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A web-based Cover Crop Decision Tool for integrated crop management in Eastern Canada

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Background

Many cover crops species have been recognized to provide benefits of suppressing nematodes, weeds and other pests, in addition to improving soil tilth and optimizing nutrient cycling. Cover crops can be useful for growers practicing sustainable agriculture on their farms. However, to achieve maximum benefits from using cover crops, careful selection of species must be made considering on-farm conditions such as soil type, pest pressure, climate and cropping systems. Through stakeholder consultations it became apparent that, to tap into advantages of using cover crops, Canadian growers needed a tool to allow them quick access to scientific information available for various species so they could select the best match for their planting conditions and desired outcomes.

Cover Crop Decision Tool

The Canadian tool was developed based on the Cover Crop Selector Tool previously created by the US Midwest Cover Crops Council. A comprehensive database behind the Canadian tool was completed with information on cover crops species and mixtures which would be suitable to grow in each of the targeted five Eastern provinces: Ontario (ON), Quebec (QC), Nova Scotia (NS), New Brunswick (NB), and Prince Edward Island, (PE) (Fig. 1 & 2), based on respective weather profiles. Potential benefits and limitations of the cover crops were also included in the database so these are factored in when the tool generates recommendations.

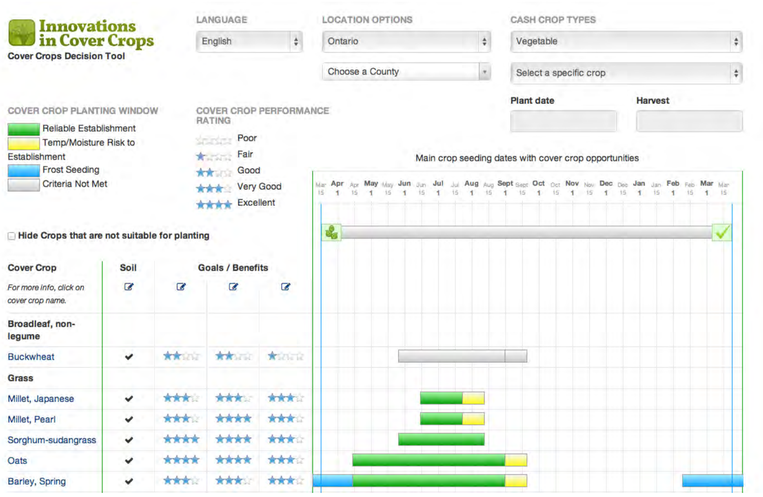

Figure 1. Partial screen shot of Cover Crop Decision Tool.

The tool consists of an interactive web-interface that allows the user to input field specific information such as soil texture, drainage, crop planting dates and select up to three goals of planting a cover crop from a list of criteria (Table 1) to obtain a ranked list of recommended cover crop options, along with their favorable seeding dates suitable in their county (Fig. 1).

Associated with each cover crop, there is an information sheet, accessible through the online tool, that provides comprehensive information on their agronomic characteristics, management practices, potential benefits and limitations.

Cover crop trials in Ontario, Canada: *Left* - comparing benefits of oilseed radish and oriental mustard three months after seeding as cover crops in mid-August;
Right - assessing impact of delaying cover crop planting dates by one month (August vs. September)

Crop Attributes as Selection Criteria

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

The tool includes 16 distinct beneficial attributes (Table 1) for growers to choose from when searching for optimal cover crop recommendations. Approximately 30 cover crop selections are included in the tool, either as individual species or in mixtures. These provide a large suite of options for growers to work with in obtaining their desired outcome.

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

The tool uses the probability of frost-free periods for each county in each province to establish reliable planting dates for each cover crop. County-specific cover crop planting windows are based on temperature, moisture and frost-free seeding opportunities suitable for normal growth.

Acknowledgements

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Outreach

A *Cover Crop Decision Tool* is now accessible to Canadian growers

With support from Agriculture and Agri-Food Canada's Pesticide Risk Reduction Program and in collaboration with the University researchers and provincial specialists, a tool was made available to help growers with cover crop decisions:

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

This interactive tool is user friendly, region specific and bilingual (English and French). It can assist growers in Canada's eastern provinces gain access to agronomic and biological characteristics of various species and their attributes, thus making scientifically sound, customized cover crop choices.

The database was created and validated by teams of cover crop experts from diverse backgrounds, including researchers, growers, industry representatives, and government specialists in each of the five target provinces: ON, QC, NS, NB, and PE (Fig. 2). These teams coordinated the data collection and verification to ensure that only regionally appropriate information was included in the database. Same teams coordinated the introduction of the tool to growers and extension specialists in respective provinces. A factsheet to guide stakeholders in using the tool is available online at www.agr.gc.ca/sustainable-crop-protection.

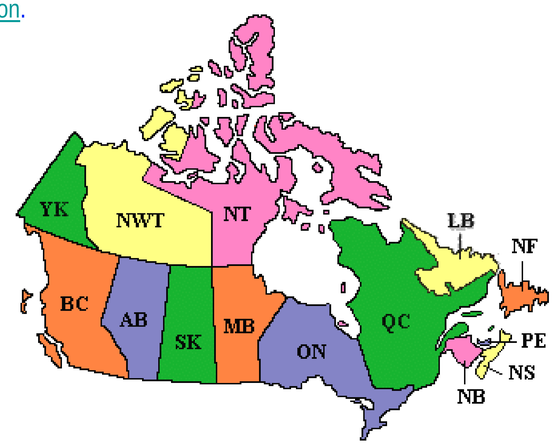

Figure 2. Map of Canada showing Provinces and Territories.

There is a growing interest in using cover crops as part of integrated crop management strategies to reduce pesticide input in Eastern Canada. This tool is expected to contribute to widespread uptake of cover crops in these regions.

About the Pesticide Risk Reduction Program

Supported by the Government of Canada, this Program aims to deliver viable agricultural pest management solutions which reduce pesticide risks in crop production. To learn more about the Program visit www.agr.gc.ca/pmc.

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