les qualifications requises (études, connaissances, compétences, expériences, etc) et les avantages pour les candidats*

Candidate should have an M.Sc. in plant or food science and working knowledge of instruments and technologies used in quality testing Candidate will also be involved in the statistical analysis. Knowledge of HPLC and/or mass spectrophotometry would be an asset. Candidate must be able to communicate in English.
The student will work as a part of a multi-disciplinary team, and will have freedom to contribute new ideas, and write publications from their project.
The successful candidate will be learn various techniques used in grain quality analysis and gain experience in conducting field and lab experiments and in statistical analysis and possibly molecular mapping.

OPPORTUNITY/*OPPORTUNITÉ* ID: 2010_Swift Current_07(IH) Return to the List

A – Identification

Type of Candidate (check one or more)/*Type de candidats recherchés (choisir un ou plus)* :

- Graduate students / étudiants des cycles supérieurs: - Master's or equivalent / *Maîtrise ou équivalent* - Ph.D.
- Scientist from a university or a research organisation/*Chercheur d'une université ou d'un organisme de recherche*.

If necessary, specify country (or countries) of preference./*Si nécessaire, spécifier le ou les pays de préférence* :

Justify if this Opportunity cannot be offered to a Canadian/*Justifiez si cette Opportunité ne peut être offert à un Canadien :*

OPPORTUNITY TITLE/ TITRE DE L'OPPORTUNITÉ :

Foreigner's length of stay at AAFC, specify number of months (minimum and/or maximum)/ *Durée du séjour à AAC, spécifier le nombre de mois (minimal et/ou maximal)* : 20-24

Preferred start date before March 31, 2011/
Date de préférence pour le début du séjour avant le 31 mars 2011, specify/*spécifier* :

Research location in Canada / *Lieu de la recherche au Canada :*
-Indian Head Research Farm
Website : http://www.agr.gc.ca/science

City/*Ville*, Province :
Indian Head, SK

Contact:
Dr. Guy P. Lafond

Email/*Courriel* : guy.lafond@agr.gc.ca
Phone/*Téléphone* : 1-306-695-5220

B – The Research Team/ *L'équipe de recherché*

AAFC Supervisor/*Superviseur à AAC* : Dr. Guy P. Lafond
Other AAFC scientists/*Autres chercheurs d'AAC* : Mr Bill May, Dr Brian McConkey, Dr Herb Cutforth
University partners/*Partenaires universitaires* :
Industry partners/*Partenaires industriels* : Straw Track Manufacturing of Regina (provide a specialized planter), Indian Head Agricultural Research Foundation (provide tractor and plot combine), Saskatchewan Oat Development Commission (funding for project but decision still pending)

C – Opportunity Description/ *Description de l'Opportunité*

Objective/*Objectif* :
Background: Dry land crop production requires special attention to water management. Recent studies by Cutforth et al of the Swift Current Research Center have shown that growing crops in tall stubble will improve overall grain production due to improvements in water use efficiency from micro-climatic benefits. In order to capture this potential combined with the recent advancements in auto-steer technology and GPS(global positioning systems), in order to capture that benefit, there is need to go to wider row spacing to allow greater ease of seeding between the rows. Tall stubble also allows for greater snow trapping and enhanced water conservation.

Objective: To determine the relative agronomic performance of wide row spacing (25, 30, 36 and 45 cm) using different rates of side-banded nitrogen (0, 35, 75, 105 and 140 kg N/ha.) on the production of oat under no-till. This will allow the investigation of the implications of wide row spacing when fertilizer is side-banded because as row spacing increases, so does the concentration of nitrogen besides the row.

Value of the Opportunity (issue, results, outcomes)/*Valeur de l'opportunité (problème, résultats, retombées*):
The outcome would be the basis of a PhD thesis based on two years of results looking at the effects of row spacing and rate of nitrogen using a side-band opener on cereal production with attention given to the variables plant populations, plant development (using previously developed methodology for spring wheat), crop water use, grain yield, yield components and grain quality parameters.

D – Describe the qualifications needed (academic, study, knowledge, skills, experiences, *etc.*), and the benefits to the candidate /*Décrire les qualifications requises (études, connaissances, compétences, expériences, etc) et les avantages pour les candidats*

The candidate would have to be enrolled in a Chinese University at the MSc level. The candidate would be doing their research project in Canada and in this case at AAFC-Indian Head. However, the thesis project does not have to include the proposed project. If the student decides to work on another problem for his thesis in China, he would still be expected to lead an agreed upon project as part of his internship. At a minimum, the intern would need to be very fluent in oral and written English. The intern would be expected to have a strong academic background in either soil or crop science. A driver's license would be an asset but not required because when located at Indian Head, the student would be located away from a large center and public transport is very limited. The Indian Head Research Farm is located in rural Saskatchewan and the population of Indian Head is only 2000. The intern would be required to show initiative, interest in research, ability in critical thinking, be independent with a strong ability to adapt to living conditions in rural Saskatchewan and tolerate some isolation.
The benefits to the intern would be the exposure to a very active agronomic field research program under no-till looking at many aspects of crop production. The intern would leave with a strong formation in field experimentation under no-till and a very good understanding of no-till production systems.

OPPORTUNITY/*OPPORTUNITÉ* ID: 2010_Swift Current_08 Return to the List

A – Identification

Type of Candidate (check one or more)/*Type de candidats recherchés (choisir un ou plus)* :

- Graduate students / étudiants des cycles supérieurs: - Ph.D.
- Scientist from a university or a research organisation/*Chercheur d'une université ou d'un organisme de recherche*.

If necessary, specify country (or countries) of preference./*Si nécessaire, spécifier le ou les pays de préférence* :
China

Justify if this Opportunity cannot be offered to a Canadian/*Justifiez si cette Opportunité ne peut être offert à un Canadien :*

OPPORTUNITY TITLE/ TITRE DE L'OPPORTUNITÉ : **Coping with climate change and climate variability on crop production**

Foreigner's length of stay at AAFC, specify number of months (minimum and/or maximum)/ *Durée du séjour à AAC, spécifier le nombre de mois (minimal et/ou maximal)* :	12-24
Preferred start date before March 31, 2011/ *Date de préférence pour le début du séjour avant le 31 mars 2011*, specify/*spécifier* :	March 2011
Research location in Canada / *Lieu de la recherche au Canada :* Semiarid Prairie Agricultural Research Centre Website : http://www.agr.gc.ca/science	City/*Ville*, Province : Swift Current, SK
Contact: **Dr. Hong Wang**	Email/*Courriel* : hong.wang@agr.gc.ca Phone/*Téléphone* : 1-306-778-7288

B – The Research Team/ *L'équipe de recherché*

AAFC Supervisor/*Superviseur à AAC* : Dr. Hong Wang
Other AAFC scientists/*Autres chercheurs d'AAC* : Dr. Brian McConkey
University partners/*Partenaires universitaires* : Dr. Paul Bullock, University of Manitoba
Industry partners/*Partenaires industriels* : Mr. T. Goddard, Alberta Agriculture and Food

C – Opportunity Description/ *Description de l'Opportunité*

Objective/*Objectif* :
The objective is to study the impact of climate change and climate variability on crop production. The crop growth model will be calibrated, modified, tested and validated under a broad environment. Then, the model will run using historical weather data and different climate scenarios and different management practices (tillage, rotation, fertilization, seeding date, etc.) for thousands of sites in western Canada. Coping strategies to adapt and mitigate global change will be identified.

Value of the Opportunity (issue, results, outcomes)/*Valeur de l'opportunité (problème, résultats, retombées)*:
The student/scientist will bring his/her expertise, knowledge and efforts to help us accomplish the project. In return, he/she will learn from Canadian scientists so as to improve research in China. Under the guidance of supervisory scientists in Canada and China the student will study on modelling impacts of climate change on agricultural productivity and environment and coping strategies. The student will publish at least two scientific papers.

D – Describe the qualifications needed (academic, study, knowledge, skills, experiences, *etc.*), and the benefits to the candidate /*Décrire les qualifications requises (études, connaissances, compétences, expériences, etc) et les avantages pour les candidats*

The student/scientist must have a good training in at least one of the following areas: agronomy and crop physiology; soil chemistry and soil physics; agro-meterology and climatology; and computer science (C++ and/or Fortran).

OPPORTUNITY/*OPPORTUNITÉ* ID:	2010_Swift Current_09	Return to the List

A – Identification

Type of Candidate (check one or more)/*Type de candidats recherchés (choisir un ou plus)* :

- Graduate students / étudiants des cycles supérieurs: - Master's or equivalent / *Maîtrise ou équivalent* - Ph.D.
- I accept a candidate who wants to register in a Canadian university: (name)/*J'accepte un candidat qui veut s'inscrire dans une université canadienne (nom)* : University of Saskatchewan
- Scientist from a university or a research organisation/*Chercheur d'une université ou d'un organisme de recherche*.

If necessary, specify country (or countries) of preference./*Si nécessaire, spécifier le ou les pays de préférence* :

Justify if this Opportunity cannot be offered to a Canadian/*Justifiez si cette Opportunité ne peut être offert à un Canadien :*

OPPORTUNITY TITLE/ TITRE DE L'OPPORTUNITÉ : **Phosphorus Forms and Dynamics From Winter Cattle Feeding Sites**

Foreigner's length of stay at AAFC, specify number of months (minimum and/or maximum)/ *Durée du séjour à AAC, spécifier le nombre de mois (minimal et/ou maximal)* :	12-24
Preferred start date before March 31, 2011/ *Date de préférence pour le début du séjour avant le 31 mars 2011*, specify/*spécifier* :	April 2010
Research location in Canada / *Lieu de la recherche au Canada :* Semiarid Prairie Agricultural Research Centre	City/*Ville*, Province : Swift Current, SK

Website : http://www.agr.gc.ca/science

Contact:
Dr. Barbara Cade-Menun
Email/*Courriel* : Barbara.Cade-Menun@agr.gc.ca
Phone/*Téléphone* : 1-306-778-7245

B – The Research Team/ *L'équipe de recherché*

AAFC Supervisor/*Superviseur à AAC* : Dr. Barbara Cade-Menun
Other AAFC scientists/*Autres chercheurs d'AAC* : Dr. Alan Iwaasa, Dr. Brian McConkey
University partners/*Partenaires universitaires* :
Industry partners/*Partenaires industriels* : Bart Lardner, Western Beef Development Centre

C – Opportunity Description/ *Description de l'Opportunité*

Objective/*Objectif* :
Water quality impairment due to nutrients and sediment is a serious issue throughout much of the world, and agricultural production is a leading source for nutrients and sediment in many regions. Of particular concern is phosphorus (P) in manure from animal operations. The balance of P to nitrogen (N) in manure is much higher than is required by plants, resulting in P accumulation in many soils where manure is applied. Because the P lost in runoff from sites with excess P can trigger harmful algal blooms in adjacent water bodies, it is important to understand the processes controlling P transport from land to water. Bale-feeding cattle on pastureland during the winter, rather than in contained corrals, is an increasingly popular practice in Saskatchewan. The objective is to increase soil fertility from direct feces and urine deposits, while decreasing costs associated with manure hauling and spreading. However, given that the predominant source of runoff from land into streams in Saskatchewan occurs during spring snowmelt, this practice has the potential to increase nutrient loading into water bodies, because the underlying soil will be frozen and unable to retain P. Drs. Cade-Menun, Iwaasa, McConkey and Lardner are involved in several projects investigating P movement from winter bale grazing and fall manure application from cattle operations, using advanced techniques such as 31P NMR spectroscopy, and examining the relative proportions of P moving in dissolved forms or as sediments. The student joining this project would expand on this work, examining in detail the transport processes of these P forms and developing strategies to minimize the loss of these P forms from agricultural lands to water.

Value of the Opportunity (issue, results, outcomes)/*Valeur de l'opportunité (problème, résultats, retombées*):
This research will support the Agriculture & Agri-Food Canada national research priority to enhance environmental performance of the Canadian agricultural system, providing information that will be useful not only in Saskatchewan and Canada, but worldwide too.

D – Describe the qualifications needed (academic, study, knowledge, skills, experiences, *etc.*), and the benefits to the candidate /*Décrire les qualifications requises (études, connaissances, compétences, expériences, etc) et les avantages pour les candidats*

An MSc. student must have an undergraduate degree in soil science or a related field; a Ph.D. student must have a M.Sc. dgreee in soil science or a related field. Course work in chemistry, soil chemistry and nutrient cycling at the undergraduate level is essential. Experience studying soil P cycling is preferred, as is experience with soil sample collection and analysis. The student will received advanced training in P chemistry, including the use of ^{31}P NMR spectroscopy to characterize P forms, and will leave with a detailed understanding of the factors controlling P movement from soils to water bodies.

OPPORTUNITY/*OPPORTUNITÉ* ID: 2010_Winnipeg_02(Morden) Return to the List

A – Identification

Type of Candidate (check one or more)/*Type de candidats recherchés (choisir un ou plus)* :

- Graduate students / étudiants des cycles supérieurs: - Ph.D.
- Scientist from a university or a research organisation/*Chercheur d'une université ou d'un organisme de recherche*.

If necessary, specify country (or countries) of preference./*Si nécessaire, spécifier le ou les pays de préférence* :

Justify if this Opportunity cannot be offered to a Canadian/*Justifiez si cette Opportunité ne peut être offert à un Canadien :*
Visiting student or scientist will be sponsored by a foreign fellowship

OPPORTUNITY TITLE/ TITRE DE L'OPPORTUNITÉ : **Genetic diversity and breeding use of dry bean (*Phaseolus vulgaris* L.) germplasm**

Foreigner's length of stay at AAFC, specify number of months (minimum and/or maximum)/ *Durée du séjour à AAC, spécifier le nombre de mois (minimal et/ou maximal)* : 12-24

Preferred start date before March 31, 2011/ *Date de préférence pour le début du séjour avant le 31 mars 2011*, specify/*spécifier* : April 2010

Research location in Canada / *Lieu de la recherche au Canada :* City/*Ville*, Province :
AAFC Morden Research Station Morden, MB
Website : http://www.agr.gc.ca/science

Contact: Email/*Courriel* : anfu.hou@agr.gc.ca
Dr. Anfu Hou Phone/*Téléphone* : 1-204-822-7228

B – The Research Team/ *L'équipe de recherché*

AAFC Supervisor/*Superviseur à AAC* : Dr. Anfu Hou
Other AAFC scientists/*Autres chercheurs d'AAC* : Dr. Robert Conner
University partners/*Partenaires universitaires* :
Industry partners/*Partenaires industriels* : Dr. Linda Malcolmson

C – Opportunity Description/ *Description de l'Opportunité*

Objective/*Objectif* :
1. Molecular marker assisted selection for disease resistance to bacterial blight and anthracnose in dry beans; 2. Evaluation of dry bean germplasm collections for agronomic traits including disease resistance, seed quality, growth habits, photoperiod, and adaptation; 3. Genetic diversity evaluation based on PCR-markers; 4. Association mapping of traits of interest in dry beans.

Value of the Opportunity (issue, results, outcomes)/*Valeur de l'opportunité (problème, résultats, retombées*):
Dry bean production worldwide is hindered by diseases. Disease infection leads to severe losses in yield and reduction in seed quality. In Canada, the major dry bean diseases include common bacterial blight, anthracnose, and white mould. Use of resistant cultivars is considered the most efficient approach for disease control in commercial production. However, breeding efforts for disease resistance are often restricted by the lack of resistance gene sources and inefficient transfer of multiple QTLs into breeding lines and cultivars. Identification of new resistance genes and related molecular markers would facilitate the pyramiding of multiple diseases resistance in dry beans. Demand for high food quality of dry beans is increasing on world markets. More attention is needed to breeding for improved seed quality traits such as better water absorption and hydration rate, low stone seed rate and soft seed texture, and marketable seed size, shape, and colors. However, detailed profiling and genetic background for such traits are very limited. The breeding lines and germplasm selected from this study could be used as new breeding materials for development of improved cultivars. The molecular markers identified could be used to assist and accelerate future breeding selection, especially for quantitatively inherited genes. The modern research and breeding technologies acquired by the visiting student/scientist would enhance their capabilities in future career development. This training would also lay a good foundation for future collaborations between the Canadian and foreign dry bean researchers.

Outcomes expected: 1. Release of breeding lines with resistance to multiple diseases and strains; 2. Detailed profiling of agronomic traits in dry bean genetic materials for use in breeding; 3. Estimation of genetic diversity in worldwide germplasm collections; 4. Identification of new QTLs for disease resistance and seed quality traits; 5. Presentation of research results at scientific conferences and publication in international refereed journals.

D – Describe the qualifications needed (academic, study, knowledge, skills, experiences, *etc.*), and the benefits to the candidate /*Décrire les qualifications requises (études, connaissances, compétences, expériences, etc) et les avantages pour les candidats*

The internship program is designed for Ph.D. graduate students/Visiting Scientists to conduct research and gain training in modern crop breeding and genetic practices, including technologies in molecular markers, seed quality analysis, disease resistance screening and gene mapping, genetic diversity evaluation, and genetic enhancement of germplasm resources. The qualified students/scientists are expected to have basic knowledge and training in disciplines of plant science, especially in the areas of plant genetics and breeding, plant pathology, and molecular markers technology. Fluency in English language is required. Willingness to do field-work is a prerequisite. The selected student/scientist should be able to work in a multi-disciplinary team, and be multi-task oriented. The training will provide opportunities to the candidate to gain experiences and develop a career in both conventional and molecular plant breeding and genetics.