CSA Newsletter

Canadian Society of Agronomy **November 2009**

President's Message

Little Known Giant of the 20th Century: Norman Borlaug 1914-2009

I saw Dr. Borlaug only once. It was two years ago in New Orleans, where at the age of 93 he was delivering an important keynote address to hundreds of professional colleagues on the worrisome prospects for the future of world food supplies. The ovations (several) were the most exuberant I have ever seen for one in our profession. It was also evident that a handful scattered in the large hall abstained.

Who was Norman Borlaug? This clear-eyed nonagenarian of Norwegian ancestry, who grew up on a tiny Iowa farm and loved to wrestle, was a Nobel Peace Laureate. Borlaug gave us the almost forgotten expression "Green Revolution". He also helped us to forget the once familiar phrase "famine in the subcontinent". Thanks to his work and leadership, food production in India, Bangladesh, Pakistan and other parts of Asia flipped from highly inadequate to surplus, all the while the population was exploding. With meticulous transfer of pollen between plants and perspicacious selection of progeny, Dr. Borlaug bred new strains of wheat that were resistant to pernicious plant diseases (like rust) and had the inherent capacity for high yield on a unit of land. It was a tough task; combining these traits was a great challenge that took many years of brilliant and tireless work. Thanks to this work, hundreds were trained, yield doubled, and hunger was massively reduced.

But this increase in yield did not occur without the addition of fertilizers. As Dr. Borlaug stated in New Orleans, his genetic improvements would have had produced little benefit without the addition of manufactured fertilizers.

It is a cautionary tale. The mouths that are fed must be kept fed. I had occasion recently to visit a museum in Ireland depicting the great potato famine of 1845. Irish population in the early 19th century had increased on the back of the potato, a New World crop that had been introduced to Ireland and could support more people per acre of land. But when the crop suddenly failed, a million people starved. The culprit was a fungus called late blight, which infected the potato crop causing healthy-looking potatoes to rot in storage. For hundreds of thousands of families there was suddenly no food. And no rescue.

Today we have much better scientific tools. But we also have the greater challenges of unprecedented increases in human population, real concerns about environmental degradation, and threats posed by ever more insidious pests. A triple threat. Great advances in crops and cropping practices are required if we are to avoid both food shortages and environmental damage. And for many Western countries there may be a concern that they have not considered before. If supplies falter, with so many more able to pay, there may be a bidding war for food on a scale that has not occurred before. Forget the oil crunch. This is about our children going to bed hungry.

No one understood better than Dr. Borlaug the connection between lowly crops and the mundane activities to produce them and the freedom from hunger. He often said that there can be no peace when there is hunger. We will be well advised to listen to the late Dr. Borlaug.

Dr. Shabtai Bittman
President

A tribute to Norman Borlaug.

The world has lost one of its outstanding citizens with the passing of Norman Borlaug. This icon of scientific agricultural research for development has touched the lives of hundreds of millions of the world's poor and thousands of us in the agricultural research community. When one thinks of Norm, one thinks of the vision, of hard work, of dedication and humility.

Norm was born and in the small town of Saude, Iowa and grew up on the family's mixed farm. Like other rural kids he learned the value of hard work and to live with the consequences of one's actions. Norm always brought a high level of energy and dedication to anything he put his hand to. He was an avid sportsman, excelling at wrestling and baseball. He was third in his weight class for the state of Iowa, and had ambitions to play professional baseball as a shortstop. Thankfully for us these ambitions were not realized. Norm was influenced by his grandfather to go on to higher education. He attended the University of Minnesota during the Depression years dropping out to earn money several times in the course of his studies. He persevered however and obtained a degree in forestry. After working for a short time in the forest service he returned to University and obtained master's degree and forest pathology. This was soon followed by a Ph.D. in pathology and plant breeding which became his life's career. Norm served in the US armed services during the Second World War as a science leader in research on pesticides. He was released from these duties in 1944, at which time he joined Rockefeller Foundation and OSS in Mexico to start his illustrious career in wheat improvement for the developing world.

The initial focus of the research was to incorporate rust resistance into locally adapted materials. To do this he accessed germplasm from around the world. Thus the beginnings of the principle of free access to germplasm and information, which carries forward to this day in the CGIAR system and is embedded in the principles of the International Treaty on Plant Genetic Resources for Food and Agriculture. He also established principle of shuttle breeding at this time, which involved testing at two sites in Mexico with very different environments and growing seasons. The result was speeding up of the incorporation of rust resistance in the breeding program and in the selection of broadly adapted materials. We now take these things for granted. His initial successes were rapidly adopted by Mexican farmers who saw clear benefits of the rust resistant cultivars which avoided the devastating losses that this scourge can bring. The largest impact however, came from his development of semi-dwarf cultivars to produce wheats which were efficient water and nutrient utilizers and able to double the production level.

This transformation was no simple task. Sources of dwarfing genes from Japanese germplasm carried a number of deleterious side effects, as well as the desired positive effects. Borlaug and his coworkers overcame sterility, variability in kernel size, poor quality and lack of disease resistance. Their persistence however, laid the foundation for the green revolution. Borlaug's team recognized that varieties alone would not create the impact which was their primary target. They understood the need to develop complementary cropping practices and to extend these to the farmers and to develop the human resource capacity of developing countries to further develop and spread the fruits of agricultural research. With these elements in place the green revolution rapidly spread from Mexico around the globe. The impact was to more than double wheat production and thus transformed the lives of hundreds of millions of the world's poor. Their success also led ultimately to the formation of the CGIAR network which has carried on this work in numerous crops at numerous locations around the world.

Norm's work has been recognized by many, many awards. We are all aware that our colleague was the first and only agricultural worker to receive the Nobel Peace Prize. He has been elected to academies of agricultural science in 11 nations and has received over 60 honorary doctorate degrees. He is been honored by farmer and civic associations in 28 countries. He has received the United States presidential Medal of Freedom, the national medal of science and the Congressional Gold medal. One of which he was particularly proud was his induction into the United States wrestling Hall of Fame. Norm was a simple and humble man and used these accolades, not for personal aggrandizement, but as a platform to campaign for support for his life long quest to improve the lot of the world's poor farmers through the application of science to agricultural development. He was a major campaigner for the establishment of the World Food Prize to recognize outstanding achievement in agricultural research. He was a tireless speaker and global traveler right up until a short time before his death, campaigning for support for research to find resistance to the latest race of wheat stem rust. In the words of Thomas A. Lumpkin the director general of CIMMYT "today we stand bereft of Borlaug's physical presence but not of his spirit or ideals". The world is a much better place because Norm Borlaug passed this way and cared.

We his colleagues in Canada, salute this great man, who has been are idol, our mentor and our collaborator. Long may his ideals guide the work we do for the benefit of all humankind.

Professor Bryan Harvey
University of Saskatchewan

A Tribute to Honor Dr. Norman E. Borlaug, Architect of the "Green Revolution"

Photo credit Texas A&M AgriLife photos

I started reading about the 1970 Nobel Prize laureate scientist Dr. Norman E. Borlaug when studying for my B.Sc. (Agric) at the University of Nairobi, Kenya in late 1970's and early 1980's. Dr. Borlaug's name and association as the architect of the "green revolution" permeated most courses I took in my undergrad studies. This influenced my pursuing a career as a wheat breeder at the National Plant Breeding Research Centre, Njoro, Kenya.

In 1985, I had the privilege with Dr. Borlaug when he came to present a seminar at the University of Alberta, Canada where I was pursuing M.Sc. (plant breeding –wheat). I recall Dr. Borlaug giving a very inspiring seminar to aspiring scientists. Soon after that, Dr. Borlaug sent me a return air ticket to visit CIMMYT, Mexico for three weeks in the fall. Visiting and selecting wheat materials, with Dr. Borlaug, at the CIMMYT nurseries in Toluca and El Batan enhanced my perspective of plant breeding. He talked fondly about the shuttle breeding program and free exchange of germplasm without boundaries, as well as the breeding of cereal rust resistant cultivars. In 1991, I had another opportunity to visit with Dr. Borlaug at CIMMYT, Mexico. After visiting, coincidentally Dr. Borlaug and I flew together from Mexico via Houston, TX to Amsterdam, NL. He was heading to Accra, Ghana on a Sasakawa Africa Association Global 2000 Project and I was going to Nairobi, Kenya. In those days, before the economic crunch, KLM provided two days free stay in some of their fine hotels in Amsterdam if you were connecting with KLM to Africa. This turned out to be an ample opportunity to connect with Dr. Borlaug as we shared the same hotel and dining for two days. I learned more science and the art of plant breeding science within two days of visiting with Dr. Borlaug. Dr. Borlaug was a practical and encouraging person. He had an uncanny ability to make people feel comfortable around him. He had a unique way of communicating powerful ideas that left you thinking further and wanting to embrace his ideas at the same time leaving you empowered with new ideas and wanting to explore more. Dr. Borlaug had so big an impact on so many people around the world that he will be greatly missed by us all.

Dr. Joseph M. Nyachiro

Barley Breeder, Alberta Agriculture and Rural Development, Field Crop Development Centre, Lacombe, AB

IPNI BOARD OF DIRECTORS STATEMENT ON THE PASSING OF DR. NORMAN BORLAUG

September 15, 2009 – Norcross, GA – The International Plant Nutrition Institute (IPNI) Board of directors has issued a brief statement honoring the legacy of Dr. Norman Borlaug, who passed away on September 12 in Dallas, Texas, at the age of 95.

"Dr. Borlaug was one of those rare individuals who made the most of his fame and influence to champion the cause of applying science for humanitarian benefits," said IPNI President Dr. Terry Roberts. "Our Board of Directors has a message of sympathy and admiration in tribute to Dr. Borlaug."

The IPNI message states:
"In Remembrance of Dr. Norman Borlaug, 1914-2009----
We join with millions of people around the world in expressing appreciation and admiration for the great achievements of Dr. Norman Borlaug. His dedication to science in agriculture is responsible for improving the lives of individuals around the world over the past 50 years and into the future. In an amazing journey from his Iowa farm roots to world recognition as a Nobel Peace Prize laureate, he never lost sight of the importance of global food security and the power of science through agriculture. Dr. Borlaug was considered by many as the father of the 'Green Revolution' as his early work in plant breeding led to great increases in harvests of cereal crops in Mexico, India, Pakistan, and other countries. His phenomenal success in breeding high-yielding varieties of wheat, rice, and other crops evolved into broader initiatives in training young agricultural scientists, educating audiences around the globe, and furthering important humanitarian causes. The International Plant Nutrition Institute extends its condolences to the Borlaug family and to his many friends and colleagues. While we are saddened by the loss of this innovative scientist and beloved leader, we believe his vision and accomplishments will serve as inspiration to future generations to continue the quest for world food security."

A pdf of this press release is available at the IPNI website.

Norman Borlaug's fight to feed the world

by Kevin Libin

http://network.nationalpost.com/np/blogs/fullcomment/archive/2009/09/14/kevin-libin-norman-borlaug-s-fight-to-feed-the-world.aspx

Canadian worked to feed millions of hungry people

MANY are familiar with the life and work of Norman Borlaug, the American Nobel laureate known as the Father of the Green Revolution, who died last month at the age of 95.

Less well-known is the fact his right-hand man during the 1960s campaign to stave off a looming food shortage in India was a Canadian scientist and former Winnipegger — R. Glenn Anderson.

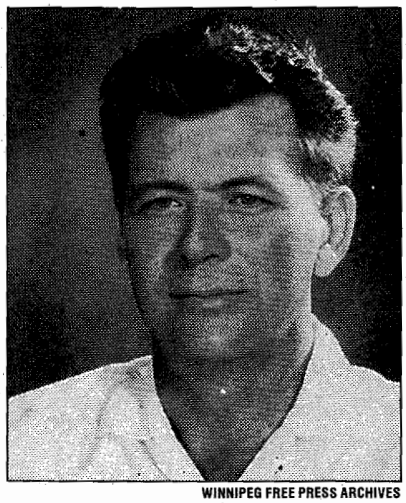
LAURA RANCE
RURAL REVIVAL

Anderson, an Agriculture Canada plant pathologist working on the genetics of rust resistance in bread wheat, was recruited by Borlaug in 1964 to help lead an accelerated wheat-breeding program that was being established in India by the Indian Council of Agricultural Research (ICAR), the Rockefeller Foundation and the newly formed CIMMYT, an international wheat and corn-breeding centre in Mexico.

"When Glenn arrived in India, the country had a five- to eight-million-ton deficit that was steadily worsening as food demand increasingly outpaced supply," Borlaug said in a 1992 address to the Canadian and American phytopathological societies. "Glenn helped to lead a research and production effort that literally put bread into the mouths of tens of millions."

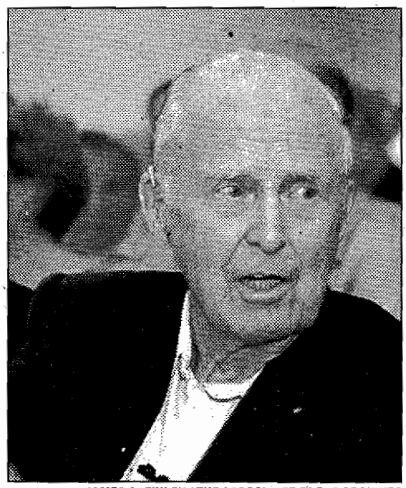
The key to their success was two-fold: genetics with improved disease and lodging resistance and a comprehensive extension effort aimed at teaching farmers how to maximize the potential of these new varieties.

Anderson succeeded Borlaug as director of CIMMYT's wheat program after Borlaug's retirement in 1979. "His interest, experience and knowledge transcended wheat as a crop; he was a green-fingered agricultural scientist in the broadest context. For example, he understood the many indirect values of forests in food production and erosion control, as a habitat for wildlife and for recreation. This permitted him to see the 'big picture' of how to best manage the world's land and water resources to supply human needs on



WINNIPEG FREE PRESS ARCHIVES

R. Glenn Anderson: 'big picture'



JAMES A. FINLEY / THE ASSOCIATED PRESS ARCHIVES

Norman Borlaug: Green Revolution

he died in 1981. But as Borlaug described it, Anderson's role in the Green Revolution was pivotal.

While touring India in 1968, Borlaug and Anderson found the improved production also created new problems. "All the harvesting was done by sickle and it takes three to four times longer to harvest a five-tonne-per-hectare crop than an 800 kilogram-per-hectare crop.

"There was a shortage of space on the threshing floors, shortage of bullock carts to move harvested sheaves to the threshing floor and bagged grain to market, shortage of bullocks, shortage of jute bags, shortage of trucks, shortage of railroad cars and, worst of all, shortage of grain-storage warehouses.

"Unfortunately, there was no shortage of the greedy 'grain-buyer-money lenders' who, with many local markets temporarily flooded with grain, found better opportunities than ever before to beat down the prices paid the farmer," Borlaug said, noting India soon added regulations to protect farmers.

India quickly became self-sufficient in cereals and a grain export competitor, which placed the efforts of Borlaug's team at odds with the interests of North American farmers, whose profitability has suffered.

The Green Revolution has since come under fire. Although it dramatically boosted production of cereal grains in countries where hunger was chronic, that production came at a weighty environmental and social cost. Meanwhile, a report released in conjunction with World Food Day

able countries is actually rising.

Borlaug, honoured once again last week during the World Food Prize celebrations in Des Moines, Iowa, remained to his dying day a passionate promoter of science and its technological applications — including genetically modified crops. But he also cautioned against their overuse, likening them to medicines. "When used appropriately, they are beneficial, but when used without the proper caution, they can be harmful and even deadly."

And he was adamant the Green Revolution was about more than technology transfer. "More accurately, the term 'green revolution' symbolized the beginning of a new era for agricultural research, extension and rural development in developing countries, one in which modern principles of genetics/plant breeding, agronomy, plant pathology, entomology and economics have been applied to develop indigenous technologies appropriate to the conditions of local farmers," he told his colleagues in 1992.

Our emerging environmental awareness has prompted a push for a "greener" revolution in agriculture, but even in that context, Borlaug's words remain valid today.

Scientists like Borlaug and Anderson were driven by the reality world peace could not be built on empty stomachs. But likewise, ending hunger is more complicated than increasing production.

Laura Rance is editor of the Manitoba Co-operator. She can be reached at

CSA 2009 Student Award Winners

Amit Jhala
Pest Management Scholarship
1st Place, Oral Presentation

Joel Hemmingway
2nd Place, Oral Presentation

Caroline Halde
3rd Place, Oral Presentation

Chantale Morin
1st Place, Poster Presentation

Other Winners:

Golsa Samii-Sakit	2nd Place, Poster Presentation
Amanda Ward	3rd Place, Poster Presentation

CSA 2009 Fellowship Award Winners

Dr. Yantai Gan

The Canadian Society of Agronomy is pleased to announce that Yantai Gan has been selected as a Fellow for 2009. Dr. Gan received his Bachelors of Science degree in Plantand Soils in 1983 from Gansu Agricultural niversity, China and his M.Sc. and Ph.D. degrees in Agronomy and Cropping Systems in 1991 and 1994, respectively from the University of Manitoba. He has worked as a Research Scientist for Agriculture and Agri-Food Canada in Swift Current from 1994 to the present. Yantai has led a multi-disciplinary research program at the centre mainly addressing issues related to the adaptation of alternative crops, crop diversification, and the development of sustainable cropping systems for dryland agriculture. During the past 15 years, he has conducted research in several areas, including identification and development of diverse crop sequences and rotation systems to use resources more efficiently; adaptation of alternative and profitable crops (mainly pulses and oilseeds) to the changing environments; use of alternative crops to replace conventional summerfallow; development of alternative tools to reduce the risks associated with the production of new alternative crop species; development of integrated management packages for the production of profitable pulse crops like chickpea; quantification of carbon input to soils under various pulse and oilseed crops; and determination of rooting systems of pulses and oilseed crops. This research has supported the diversification and improved profitability of semi-arid farming systems in the northern Great Plains region.

Dr. Thin-Meiw "Alek" Choo

The Canadian Society of Agronomy is pleased to announce that Dr. Alek Choo has been selected as a Fellow of the Canadian Society of Agronomy. Dr. Choo obtained his bachelor's degree from the National Taiwan University in 1971 and his doctoral degree from McGill University in 1976. Dr. Choo was a research associate at the University of Guelph from 1976 to 1978. He has been a research scientist with Agriculture and Agri-Food Canada for the past 30 years. In 1978, Dr. Choo initiated the red clover breeding program at Charlottetown. Currently, he is the barley breeder at the Eastern Cereal and Oilseed Research Centre. Dr. Choo was a visiting professor at the University of Kentucky, USA, for a year in 1983-1984 and a visiting scientist at the Zhejiang Academy of Agricultural Sciences, China, for nine months in 2006. He was an adjunct professor with the Nova Scotia Agricultural College from 1986 to 1998. Dr. Choo's breeding programs have been extremely productive. He has released 15 barley cultivars and co-released 4 red clover and 1 birdsfoot trefoil cultivars. Many of his cultivars are widely grown across Eastern Canada as well as in the northeastern United States. His barley cultivar AC Klinck yielded 10% more than check cultivars in Quebec in the five-year period from 2000 to 2004. Encore barley was the highest yielding cultivar in Quebec for the eight-year period from 2000 to 2007, producing 14% more than check cultivars. Island barley was found to be the commercial cultivar in Eastern Canada most resistant to deoxynivalenol accumulation. His cultivars have helped 5 producers in Eastern Canada to obtain high yield and to reduce the level of deoxynivalenol contamination. While breeding for red clover and barley, Dr. Choo has also actively pursued scientific investigations to develop breeding methodologies and to better understand the genetic make-up of plant traits. As a result, he has authored/co-authored 91 referred papers in international journals. Three of his publications have been translated into Chinese and the translated version published in a scientific journal in China. Dr. Choo has published many biometrical methods for studying gene actions in doubled-haploid populations. He was instrumental in documenting the first published report on the severity of mycotoxin contamination in barley in Eastern Canada. Upon invitation, Dr. Choo authored two review papers on Fusarium head blight of barley and co-authored a review paper on the use of haploids in breeding barley. Dr. Choo has generously donated his time and service to scientific societies. He served as associate editor for the Canadian Journal of Plant Science for two terms (1997-2002) and as associate editor for a special issue of the Canadian Journal of Plant Science in 2006. Dr. Choo also served on the Editorial Policy Subcommittee of the Agricultural Institute of Canada for two terms (2002-2005). He chaired the Crop Science Research Award Committee of the Crop Science Society of America in 2000. He served on the Agronomic Service Award Committee (1991 and 1992) and Fellows Committee (2003 and 2004), both with the American Society of Agronomy. Dr. Choo also served as a Regional Secretary for the Society of the Advancement of Breeding Researches in Asia and Oceania for five years (1991-1995). Upon invitation, Dr. Choo has visited China eight times to provide expert advice and lectures at research institutes in 11 provinces. Dr. Choo has had an exceptional career as a forage and cereal breeder, developing several cultivars which have produced over a million dollars annually in increased yields for Eastern Canadian producers. He has complemented this with exciting scientific creativity, especially in the fields of haploidy breeding and Fusarium head blight resistance. For these outstanding contributions to Canadian and international agriculture, we are pleased to recognize Dr. Choo as a Fellow of the Canadian Society of Agronomy.

Gueph 09: CSA Annual Meeting, August 5-7, 2009

Statistics Symposium Presentations from Guelph 2009

There were requests after the Statistic Symposium for copies of information presented in Power-Points by the symposium presenters. These presentations are now posted on the website: http://www.guelph09.ca/presentations/ .

The presentations posted are:

Linear-bilinear model analysis of agricultural experiments: when interactions are important.
Dr. Jose Crossa, Distinguish Scientist, Head of Biometrics and Statistics, International Maize and Wheat Improvement Center (CIMMYT)

Mixed-model analysis of agricultural experiments: when some effects are random.
Dr. Rong-Cai Yang, Research Scientist, Alberta Agriculture and Rural Development (ARD) & ARD professor, University of Alberta

Bayesian analysis of agricultural experiments: when everything is random.
Dr. Shizhong Xu, Professor of Genetics, University of California Riverside

SPOTLIGHT: NSAC STUDENTS

In the next few issues, we will be highlighting students from different universities.

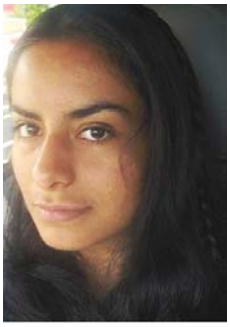
The students on this page and the following 4 pages are from Nova Scotia Agricultural College.

"NSAC isn't just a university. It's a world class research facility. All our faculty are working researchers and all are working to have a positive global impact. They are changing the way we see climate, food and energy now to build a sustainable future. Our students, especially those in the graduate program, have just as many positive contributions.

The real world doesn't work like a classroom so we don't think you should spend all day in one. Instead, our students work in the field, in the lab or in one of our state-of-the-art facilities, like the $9.8 million Atlantic Poultry Research Centre. In 2006-2007, $8.5 million in funding went to support research infrastructure and operating.

We live in the world now, but we want to be here in the future. The work our graduate students are doing will help ensure that goal is possible."

Administration, NSAC



Maria Angelica Rojas

MSc. Environmental Science
Nova Scotia Agricultural College
Truro, NS, Canada
rojasm@nsac.ca

Education
BSc. (Honours) in Environmental Science with Certificate in GIS, York University, Toronto, ON, Canada

Current Research
Site specific management study of fertilizers and herbicides in lowbush blueberry
Maria Angelica Rojas[1] Nathan Boyd[1] Gordon Brewster[1]

An experiment analyzing the effects of site specific application of fertilizers and herbicides in comparison to broadcast applications was conducted in two commercial blueberry fields in Earltown and Mount Thom, Nova Scotia. A randomized complete block design with six treatments and four blocks in a plot size of 10m x 10m was used. The treatments included fertilizer application methods (broadcast vs site specific in blueberry patches) and herbicide applications (broadcast vs site specific in weed patches vs site specific in weeds growing within blueberry patches). Blueberry and weed areas were mapped using GIS technologies. Stem height, fruit bud density, blueberry and weed biomass, and number of individuals responded differently at each site. Site specific fertilization stimulated blueberry area extension, increased fruit bud density, and induced more proliferation of weeds within blueberry clones. Site specific herbicide application had significant effects on weed population: Weed control in blueberry patches favoured emergence of weeds in weed patches while appearance of weeds within blueberry patches was favoured by herbicide applications in weed patches.

[1] Department of Environmental Science. Nova Scotia Agricultural College P.O. BOX 550 Truro, Nova Scotia B2N 5E3

Future Vision: After I graduate I would like to continue my studies in agricultural research by pursuing a PhD. Degree. This degree will help me to acquire more knowledge and become an active member of the scientific community, eager to find new strategies to preserve sustainable agricultural practices.

Amanda Ward

M.Sc. Candidate in Agri-Biology (2008-2010)
Nova Scotia Agricultural College
Truro, NS, Canada
warda.nsac@gmail.com

Education
B.Sc in Biology, Acadia University, Wolfville, NS, Canada

Current Research
Phosphorus Regulation of Soybean and Alfalfa Biological Nitrogen on Ontario Dairy Farms

A recent survey of long-term organic dairy farms in Ontario have shown the farms have low to extremely low levels of soil test phosphorus. The purpose of this study is to determine if low levels of phosphorus affect the amount of nitrogen which can be obtained from biological nitrogen fixation and the level where this may occur. Additionally, three soil amendments will be evaluated to determine their potential for supplying readily available phosphorus to the plants. Results to date have shown the amount of plant available phosphorus does affect soybean growth and the amount of nitrogen accumulated per plants. An alfalfa trial was recently harvested and it is expected the results from this trial will follow a similar pattern as the soybean trial. A visual inspection of the plants showed there was a height and biomass difference between the various P rates. A trial using soybean has been established to evaluate the effectiveness of three potentially organically acceptable products to provide a readily available supply of phosphorus to growing plants. These amendments include phosphate rock partially solubilized in citric acid, a MSW compost and Crystal Green®, a phosphorus rich product obtained from waste water. This trial will be harvested mid-December 2009.

Future vision:
I plan to graduate in the spring of 2010. I plan to continue research focusing on sustainable agricultural practices and hope to educate those who will benefit from the research.

David Hobson

MSc Candidate Plant Science
Nova Scotia Agricultural College
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Education
BA (Linguistics), University of Alberta, Calgary, AB, Canada

Current Research
***Ascophyllum nodosum* extract for management of bacterial leaf spot and head rot of cauliflower and broccoli.**

The use of chemicals to manage plant disease is increasingly in disfavour with public opinion, as the environmental implications come to the fore, but also because of their declining effectiveness. Bacterial plant pathogens are often very difficult to control, both pre- and post-harvest. Seaweed extracts have a biostimulating effect on plants, and *Ascophyllum nodosum* extracts were found to induce systemic resistance against *Pseudomonas syringae* DC 3000 in the model plant *Arabidopsis thaliana*. The objectives of this work are to study the effects of seaweed extracts on leaf spot and head rot of broccoli and cauliflower, specifically to 1. Characterize the effective seaweed products for management of these diseases and 2. Select the optimum rate, method and time of application of extracts. Presently, head rot of broccoli is being studied using Arabidopsis to profile the disease.

Keywords: Broccoli, Cauliflower, Head rot, Leaf Spot, Seaweed extracts, *Ascophyullum nodosum*.

Future Vision
I would like to use my research experience to improve agricultural practices in Canada, making them more sustainable and adaptable to the rapidly changing environment and climate.

Di Fan

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Education
M.Sc. Candidate in Genetics, Jinan University, China.
B.Sc. in Biotechnology, Jinan University, China.

Current Research
Ascophyllum nodosum* extract enhances nutritional parameters and post-harvest qualities of spinach (*Spinacia oleracea* L.), and ANE-treated spinach extract imparts stronger protective effects on stress resistance in *Caenorhabditis elegans

Seaweeds have a number of beneficial effects such as improving plant growth and imparting tolerance to biotic and abiotic stresses. Postharvest quality decline in fruit and vegetables is associated with natural and stress-induced senescence. However, little has been done to characterize the effects of application of seaweed extract from *A. nodusum* on postharvest quality of fruit and vegetables. It is hypothesized that *A. nodusum* extract (ANE) can improve nutritional parameters as well as post-harvest qualities of spinach, and that the extract of ANE-treated spinach better protect *C. elegans* under stress conditions. The objectives of my research are: 1) to study the effects of seaweed extracts in enhancing nutritional quality and shelf life of spinach; 2) to characterize the efficacy of extracts of ANE-treated and non-treated spinach in *C. elegans* under stress conditions.

Future Vision:
I have gained great interests in the study of functional food and aging during my M.Sc. work at NSAC, Canada. I would like to pursue a Ph.D. with a focus on the aging process and the use of plant adaptogens in gerontological research. I would be delighted to have the chance to contribute my knowledge obtained from Canada and my motherland China, to facilitate scientific research.

Emily Snowdon

M.Sc. candidate in Environmental Science (2008-2010)
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Education
B.Sc. in Biology, Faculty of Science, University of New Brunswick, Fredericton, New Brunswick, Canada.

Current Research
Effect of the preceding crop on nitrous oxide (N_2O) emissions during the potato year in two-year potato rotations

In humid regions, the majority of anthropogenic N_2O emissions result from bacterial denitrification occurring in agricultural soils. N_2O emissions resulting from denitrification are principally controlled by soil aeration and by the availability of soil nitrate and carbon. However, the influence of crop rotation on these parameters, and consequently their influence on N_2O emissions, is poorly understood. The goal this research project is to examine how N_2O emissions during potato production are influenced by choice of preceding crop and nitrogen management in two-year potato rotations through their effects on soil carbon and nitrate availability and soil aeration. It is hypothesized that choice of rotation crop and nitrogen management will have a significant effect on N_2O emissions during potato production.

Future Vision:
I would like to contribute to projects concerning agriculture and the environment. Using the knowledge I have gained from my research project, I would like to assist in finding ways to improve current agricultural practices in order to minimize environmental impacts.

Malinda Thilakarathna

M.Sc. candidate in Plant Science (2008-2010)
Nova Scotia Agricultural College
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Education
M.Sc. in Crop Science, Post Graduate Institute of Agriculture, University of Peradeniya, Sri Lanka.
B.Sc. (Hons.) in Agriculture, Faculty of Agriculture, University of Peradeniya, Sri Lanka.

Current Research

Genetic variability among red clover cultivars for nitrogen fixation and transfer to companion grasses

Concerns regarding the environmental impact associated with N-fertilizer have resulted in an increased interest to maximize the benefit of biological nitrogen fixation (BNF) in legume- based pasture mixtures. Red clover is one of the most important N-fixing forage legumes in northern latitudes where much of the agriculture is based on livestock production. Improving the transfer of fixed N to associated grasses during the growing and extended grazing seasons will reduce the requirement for N fertilizer and also N lost by leaching and emission. It is hypothesized that there is significant genetic variability among and within adapted red clover cultivars for nitrogen fixation and subsequent transfer of N to associated grasses. The objectives of this research are: 1) to characterize the efficiency of nitrogen transfer from red clover to companion grass in perennial forage stands; and 2) to estimate the genetic variance of the nitrogen transfer trait among and within selected red clover cultivars.

Future Vision
From the new knowledge gained from my research, I would like to contribute my service and support to my nation in return for the free education I received. To show gratitude to the country that facilitated my studies, I would be pleased if I could contribute to the scientific knowledge base in Canada.

Lin Wu

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Education
B.Sc.(Agr.) in Environmental Science, Nova Scotia Agricultural College, Canada .
B.Sc.(Agr.) in Agricultural resources and Environment, Fujian Agricultural and Forestry University, China.

Current Research
Development of a best management plan for spreading dogbane (*Apocynum androsaemifolium L.*) in blueberry fields

Spreading dogbane (*Apocynum androsaemifolium* L.) is a native perennial herb that is considered a serious problem because it is a strong competitor, interferes with harvest and spreads rapidly once established in blueberry fields. Effective means of controlling spreading dogbane must be developed to optimize yields and profits. Phenology plays an important role in weed management. Therefore, a study into the emergence patterns and timing of flowering of spreading dogbane will be undertaken to predict the optimum herbicide application timing. Damage rate and dogbane biomass will be observed from plants with recommended herbicides and different control techniques (spot spray, wiper spray and broadcast application), and will be compared with control plants to determine blueberry tolerance and herbicide efficacy and to identify effective management options for spreading dogbane.

Future Vision:
I hope my future career is related to reducing the impact of agricultural process on the environment, specializing in integrated pest management. I would like to apply the knowledge gained from my research in blueberry fields to other fields and crops, to develop a best effective and sustainable pest management plan.

Terri MacPherson

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Education
B.Sc. (Hons.) in Biology, Cape Breton University, Nova Scotia, Canada

Current research

Seasonal monitoring of nitrate leaching in pure bluegrass versus bluegrass-clover mixed swards

Nitrogen (N) is an essential element for plant growth, and the use of N fertilizers continues to rise in conjunction with the increasing utilization of arable land for agricultural use. When the amount of applied N on these pastures exceeds plant metabolic needs, the excess nutrients exit the system and what's not incorporated into soil organic matter may be leached into ground and surface water systems, contaminating them. Nutrient losses into groundwater can be prevented through the environmentally sustainable process of biotic control on nitrate leaching. Henceforth, there has been a research shift that targets the increased incorporation of N-fixing legumes into agricultural ecosystems to promote more efficient utilization of N by plants, therefore minimizing N losses out of agricultural systems. Grass-legume swards exhibit an improved efficiency of N cycling but are not exempt from leaching losses entirely. The primary objective of my thesis research is to measure and characterize the contribution of red clover to nitrate leaching when grown in mixture with bluegrass. Experimental field trials, located in Truro and Nappan, NS, will test the sward specific hypothesis that soil nitrate leaching will increase when bluegrass is grown in mixture with red clover.

Ruijie Zhai

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Education
B.Sc. in Horticulture, Fujian Agricultural and Forestry University, China.
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Current Research

Seaweed Product to Improve Nitrogen Fixation, Establishment and Productivity of Alfalfa and *Medicago truncatula*

Nitrogen is an essential plant nutrient and a major component of amino acid, protein, nucleic acid and nitrogenous metabolites. Earths' atmosphere is composed of about 79% nitrogen. However it is not usable by plants directly. Among cultivated plants, legumes have the ability to form a symbiotic relationship with a group of soil bacteria known as Rhizobia. This leads to the formation of nodules, with in which the bacteria fix atmospheric nitrogen to a form that is available to plants. *Ascophyllum nodosum* is a perennial brown alga. It is the most studied seaweed species as fertilizers, biostimulents, and as a soil conditioner. It is hypothesized that the application of *A. nodosum* extracts to *Medicago sativa* (alfalfa) and *Medicago truncatula* will increase functional nodule number, total dry mass, nitrogen, and total protein by altering physiological and biochemical processes. This hypothesis will be tested in the greenhouse and under field condition.

Future Vision

I would like to contribute my scientific knowledge gained from the college and my project to the agriculture of either Canada or China to support their development. I would be happy if I could work on the cooperative projects of agriculture between these two countries.

Invitation to Saskatoon 2010
Joint Conference of the CSSS & CSA

The Department of Soil Science and University of Saskatchewan are pleased to host the 2010 joint conference of the Canadian Society of Soil Science (CSSS) and the Canadian Society of Agronomy (CSA). The conference will take place **June 20th to 24th** on the **University of Saskatchewan Campus** in Saskatoon, SK.

The theme for this year's conference is ***Transfers & Transformations: Our Evolving Biosphere***. The CSSS, CSA and local organizing committee welcome scientific contributions to the theme in the form of oral and poster presentations.

Abstracts will be accepted starting on **January 4, 2010**.

Call for Papers

THE ATLANTIC AGRONOMY WORKSHOP

Rodd Charlottetown Hotel, Charlottetown, PEI
January 19 -20, 2010

Organized by Canadian Society of Agronomy

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