

Date: July 14, 2008  
To: WSSA Board  
From: C.J. Swanton, President Canadian Weed Science Society  
Re: Canadian Weed Science Society

The Canadian Weed Science Society has been very active this past year. Administratively, efforts have focussed on expanding the Board members to include a representative from the Pest Management Regulatory Agency (PMRA) and the Canadian Food Inspection Agency (CFIA). In addition to representation on the Board these two federal agencies will be allotted presentation time during our annual conference. The goal is that they have an open forum for discussion of issues relevant to our membership. As well, a new graduate student Emily Green-Tracewicz has been appointed to the Board. Committee memberships, bylaws and our operating manual are all under review and being up-dated. Strategic planning meetings are scheduled for this fall.

Our annual conference is scheduled for November 24<sup>th</sup> to 27<sup>th</sup>, 2008 in Banff Alberta. This year's theme is "The Politics of Weeds". This plenary session will cover a wide range of scientific and political issues that have influenced public opinion and/or public policy. Topics include: climate change and weed populations, biofuels, invasive weeds, urban pesticides and cancer. In addition, workshops will include statistics, a primer in molecular biology and diagnosing agronomic problems.

The Board recently authorized the release of a position paper entitled, "The relevance of Weed Science in Canada". This paper was sent to both federal and provincial ministries of agriculture, environment and natural resources. A copy was also sent to the federal ministry of health. A copy of this paper and the letter written to the federal minister of agriculture are attached with this report.

Finally, our society is actively seeking an Executive Assistant to replace Daniel Cloutier who honourably served our society for the past several years.

June 19, 2008

Minister of Agriculture  
House of Commons  
Ottawa, Ontario  
K1A 0A6

Dear Minister Ritz:

The Canadian Weed Science Society- Société canadienne de malherbologie is a science based organization that fosters an awareness of weeds and their impact on the environment. We provide peer reviewed biological information to the Canadian farming community, the general public and government policy makers. In addition, our organization actively promotes research, educational opportunities and awareness of weed related issues among the general public.

For your review and comment, we have put forward a position paper entitled, "The Relevance of Weed Science in Canada". The purpose of this paper is to highlight the value of this discipline to you and to promote the need to insure that weed science positions are refilled and that new positions are created within provinces that currently do not have positions. A strong pro-active hiring initiative must be implemented at the federal, provincial and university levels. This is necessary to insure that the critical mass of scientific expertise exists within each province to address the emerging weed management issues of the bioeconomy.

I express my appreciation to you for the time taken to review this position paper. I hope that this report will make you aware of the importance of Weed Science to Canadian agriculture. I will be delighted to speak to you directly if you have any questions regarding the need for the weed science expertise throughout Canada.

Sincerely,

Dr. Clarence J. Swanton, President,  
Canadian Weed Science Society- Société canadienne de malherbologie  
E-mail: [cswanton@uoguelph.ca](mailto:cswanton@uoguelph.ca)

Encl.

## **The Relevance of Weed Science in Canada**

The Canadian Weed Science Society- Société canadienne de malherbologie (CWSS-SCM) is a science based organization that fosters an awareness of weeds and their impact on the environment and economy. We provide peer reviewed biological information to the Canadian farming community, the general public and government policy-makers. In addition, our organization actively promotes research, educational opportunities and awareness of weed-related issues among the general public.

The purpose of this position paper is to demonstrate the value in continuing to support weed scientist appointments across Canada, and to document the current status of weed science expertise nationally. Over the past 50 years, researchers in weed science have shifted their traditional emphasis from herbicide discovery and evaluation to a discipline which now encompasses broader environmental and ecological issues such as alternative weed management strategies. As such, the breadth of knowledge of modern weed scientists not only includes herbicide fate in the environment and mode of action in plants, but typically will include aspects of agronomy, ecology, physiology, taxonomy, genomics, soil science, horticulture, and forestry. Because of the interdisciplinary nature of this field, weed scientists are committed to conducting research which secures Canada's economic prosperity while fostering innovations that ensure environmental sustainability. The National Sciences and Engineering Research Council of Canada (NSERC) identified several research areas, which include Environmental Health, Sustainable Crop Production Systems, Bioproducts and Bioprocesses, and Food Safety and Quality, to which weed scientists contribute regularly. Within these priorities outlined by NSERC,

this paper will discuss specific research areas and highlight the contributions that weed scientists are able to make to address these priorities.

## **Environmental Health**

### Biodiversity

The intrinsic value of ecosystem biodiversity is well known, but seems to be appreciated only after it has been lost. Weed scientists will continue in their efforts to develop indices of environmental quality and biodiversity and to model and measure the impact of crop production systems on environmental health. Maintaining biodiversity and environmental quality will be a vital buffer to Canadian agriculture as it faces the challenges of climate change.

### Climate change

Climate change could also have unforeseen impacts on Canadian agriculture and human health. Canadian producers will benefit greatly from studies assessing the influence of climate change on weed population dynamics and crop and weed interactions. Global changes may provide greater opportunity for the introduction of new invasive weed species that will threaten crop production and possibly human health. The threat of alien species is intensified when coupled with the increased globalization of Canada's economy.

### Invasive alien and noxious weed species

Weed scientists across Canada are responsible for identifying and alerting the public about potential invasive or noxious weeds. Invasive weeds can seriously affect biodiversity and ecological integrity, causing

significant environmental harm. In order to preserve and protect environmental and public health, weed scientists will be needed to develop environmentally conscious management strategies.

## **Sustainable Crop Production Systems**

### Conservation strategies and carbon management

Canadian farmers have contributed to carbon management through the widespread adoption of conservation-tillage practices. Conservation tillage has also benefited Canadian producers by reducing soil erosion and increasing soil moisture. The acceptance of this new cropping system was made possible through the development of effective new weed management strategies developed through research conducted by weed scientists.

### Evaluating sustainability of current cropping systems

Weed scientists will continue to be a valuable asset in maintaining sustainable crop production systems. For example, the occurrence and prevalence of herbicide-resistant weeds presents a serious threat to producers across Canada. To meet this threat, weed scientists worked to develop not only the techniques to detect herbicide resistance in weeds, but also strategies to manage these weeds once they are detected.

### Organic production and alternative management strategies

Canada's demand for organic commodities is not currently met with domestic production as evidenced by imported organic foods. Weed

scientists are vital in assisting producers to transition from conventional to organic because of their required knowledge in alternative weed management strategies. These innovative weed management strategies will need evaluation for their effectiveness in organic and conventional crop production systems in order to maintain sustainability.

## **Bioproducts and Bioprocesses**

### New cropping systems

To ensure that Canada maintains its position as an innovator in the new global bioeconomy, weed scientists will be at the forefront as new plant-based bioproducts are incorporated into current cropping systems. Critical weed-free periods and herbicide-use patterns will need to be established for any new high-value or value-added plants. Research expertise on evaluating potential competitiveness will be crucial in developing sound agronomic practices.

### Risk management

As with the introduction of any new technology, the potential impact must be evaluated. For example, Canadian weed scientists have recently played a crucial role in risk management and assessment of weedy escapes or gene transfer of new herbicide-resistance technology in wheat. Because of the economic importance of agriculture, Canada will continue to need weed scientists to measure the impact of the introduction of new bioproducts into cropping systems and the environment.

### New value-added plant products

Weed scientists can identify new alternative crops or valuable germplasm for plant breeders. For example, a common weed of the Prairies, cow cockle, is currently under evaluation as a new crop (Prairie Carnation) because of the presence of a desirable oil in its seed. Velvetleaf, a weed originally introduced to North America for its fibre production and which dominates the fields it infests, could potentially be used for biomass-based energy generation. Weed research in the new bioeconomy will be a valuable asset as Canada positions itself as a global leader and innovator.

### **Food Safety and Quality**

The competitive presence of weeds is recognized as the single greatest limiting factor for the production of food in Canada and worldwide. Canadian consumers demand that their food be affordable, safe, and of the highest quality. If it were not for the research by weed scientists, these demands would have gone unmet. Weed scientists have evaluated cultural and mechanical methods for weed control, tested new herbicides for crop safety, weed efficacy, and their environmental impact. These contributions to the Canadian producer are incalculable and weed scientists will continue in this role as new weed control technologies become available.

### **Pollution**

Several municipalities have recently banned the use herbicides within their boundaries. Urban sprawl continues to put pressure on available agricultural land. Because of their knowledge of herbicide chemistry, weed scientists will be a source of scientific knowledge as issues related to herbicide use arise between urban and rural communities, especially in the critical boundary areas where conflicting interests can become controversial.

## **Summary**

Weed scientists in Canada have made significant contributions to our society as a whole. These dynamic and innovative researchers will continue to contribute in Canada's new bioeconomy. Weed science continues to be dynamic and essential to the well being on Canadian agriculture, its people and the economy. This position paper has demonstrated that weed scientists are a valuable resource to Canadian agriculture. Weed scientist positions must be protected so that Canada can maintain a position of global leadership through innovation in agriculture.

### **1. THE STATUS OF WEED SCIENCE IN CANADA**

The survey was conducted by the CWSS in 2006-2007 across all sectors of weed science, universities, provincial and federal institutions and industry in Canada. The survey requested information concerning human resources, type and level of activity in weed science. A sample of the survey questionnaire and detailed results can be found at [www.cwss-scm.ca](http://www.cwss-scm.ca).

The survey results revealed that the research community in weed science (both at federal research centres and university) is mature at mid- to end of career, with few incoming young researchers or university professors (Tables 1, 2). The ratio of M.Sc. to Ph.D. graduate students registered in weed science is similar to the overall graduate students in areas other than agriculture. However, the number of weed science research associates or



post-doctorates in agriculture is low. Many Canadian Ph.D. graduates trained in weed science **have not** been able to secure positions in Canada and have, as a result, been hired within U.S. universities.

Provincial governments have reduced and in many cases closed down their extension and research services. Weed professionals at provincial level concentrate their effort on extension (Table 3). Personnel devoting 50% or more of their time to weed science are present in only four provinces but represent a young work force where present. Québec and Ontario are the only provinces with weed professionals in forestry (1 weed scientist each).

The federal government has gone through several rationalizations of their operations, and their aging scientific capacity is only starting to be renewed. Federal weed scientists, mainly within Agriculture and Agri-Food Canada (AAFC), devote most of their time to research. There are virtually no commitments to weed science in other science based federal departments (forestry & environment). Maintaining a critical mass of researchers at AAFC is essential because of the AAFC leadership on various weed science issues. In both AAFC and universities, researchers have a strong expertise in weed biology/ecology and Integrated Weed Management (IWM), thereby creating a critical mass for potential collaborations in both fundamental and applied research.

The success of weed science research and development in Canada has been due largely to the interaction between the agricultural sector, provincial extension services, the Life Science Industry, research organizations and universities. These organizations have provided each other with

complementary resources and activities that allowed the Canadian agro-economy to remain competitive worldwide. The erosion of these resources will lead to the deterioration of this association and may have long term detrimental effects.

This erosion of resources dedicated to weed science may jeopardize research efforts in addressing emerging issues related to the new bioeconomy. Since effective weed management is critical for the sustainability and world competitiveness of current and future cropping systems, it is essential that capacity to conduct weed research at a basic and applied level be supported.

**The CWSS-SCM believes that:**

- A strong pro-active replacement policy must be implemented and financially supported both at the federal and university levels if the expertise and critical scientific mass is to be adequate to meet demands of the new bioeconomy.
- MSc and Ph.D graduates must be able to find employment opportunities within Canada. Presently, Canada is not retaining its Ph.D. graduates because of a lack of a replacement policy within government and non-governmental institutions.
- Whereas the management and coordination of weed research can be addressed through formal and informal inter-agency collaborations, leadership from such organizations as AAFC, provincial agricultural ministries and universities on weed science issues is essential and required to address public good issues.

Agriculture is facing many challenges, partly because of pressures from global markets, rising competitive economies and shifting public demand. We must respond to these challenges by providing knowledge and by training students to generate innovative science and research based solutions. This is essential to the future of Canada's agricultural economy as a whole. We believe strongly that Weed Science can and will make significant contributions to the solution of merging issues within agriculture both at the national and international level.

**Given the importance of agriculture in Canada's economy, and the role of Weed Science in contributing to the training of highly qualified personnel, the Canadian Weed Science Society would like to express strong support for the maintenance and /or creation of Weed Science positions in all regions of Canada. We believe that this is essential in order to insure the success of Canadian agriculture.**

**Table 1. Status of Weed Science in Canadian Universities (April 2007)**

Province	Total number of professors in weed science	Years of employment (mean±SD)	M. Sc. students in weed science	Ph.D students in weed science
<b>Total</b>	<b>15,0</b>	<b>---</b>	<b>29,0</b>	<b>5,0</b>
Newfoundland	0			
Prince Edward Island	0			
New Brunswick	0			
Nova Scotia	2	13±15	1	0
Québec	2	28 ± 8	9	1
Ontario	6	19 ± 8	12	2
Manitoba	0	0,0	0	0
Saskatchewan	2	16 ± 9	6	1
Alberta	1	na	na	na
British Columbia	2	19 ± 8	1	1
<b>Mean</b>		<b>19 ± 9</b>		

**Table 2. Status of Weed Science at AAFC (Dec 2007)**

Province	Total number of weed scientists	Years of employment (mean±SD)
<b>Total</b>	<b>12</b>	
Newfoundland	0	
Prince Edward Island	0	
New Brunswick	0	
Nova Scotia	0	
Québec	2	17 ± 15
Ontario	1	2
Manitoba	0	
Saskatchewan	6	16 ± 12
Alberta	3	17 ± 8
British Columbia	0	
<b>Mean</b>		<b>18 ± 11</b>

**Table 3. Status of personnel with >50% time devoted to Weed Science in provincial institutions (April 2007)**

Province	Total number of personnel	Number of weed researchers	Years of employment (Mean $\pm$ SD)
<b>Total</b>	<b>10</b>		
Newfoundland	0	0	
Prince Edward Island	0	0	
New Brunswick	1	0	2
Nova Scotia	1	0	27
Québec	2	1	15 $\pm$ 2
Ontario	4	0	16 $\pm$ 8
Manitoba	1	0	4
Saskatchewan	0	0	
Alberta	0	0	
British Columbia	0	0	
<b>Mean</b>			<b>14 <math>\pm</math> 8</b>