SUSTAINABLE CROP PROTECTION

Results from the Pesticide Risk Reduction Program

A web-based cover crop decision tool for growers in Eastern Canada

Introduction

The use of cover crops can be an important tool in sustainable agriculture, with many cover crops recognized to provide benefits in suppression of nematodes, weeds and other pests, as well as improving soil tilth and optimizing nutrient cycling. There is currently a growing interest in using cover crops as part of integrated management strategies to reduce pesticide input, in particular herbicides, in Canada's eastern provinces.

A large body of information regarding the use of cover crops has been generated over the years and many potentially beneficial attributes have been recognized for a number of plant species (Figures 1 and 2). However, any given cover crop must be adapted locally and properly managed to achieve its full potential, because their performance is highly dependent upon soil type, pest, climate and cropping systems.

Source : Laura van Eerd

Figure 1: Trial in Southeastern Ontario comparing the benefits of oilseed radish against oriental mustard when seeded as cover crops in mid-August (image showing growth by early November).

Source: Laura van Eerd

Figure 2: Impact of delaying cover crop planting by one month; cover crops in these research trials were planted in early August and early September with photo taken on October 4.

The need for a tool to assist growers in Eastern Canada gain access to a large amount of relevant data to make scientifically sound cover crop choices was identified by stakeholders as a priority gap to be addressed by the Pesticide Risk Reduction Program's Integrated Weed Management Strategy for Field Vegetables.

Two projects (PRR10-010 and PRR12-020) were funded by the Program to address the gap, resulting in the development of the bilingual Cover Crop Decision Tool for Eastern Canada.

This factsheet describes what the tool is about and how it can be used for successful adoption of cover crops.

Agriculture and Agri-Food Canada
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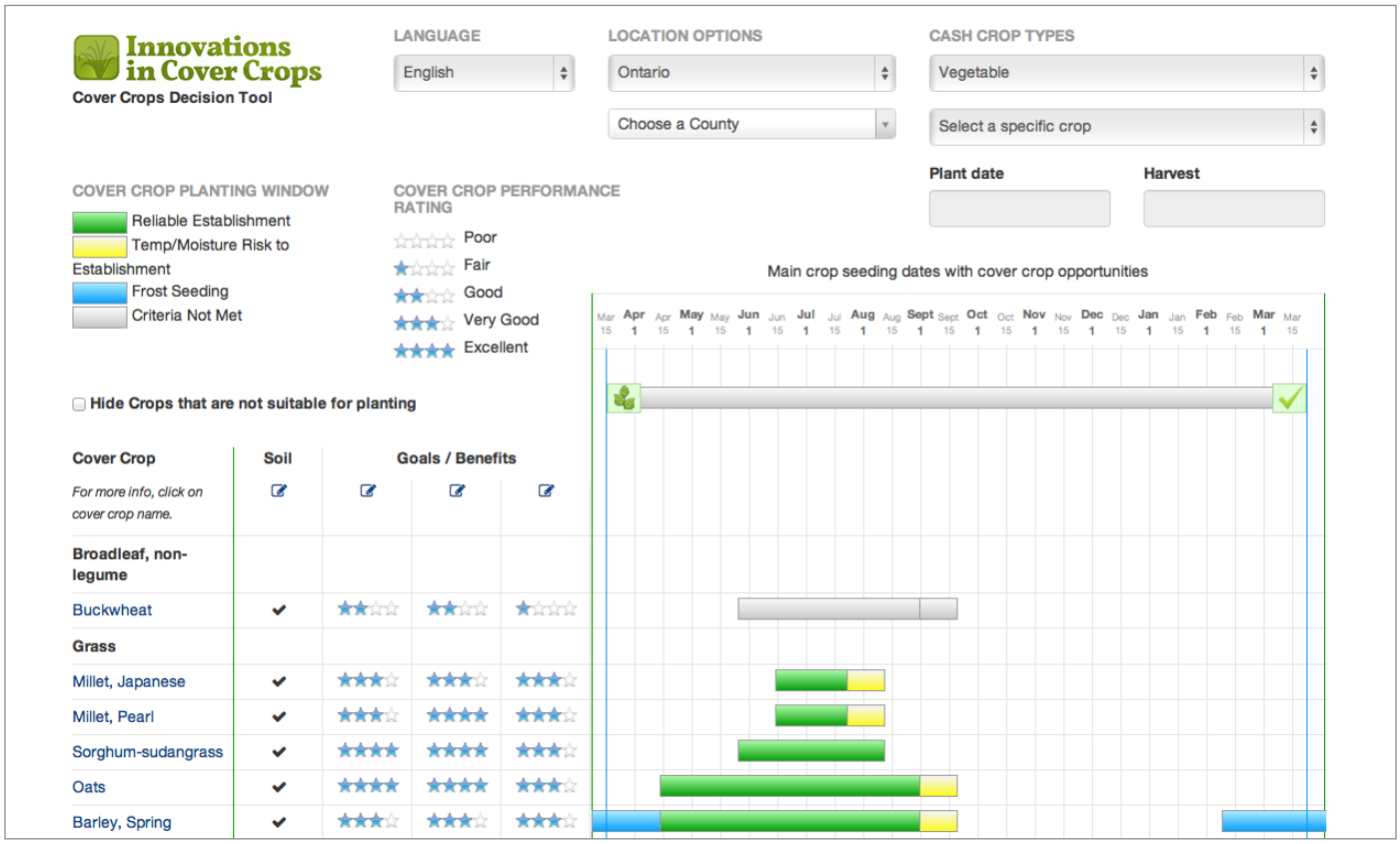
Developing the tool

A Cover Crop Selector Tool previously created for field crops by the US Midwest Cover Crops Council was used as a model for growers in Eastern Canada. The approach was to first create a comprehensive database of potential cover crop species and mixtures which would be suitable to grow in each province. The next step was to validate existing information related to agronomic practices, potential benefits and limitations of the various cover crops.

The database was created by engaging a team of cover crop experts from diverse backgrounds, including researchers, growers, industry representatives, and government specialists, and involving them directly in data assembly and verification. Project teams in each of the five target provinces (Ontario, Quebec, Nova Scotia, New Brunswick, and Prince Edward Island) ensured that only regionally appropriate information was included in the database. Long-term regional weather data from numerous locations in each province were analyzed by experienced climatologists and used to establish reliable planting dates for cover crop species based on a grower's location. Cover crop planting dates are specific for each county in each province.

The information and ratings contained in the tool were determined by team consensus and were based on published scientific information, research results, on-farm experience and practical knowledge. Using the database of validated information, a prototype tool was developed based on a set of predetermined parameters and criteria. Several rounds of functionality testing were carried out by provincial specialists before the prototype was offered to participating stakeholders for validation.

In all, more than 50 experts from disciplines as diverse as climatology, web development, agricultural extension and agronomy contributed their expertise to develop the Cover Crop Decision Tool for Eastern Canada, now available on-line at http://decision-tool.incovercrops.ca/.



Source: http://decision-tool.incovercrops.ca/

Figure 3: Screen shot of cover crop decision tool.

What can the tool do?

The Cover Crop Decision Tool assists growers in identifying the cover crop best suited to meet their needs depending on location, soil type, cropping system, and desired goals.

The tool consists of an interactive web-page that allows the user to input specific information such as soil texture, drainage, crop planting dates and their goals in planting a cover crop (e.g. minimize erosion, biofumigation, weed control, etc.) to obtain a ranked list of recommended cover crop options suitable in their county (Fig. 3). Associated with each cover crop, there is an information sheet that provides comprehensive information on their agronomic characteristics, management practices, potential benefits and limitations. Information sheets are readily accessible to the user through the online tool.

Available in English and in French, the tool was designed for vegetable production, but is also applicable for field crops.

How does the tool generate the recommendations?

The Cover Crop Decision Tool recommends cover crop options based on goals and parameters pre-selected by the user. A wide range of specific cover crop benefits are included as selection criteria (Table 1). There are about 30 cover crop species, individually and in mixtures, identified in this tool as suitable for Eastern Canada provinces.

The tool uses the probability of frost-free periods for each county in each province to establish reliable planting dates for each cover crop. When a user inputs specific parameters and selects (up to three) beneficial criteria, the tool generates a graphical display indicating planting windows for favorable establishment of each recommended cover crop option. Planting windows are based on temperature, moisture and frost seeding opportunities suitable for normal growth of cover crops.

As with any other source of information, the tool was designed to guide growers in the cover crop selection process. Users are advised to consult provincial crop production publications or contact their respective provincial experts for more detailed information.

Technology Transfer

As a result of this work, extension specialists and growers now have access to a new tool that can assist them in selecting appropriate cover crops that match production conditions, pest or soil management challenges, and desired beneficial outcomes. The benefits of using the decision tool will be further validated by evaluating the outcomes of implementing the cover crop recommendations in commercial farming operations.

Table 1. Beneficial attributes of cover crops which can be selected with the tool.

Selection criteria	
1. Legume Nitrogen Source	9. Winter Kill
2. Nitrogen Scavenger + Nitrogen Holder	10. Quick Growth
3. Organic Matter/Soil Builder	11. Lasting Residue
4. Compaction Fighter	12. Quick Residue Breakdown
5. Water Erosion Fighter	13. Acts as a Potential Biofumigant
6. Wind Erosion Fighter	14. Forage Harvest Value
7. Weed Fighter	15. Grain/Seed Harvest Value
8. Winter Survival	16. Interseed with Cash Crop

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For more details about the Eastern Canada Cover Crop Decision Tool, please contact your provincial specialist listed in Table 2 or:

Dr. Laura L. Van Eerd
University of Guelph, Ridgetown Campus
120 Main St. E.
Ridgetown ON N0P 2C0
519-674-1500 x63644
lvaneerd@uoguelph.ca

Table 2. Provincial specialists collaborating on the project

Name	Province	Affiliation	Contact information
Anne Verhallen	ON	Ministry of Agriculture and Rural Affairs (OMAFRA)	anne.verhallen@ontario.ca
Stephanie Sanchez	QC	Compagnie de recherche Phytodata Inc. (Prisme)	ssanchez@prisme.ca
Viliam Zvalo	NS	Perennia	vzvalo@perennia.ca
Shauna Mellish	PE	PE Department of Agriculture	smmellish@gov.pe.ca
Claude Berthélémé	NB	NB Department of Agriculture	claude.bertheleme@gnb.ca

About the Pesticide Risk Reduction Program at Agriculture and Agri-Food Canada

The Pesticide Risk Reduction Program delivers viable solutions for Canadian growers to reduce pesticide risks in the agricultural and agri-food industry. In partnership with the Pest Management Regulatory Agency of Health Canada, the Program achieves this goal by coordinating and funding integrated pest management strategies developed through consultation with stakeholders and pest management experts.

The Pesticide Risk Reduction Program is actively pursuing the development and implementation of strategies which are key to reducing pesticide risks in the agricultural environment. To view the Program's current priorities and the issues being addressed, visit: www.agr.gc.ca/pmc. To consult other factsheets in this series, visit: www.agr.gc.ca/sustainable-crop-protection.

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