

# CSA Newsletter

Canadian Society of Agronomy

January 2011



## PRESIDENT'S MESSAGE

### *Happy New Year to You and Your Families*

Another challenging year is unfolding before us. Many parts of the world faced some challenging weather this year and the northern Great Plains were not an exception; in western Canada we had over 12 million acres (close to 5 million hectares) not seeded or seeded and subsequently flooded. I asked our company agronomists to submit samples from flooded vs. non-flooded, cropped and fallowed out of necessity fields on the western Canada prairies. Most fields in the sample were fertilized in the spring. The main difference between the fields was that there was a crop on the non-flooded portions versus very little or no growth in the flooded fields. Logically, if there is no crop growing, there should be no nutrient usage. However, the mean values for both flooded and non-flooded areas were virtually the same for the entire soil profile. This would suggest that there were great losses in the flooded parts of the field and that these losses occurred primarily due to denitrification rather than nitrogen leaching. At the same time, in spite of the similar mean (average) values, there were extreme swings in the soil test values with differences as great as 50lb N/acre. At the same time, while one would have to go back to 1994 to find averages this low for N levels in stubble fields, fallow, not flooded fields, seem to be well charged with N. The greatest lesson though is that soil sampling for the 2011 growing season is necessary and more important than ever, especially for fallowed and flooded areas.

It is with real sorrow that I report the loss of one of the icons not only of western Canadian but the entire northern Great Plains agriculture, John Harapiak. John was a great friend and a mentor and taught me to always do the right thing for the farmer. In my Westco days, John used to say what is good for the farmer is good for Westco. For those who knew John they also know that he was instrumental in the adoption of soil banding fertilizer and the notion that airseeders can be effectively used in direct seeding and, yes, even applying anhydrous ammonia at seeding time. And these are just a few of his accomplishments. I was privileged to work with John and present a lot of his work to the scientific community. John died on January 14, 2011 at the age of 73 after a long battle with cancer.

The Canadian Society of Agronomy is meeting this year in Halifax in conjunction with the Plant Canada meeting. Yousef Papadopoulos has been a busy chair of the organizing committee leaving nothing to chance and ensuring a successful meeting again. Hopefully many of you will make it to Halifax July 17-21 (<http://www.plantcanada2011.ca/>)

*Rigas Karamanos*  
*President*



## Changes to the Canadian Journal of Plant Science.

Our journal seems to be in trouble. Long turn around times between submission and publication, low “Impact Factor” score, and a dwindling number of papers submitted and published are a few of the main problems. It seems that these problems are plaguing many scientific publications these days, although some are doing better than others. The CSA executive are investigating possible fixes to the journal, but the best thing that we as members can do is to continue to submit our high quality manuscripts to the journal. Our journal will not improve by itself and change is not something to be done without full investigation into the potential impacts. Future newsletters will keep you informed.

## Best Agronomy Paper in Canadian Journal of Plant Science

The Best Paper Award concept was introduced in 2010 as one method to improve the CJPS. Several agronomy themed papers were chosen by the editor from the papers published in 2009 and submitted to a panel for judging. The paper was judged by the following criteria:

Language: clear objectives, appropriate title and style.

Methods: clearly stated, inclusive, and understandable.

Analysis: quality, completeness.

Graphics: easy to follow, necessary, quality.

Discussion: Did the discussion explain the results, were new ideas or theories clearly supported by the evidence?

Impact/Originality: How original were the concepts presented in the manuscript?

Impact/Importance: How useful will this manuscript be to others?

A representative of the winning manuscript will be invited to present a talk on their paper at the CSA meetings, receive free registration for the conference and have part of their travel expenses paid. In addition, the authors of the winning manuscript will be asked to write a popular press article for publication. It is our hope that the Best Paper Award becomes a tradition of the CSA.

Last years winner was Dong Chen, Michael Peel, Kenneth Olson, Bart Welmer and Daryll DeWald for their paper Differential ruminal degradation of alfalfa proteins. CJPS,89:1065-1074.



## Awards—Nominate a Colleague!

Each year the Canadian Society of Agronomy recognizes individuals who have made outstanding contributions to their science. Awards are to be presented at the annual meeting, this year on 17-21 July 2011 in Halifax. The following are the award categories:

- **Young Agronomist Award** - Presented each year for distinguished service to a scientist who is 40 years old or younger.
- **Fellow of the Canadian Society of Agronomy** - A maximum of three Fellows are conferred each year on those members who have made a significant contribution to agronomy in Canada and to the Society over a period of at least ten years.
- **Distinguished Agronomist Award** - presented to members who have made a significant lifetime contribution to agronomy in Canada and to the Society.

**Pest Management Research Award** - Made available annually to qualified graduate students enrolled in any aspect of pest management at Canadian universities. Nominations **due 31 March 2011**; contact Shabtai Bittman at 604-796-1735 or [Shabtai.Bittman@AGR.GC.CA](mailto:Shabtai.Bittman@AGR.GC.CA). The guidelines for these awards as well as a list of past recipients can be found on the CSA website at <http://www.agronomycanada.com/awards.html>.

Taking the time to nominate a colleague honours that individual's contribution to the discipline but also advances the recognition of the value of agronomy to society as well. The nomination procedure is straightforward and is described thoroughly on the website. With the exception of the Pest Management Research Award, the nominations are **due 1 May 2011**. Forward nominations to:

**Shabtai Bittman**

**AAFC Agassiz BC, tel: 604-796-1735 or [Shabtai.Bittman@AGR.GC.CA](mailto:Shabtai.Bittman@AGR.GC.CA)**



## Nominations for CSA Executive 2011

Three positions on the Canadian Society of Agronomy executive are opening in 2011. Candidates are needed for the **President-elect, Secretary-Treasurer, Eastern Director** and **Western Director** positions. Holding office in the CSA provides a unique opportunity to work with your colleagues across the country, to have an impact on the society and contribute to the advancement of agronomy in Canada. Executives are required to participate in the executive meetings (teleconference calls), attend and participate in the CSA annual meeting, chair and/or serve on CSA committees as needed, and help to promote CSA within their organizations and regions. If you are interested in becoming a director for CSA or you know a colleague who you feel will be a good candidate and is interested in being nominated please contact:  
**Shabtai Bittman at tel: 604-796-1735 or [Shabtai.Bittman@AGR.GC.CA](mailto:Shabtai.Bittman@AGR.GC.CA)**

**\$3000 in prize money**  
available to CSA student members!

**Split among the 3 top oral and 3 top poster agronomy presentations**  
at the conference in Halifax.

**Co-sponsored by SeCan and CSA**



## Plant Canada 2011

### *Another fabulous conference in the East*

We have unsung heroes in CSA! An exceptional committee has been working to pull together Plant Canada 2011 in Halifax. Be sure you plan to attend, as the work going into this has been unbelievable. This conference will also host our Annual General Meeting (AGM).

CSA volunteers are spearheading the conference for all 6 plant-related Societies. The good news is that we've done our duty to organize our share of the Plant Canada conferences for the next 2 decades (we could do more if you are keen)! The challenge is to get the 6 Societies to agree on a single conference arrangement. Each has its own traditions and requirements, and the people have their own schedules. I think all the CSA committee members are working like crazy, but I hear mostly from Yousef Papadopoulos. Yousef has been the key organizer for a series of CSA conferences and regional meetings, his talent for detail and teamwork is legendary. Even without the great venue and the good collaboration of Societies, with Yousef involved this conference is guaranteed to be topnotch. Of course, many other CSA members are involved in the organization, and you'll hear from many of them and you'll see the results of their work.

There are also some important issues for CSA to consider, and the AGM is the best way to do this. How should we interact with AIC and ASA? Should we get stronger links with the ESA (European Society of Agronomy)? What about the Canadian Journal of Plant Science – is this our very own agronomic Avro Arrow (best in class but not supported by Canadians)? Plan to come to Halifax, we need your energy and input.

Note we have been asked to bid on the International Crop Science Congress for 2020, with Vancouver as the proposed location. A good example of why we need to get young agronomists involved in CSA! We'll discuss this in Halifax too.

*Steve Sheppard*  
*Executive Director*





# Plant Canada 2011

July 17-21, 2011

Saint Mary's University  
Halifax, Nova Scotia

## Plant Adaptation to Environmental Change

Hosted by  
Canadian Society of Agronomy & Canadian Society of Horticultural Science

Organized by CSA, CSHS, CSPP, CBA, CPS & CWSS



Website: <http://www.plantcanada2011.ca/Frontpage/index2.htm>

Online Registration: [https://www.regonline.com/plant\\_canada\\_2011](https://www.regonline.com/plant_canada_2011)

Early Bird Registration Discount until March 17, 2011

## SPOTLIGHT: University of Guelph Students

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



### **Melissa M.I. Bassoriello**

PhD candidate in Plant Agriculture  
University of Guelph  
Guelph, ON, Canada

#### **Advisor:**

Katerina S Jordan

#### **Education:**

BSc (Hon.) in Biology & Chemistry, Trent University  
BEd, Trent University  
MSc, School of Environmental Sciences,  
University of Guelph

### **Current Research**

**Management, host pathogenicity, and rapid identification of *Magnaporthe poae*, causal agent of summer patch on annual bluegrass and Kentucky bluegrass turf.**

Increasing demands on golf course putting green turf, combined with increased temperatures over the last few years, have increased the incidence of diseases such as summer patch throughout Ontario. Summer patch is a root disease caused by the fungus *Magnaporthe poae* and it is most pathogenic on annual bluegrass (*Poa annua*) and Kentucky bluegrass (*Poa pratensis*). Currently, a simple, rapid and user-friendly diagnostic test for *M. poae* is not available. Developing tools that aid in detecting the presence of *M. poae* in turfgrass will minimize or prevent the further spread of this fungus and will significantly reduce the annual losses resulting from this pathogen. Although chemical options are available for treatment of this potentially devastating disease, summer patch has been found to be difficult to manage curatively, making its control quite costly and sometimes ineffective. Cultural practices for management of summer patch are not extensively known in Ontario, and may be important in increasing fungicide efficacy, or possibly reducing the use of fungicides for this disease.

The objectives of this study are to develop best management practices for summer patch, determine host specificity and pathogenicity to gain a better understanding of disease development, and to develop a rapid and simple diagnostic tool for presence of *Magnaporthe poae* in the hopes of decreasing fungicide use by increasing the efficacy of preventive applications.

### **Future Vision**

Ultimately, the knowledge and experience gained throughout my PhD will allow for extension into educating the golf industry on turf-related diseases and management strategies, and will hopefully lead to a university faculty position.





## **Jonathan Brinkman**

MSc Candidate, Department of Plant Agriculture  
University of Guelph  
Guelph, ON, Canada

### **Advisors:**

Dave Hooker, Bill Deen

### **Education:**

Diploma in Agriculture, Ridgetown College, 1999  
Bachelor of Arts (Honours) in History and Biology, Redeemer University College, 2005

## **Thesis and Current Research**

My thesis is an investigation of interactions among rates of nitrogen, foliar fungicide treatments, and variety of soft red winter wheat in Ontario. Current agronomic recommendations are based on these components individually. Little is known about possible interactions, from which a more comprehensive set of recommendations could be developed for Ontario growers. Small-plot trials have been established on farm fields at 10 locations over the last three years, involving a factorial arrangement of three different fungicide timings (with or without fungicide at Zadok's growth stages 30, 45-49, and 60-65) and three nitrogen rates (100, 135, and 170 kg/ha, with a growth regulator at the high rate) across 3 to 7 top soft red wheat varieties. Measurements taken include leaf disease severity, fusarium head blight incidence and severity, DON concentrations on select treatments, NDVI canopy measurements, and grain yield components. An economic analysis will be performed on the combinations of treatment variables toward the development of more comprehensive recommendations. These results have been augmented by over 50 field-scale trials of a subset of treatments. This research will assess the economic viability of several intensive-management practices available to Ontario wheat growers, and will provide more comprehensive recommendations on intensive wheat management practices in Ontario.

## **Future Vision**

I am interested in the practical application of new knowledge to Ontario's farms. Ideally, this would involve farming my own land someday, but I am hoping to continue on in research and agronomy to deepen my own and others' understanding of crop production.



**Kathleen Dodson**

PhD Candidate in Plant Agriculture  
University of Guelph  
Guelph, ON, Canada

**Advisor:**

Katerina S Jordan

**Education :**

BSc in Earth Sciences and Biology, 1999,  
Dalhousie University  
MSc in Crop Science, 2008, Washington State University

**Current Research**

In Ontario the use of traditional pesticides is not permitted on home lawns and athletic fields and therefore a greater emphasis must be placed on cultural practices to maintain healthy turfgrass swards. I am currently studying the effects of cultural practices on plant species composition, weed pressure, and weed seedbank ecology in turfgrass systems. Due to the weed pressure present on pesticide-free athletic fields, I am particularly interested in the value of overseeding with supina bluegrass (*Poa supina*) in combination with perennial ryegrass (*Lolium perenne*). An especially exciting and novel portion of a study of athletic fields is the impact of overseeding on the soil seedbank. Information about the incoming weed seed rain and the soil seed bank should enable the determination of optimum seeding rate for improving the probability that a desired turfgrass species germinates, rather than a weed seed, when disturbance occurs in a turfgrass system. Renovation techniques, post-renovation maintenance, irrigation, fertility and overseeding are also being examined in a home lawn setting. The best combination of renovation and post renovation practices should reduce the pressure of unsightly weeds in the future. My project also investigates the impact of seeding lower input turfgrass species into established lawns, combined with varying irrigation and fertility treatments, on the species composition of a home lawn. Results from these experiments should improve our understanding of the ecology of weeds within both trafficked and non-trafficked turfgrass stands and encourage people to maintain safe, cool green-spaces on which our children can frolic and play.

**Future Plans**

Upon graduation I hope to pursue a career in academia, conducting research in plant ecology and particularly turfgrass science. Since I am from a family of four generations of turfgrass managers, I am strongly motivated to give back to the community that has inspired, encouraged and supported me to pursue my education in turfgrass management.





## **Heather Engbers**

MSc candidate in Plant Agriculture  
University of Guelph  
Guelph, ON, Canada

### **Advisor:**

Bill Deen

### **Education:**

B.Sc.Env. April 2007  
University of Guelph

## **Current Research**

I am originally from Halton County, near Campbellville, Ontario where I grew up on an apple orchard. I did my undergraduate studies at the University of Guelph where I graduated with my B.Sc.Env. in Natural Resource Management, focusing primarily on soil science and crop ecology. I am currently pursuing my Masters of Science in Plant Agriculture under the direction of Dr. Bill Deen. My research focuses on nutrient use efficiency, specifically nitrogen use efficiency, in several different varieties and species of C<sub>4</sub> perennial grasses grown as bioenergy crops. Nitrogen fertilization has the potential to significantly affect yield, tissue nutrient concentration and removal and overall stand longevity of C<sub>4</sub> grasses grown for bioenergy production. While most studies report that these grasses need little to no fertilizer inputs to maximize yield, no specific rates have been given. Field trials were established in the summer of 2008 in Ridgeway and Elora, Ontario to compare 4 varieties of miscanthus (*M. sinensis* and *M. sacchiflorus* crosses and *Miscanthus x giganteus*), 2 switchgrass (*Panicum virgatum* L.) and 2 big bluestem varieties (*Andropogon gerardii* Vitman), 4 nitrogen fertilization rates and 2 harvest timings. So far miscanthus, switchgrass and big bluestem all responded significantly to N fertilizer application for both the fall and spring harvest timings.

## **Future Vision**

My future vision is to continue to research the potential for dedicated bioenergy crops in Ontario. There are many other issues facing this emerging industry that will need to be researched scientifically as well as to raise awareness with Ontario farmers. By showing growers opportunities for planting bioenergy crops on lower class lands or less productive acreage, I hope to show that not only can we produce green energy but also generate income on unutilized land.



## **Amanda Green**

MSc candidate in Plant Agriculture  
University of Guelph  
Guelph, ON, Canada

### **Advisors:**

Dr. François Tardif and Dr. Peter Sikkema.

### **Education:**

B.Sc. (Agr) 2009 University of Guelph

Thesis project focuses on the mechanism of resistance to glyphosate in giant ragweed (*Ambrosia trifida* L.) in Ontario.

## **Current Research**

Glyphosate resistance in Ontario was first suspected in giant ragweed in the fall of 2008 in Essex County. Resistant plants exhibit a very unusual phenotype shortly after treatment; within 24 hours their leaves develop very necrosis while the growing points escape injury. One objective of the thesis is to determine the level of resistance so that the mechanism of the resistance can be assessed: reduced absorption; altered translocation; or insensitive target site. The effects of a dark period before and after glyphosate treatment will also be determined, as the resistance mechanism appears to be light dependent. The level of resistance of two resistant giant ragweed populations will be quantified through a dose response experiment in a growth room. Target-site resistance will be determined through a shikimate assay. Shikimate is the dephosphorylated substrate of the enzyme EPSPS (5-enolpyruvylshikimate-3-phosphate synthase) which is involved in the synthesis of aromatic amino acids and also the target site of glyphosate. [<sup>14</sup>C]- glyphosate will be used to measure absorption and translocation of glyphosate.

## **Future Vision:**

My future vision for my career is to work in an extension position in agronomy with a focus on weed science. I thoroughly enjoy grower interaction and problem solving.



## **Ashley Muckle**

M.Sc. candidate in Plant Agriculture  
University of Guelph  
Guelph, ON, Canada

### **Advisors:**

Art Schaafsma & Lily Tamburic-Ilicic

### **Education:**

B.Sc. in Honours Biology Co-op, University of Waterloo

### **Current Research**

My master's research project is focused on host resistance and chemical control strategies for *Fusarium* head blight (FHB) and *Septoria tritici* blotch (STB) in wheat. Both FHB and STB are economically important pathogens of wheat in Canada. In addition, *F. graminearum* produces mycotoxins, such as deoxynivalenol.

One of my research projects involves methodologies that can be used to simultaneously screen a winter wheat population for FHB, STB and desirable agronomic traits. Screening simultaneously for more than one trait would enable faster development of new wheat cultivars with good disease resistance and desirable agronomic traits and thereby be beneficial to wheat breeders, industry and growers. Two types of field trials will be conducted.. In the first, wheat lines will be inoculated with both *Fusarium graminearum* and *Septoria tritici* the casual agents of FHB and STB, respectively. Disease assessments will be completed to determine the level of disease resistance in each wheat line. In the second, wheat lines will be planted and agronomic traits such as yield, tkw (thousand kernel weight), test weight and protein content will be assessed. We propose that combining the information collected from both field trials will enable us to more effectively screen for FHB, STB and desirable agronomic traits in winter wheat populations.

### **Future Plans**

I hope that my M.Sc. thesis work contributes positively to the research community and to growers. After completion of my M.Sc., I hope to further my knowledge of plant breeding and pathology either through the completion of a Ph.D. or through work experience with industry or government.





**Scott White**

PhD candidate, Department of Plant Agriculture  
University of Guelph  
Guelph, ON, Canada

**Advisors:**

Rene Van Acker & Nathan Boyd

**Education:**

B.Sc. (2002) and M.Sc. Agr (2007),  
Nova Scotia Agricultural College

**Current Research:**

*Effect of Abiotic Factors on Vegetative and Sexual Reproduction of Red Sorrel (Rumex acetosella L.) and wild blueberry (Vaccinium angustifolium Ait.)*

The wild blueberry is a native plant in Nova Scotia. The crop is not planted. Rather, commercial fields are developed on abandoned farmland or cleared woodland where native wild blueberry stands occur naturally. Fields are managed on a two-year cycle (pruning in the first year and fruit harvest in the second). Perennial weeds tend to be one of the major limiting factors in production. Red sorrel is currently the most common weed in wild blueberry fields in Nova Scotia, infesting over 90% of the current acreage. However, little research has been conducted on the biology of this species under the current blueberry management system. My research is focused on determining red sorrel seedling and ramet dynamics in the two-year management cycle, the effects of temperature and moisture on ramet production, and the factors regulating bolting and flower development. I am also working on an emergence and development model for wild blueberry, with the goal of using this model to improve the timing of management practices.

**Future Plans:**

I am currently half-way through my Ph.D. program, so my most immediate plans are to continue my research and focus on finishing my thesis. In the future I would be interested in pursuing work in weed science or plant biology. If the opportunity arises, I would love to keep working with weeds in wild blueberries. The last weed survey identified approximately 130 weed species in wild blueberry fields throughout Nova Scotia. That is a lot of opportunity for study!

**Other Graduate Students Carrying Out Agronomy-Related Projects in the  
Department of Plant Agriculture at the University of Guelph.**

<b>Name</b>	<b>Program</b>	<b>Advisor(s)</b>
Ahmad, Hussain	MSC.HORT	T.J. Blom
Bassoriello, Melissa	PHD.PLNT	K.S. Jordan/E.M. Lyons
Bos, Aric	MSC.PLNT	B. Deen
Brinkman, Jonathan	MSC.PLNT	D. Hooker
De Jong, Melody	MSc.PLNT	F. Tardif/P.H. Sikkema
Dodson, Kathleen	PHD.PLNT	K.S. Jordan/E.M. Lyons
Engbers, Heather	MSC.PLNT	B. Deen
Green, Amanda	MSC.PLNT	F. Tardif
Hendricks, Patrick	MSC.PLNT	R. Van Acker
Kendall, Katie	MSC.PLNT	B. Deen
MacDonald, Bill	MSC.PLNT	T.J. Blom/B.J. Shelp
McNaughton, Kristen	PHD.PLNT	D.E. Robinson
Miller, Robert	MSC.PLNT	P.H. Sikkema
Muckle, Ashley	MSC.PLNT	L.Tamburic/A.W.Schaafsma
Obeidat, Wisam	MSC.PLNT	C.J. Swanton
Parker, Monica	PHD.PLNT	M.R. McDonald
Ramsahoi, Laxhman,	MSC.PLNT	H.J. Earl
Riddle, Rachel	MSC.CROP	J. O'Sullivan/C.J. Swanton
Rosser, Ben	MSc.PLNT	B. Deen
Sangster, Shayne	MSC.PLNT	M.R. McDonald
Saraceni-Tozzi, Eric	PHD.PLNT	R. Van Acker
Schweider, Patrick	MSC.PLNT	K.S. Jordan
Serajazari, Mitra	PHD.PLNT	A.W. Schaafsma/D.E. Falk
Siva, Cynthia	MSC.PLNT	K.S. Jordan
Turner, Fawn	MSC.PLNT	R. Van Acker
Vink, Joseph	MSC.PLNT	P.H. Sikkema
White, Scott	PHD.PLNT	R. Van Acker
Withers, Katherine	PHD.PLNT	B. Deen
Xu, Huasong	MSC.PLNT	E.M. Lyons

## CSA EXECUTIVE

### PRESIDENT

**Rigas Karamanos**  
Viterra Inc.  
10517 Barlow Trail  
Calgary, AB T2C 4M5  
Ph: 403-270-1120  
Fax: 403-279-1127  
rigas.karamanos@viterra.ca

### EXECUTIVE DIRECTOR

**Steve Sheppard**  
P.O. Box 637  
Pinawa, MB R0E 1L0  
Phone: (204) 753-2747  
Fax: 204-753-8478  
sheppards@ecomatters.com

### PAST-PRESIDENT

**Shabtai Bittman**  
Agriculture & Agri-Food Canada  
Pacific Agri-Food Research Centre  
Agassiz, BC V0M 1A0  
Phone: (604) 796-2221  
Shabtai.Bittman@AGR.GC.CA

### PRESIDENT-ELECT

**Malcolm Morrison**  
Agriculture and Agri-Food Canada  
960 Carling Ave,  
K.W. Neatby Building, Floor 2, Room 2008  
Ottawa, Ontario K1A 0C6 Canada  
Phone: 613-759-1556  
Fax: 613-759-1701  
Morrisonmj@agr.gc.ca

### SECRETARY-TREASURER

**Balakrishnan Prithiviraj (Raj)**  
Nova Scotia Agricultural College  
58 River Road  
Truro, NS, Canada B2N 5E3  
bprithiviraj@nsac.ca  
Phone: 9028936643  
Fax: 9028956734

### WESTERN DIRECTORS

**Patricia Juskiw**  
Agriculture and Rural Development  
5030 50th Street  
Lacombe, AB, Canada T4L 1W8  
Phone: (403) 782-8691  
Fax: 403-782-5514  
patricia.juskiw@gov.ab.ca

### **Perry Miller**

Montana State University  
Department of Land Resources & Environmental Sciences  
PO Box 173120  
Bozeman, MT, USA 59717-3120  
Phone: 406-994-5431  
Fax: 406-994-3933  
pmiller@montana.edu

### EASTERN DIRECTORS

### **Alek (Thin-Meiw) Choo**

Agriculture & Agri-Food Canada  
ECORC, CEF  
Ottawa, ON, Canada K1A 0C6  
Phone: 613-759-1307  
Fax: 613-759-1701  
ThinMeiw.Choo@AGR.GC.CA

### **Jaswinder Singh**

Macdonald Campus, McGill University  
Department of Plant Science  
21111 Lakeshore Road  
St Anne-de Bellevue, QC  
H9X3V9, Canada  
Phone: 514-398-7906  
Fax: 514-398-7897  
jaswinder.singh@mcgill.ca

## Canadian Society of Agronomy

### *Steve Sheppard, Executive Director*

P.O. Box 637, Pinawa, Manitoba, R0E 1L0  
Ph: 204-753-2747 Fax: 204-753-8478  
E-mail: sheppards@ecomatters.com  
Website: www.agronomycanada.com