

# Harmonized surveillance of common waterhemp (*Amaranthus tuberculatus*): A model of national collaboration

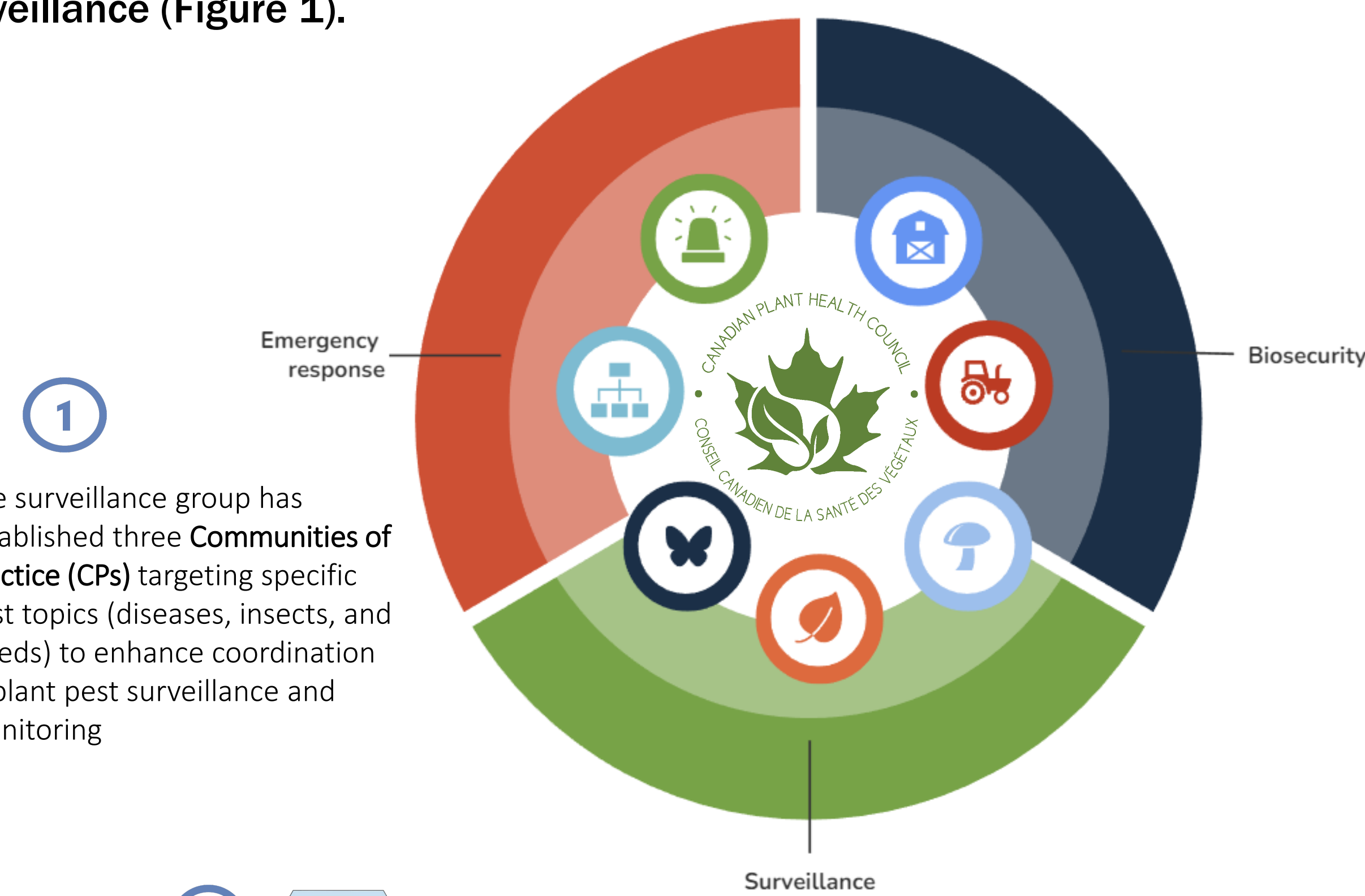
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## INTRODUCTION

The Canadian Plant Health Council was launched in 2018 with the goal to implement the Plant Health Strategy for Canada through improving coordination of plant health surveillance and enhancing the response to pest threats across Canada. Different working groups were formed under the Council focusing on three key pillars: biosecurity, emergency response and surveillance (Figure 1).



**1** The surveillance group has established three Communities of Practice (CPs) targeting specific pest topics (diseases, insects, and weeds) to enhance coordination in plant pest surveillance and monitoring



CPs are established with participation of experts from federal and provincial governments and institutions, as well as grower representatives (Figure 2).

They facilitate collaboration, information sharing and harmonization of surveillance and monitoring protocols across the country.

## Weeds Surveillance Community of Practice (WSCP)

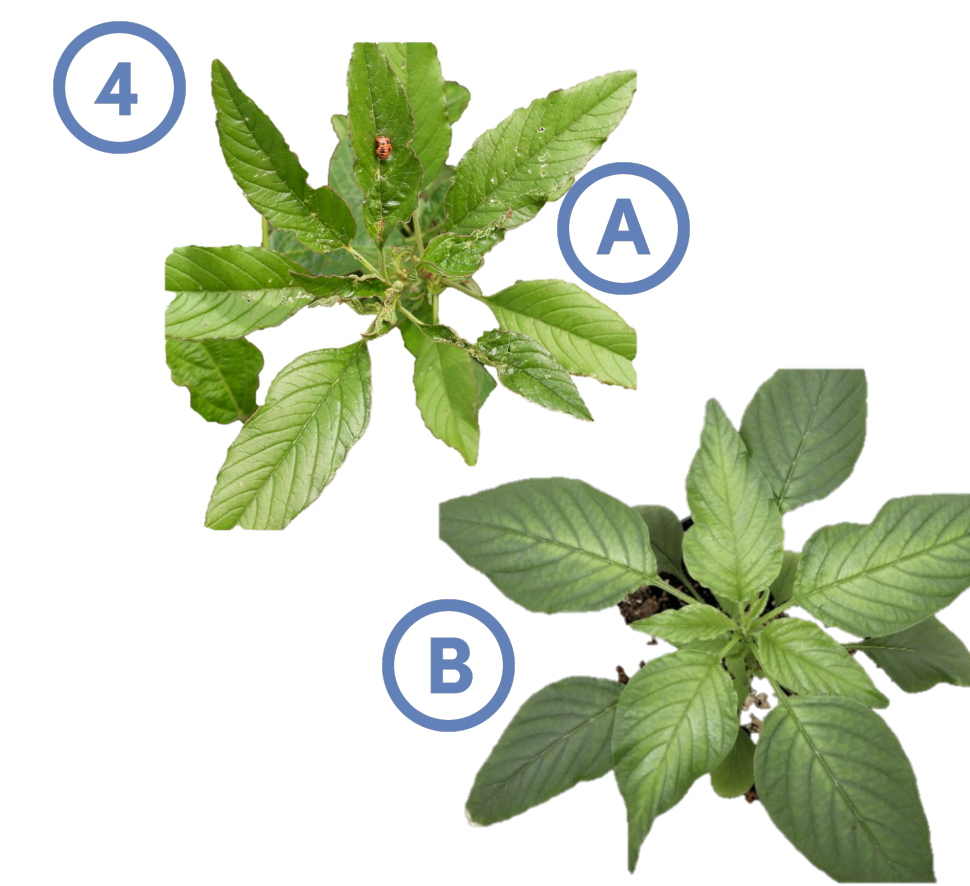
The WSCP forum allows sharing of information regarding weed management issues and needs, while providing opportunities to develop collaborative projects to address these.

Membership is open to everyone. Currently, the WSCP has 27 members from 14 institutions across Canada (Figure 3). To become a member, please contact : [cphcsecretariat@gmail.com](mailto:cphcsecretariat@gmail.com).



## WSCP's ACTIVITIES

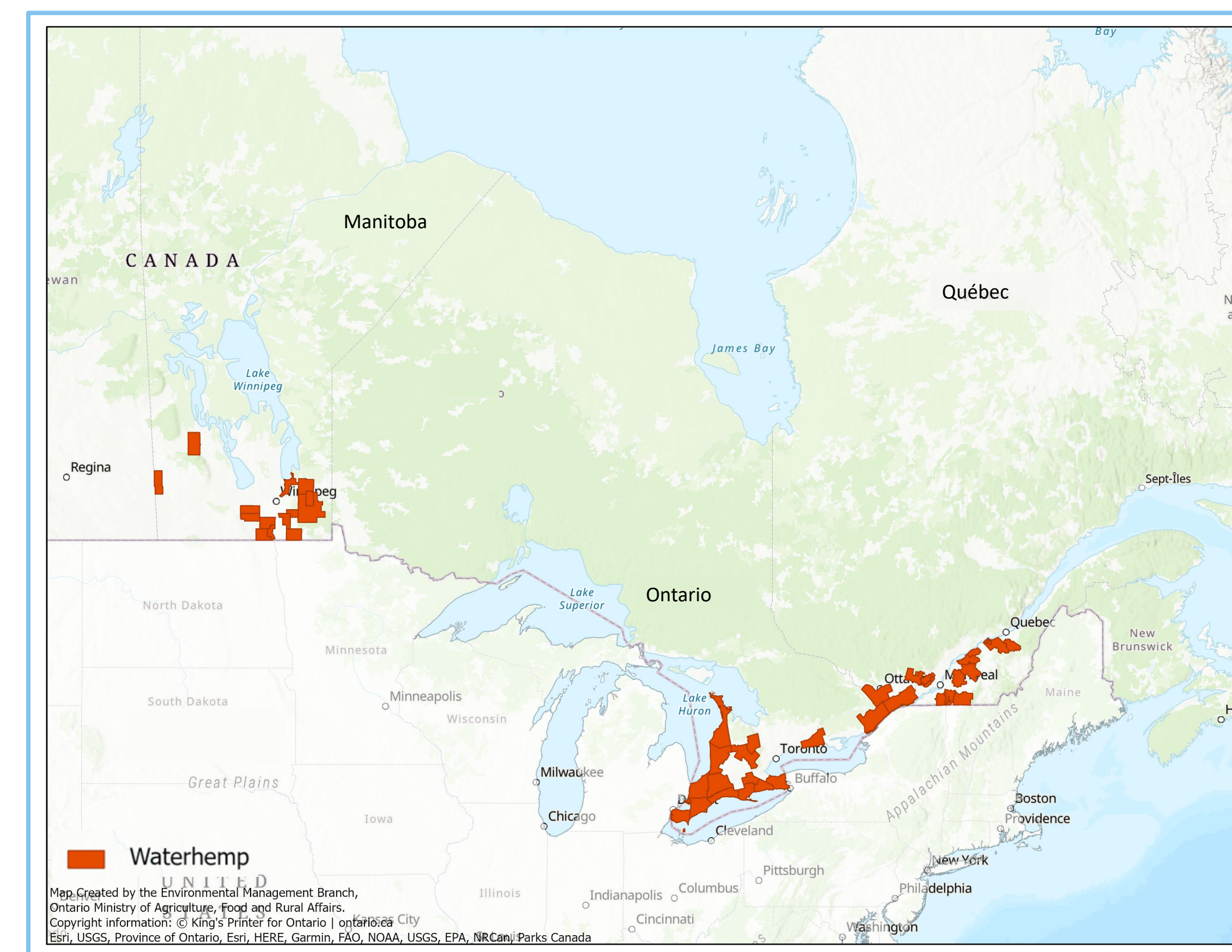
### Amaranthus species



The WSCP focuses on *Amaranthus* species, primarily common waterhemp (*Amaranthus tuberculatus*, Figure 4A) and Palmer's amaranth (*A. palmeri*, Figure 4B), as they pose a significant threat to Canadian agricultural production. Both species are very competitive and resistant to multiple herbicide groups, making their control quite challenging.

At this time, only common waterhemp has been found in Manitoba, Ontario and Quebec (Map 1).

Early detection is key to the implementation of successful management strategies. This undertaking will also help with the identification and early detection of Palmer's amaranth.

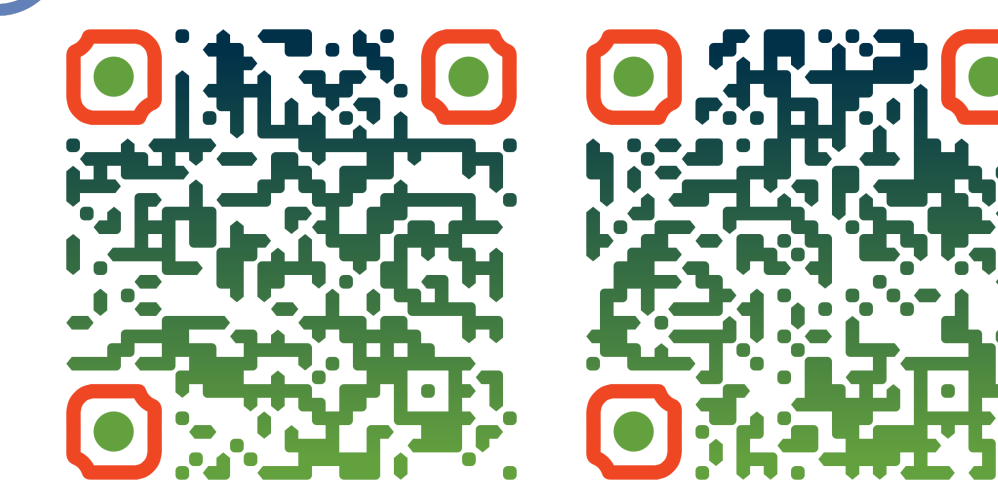


Map 1. Counties and municipalities in Canada with confirmed presence of common waterhemp (*A. tuberculatus*) between 2014 and 2022. (Modified from : OMAFRA, LEDP-MAPAQ and Manitoba Agriculture, 2022).

### Outcomes achieved by the WSCP To-Date

- Publication of harmonized protocols (bilingual, EN & FR, Figure 5) to guide monitoring for *Amaranthus* species. It features rapid genetic tests available to detect herbicide resistance (Table 1), biosecurity protocols and other relevant resources, as well as contact information for reporting suspected cases
- Questionnaire to gather information on the distribution of waterhemp and associated farming practices to inform the development of effective management programs (Figure 6).
- Common repository for literature regarding *Amaranthus* species.

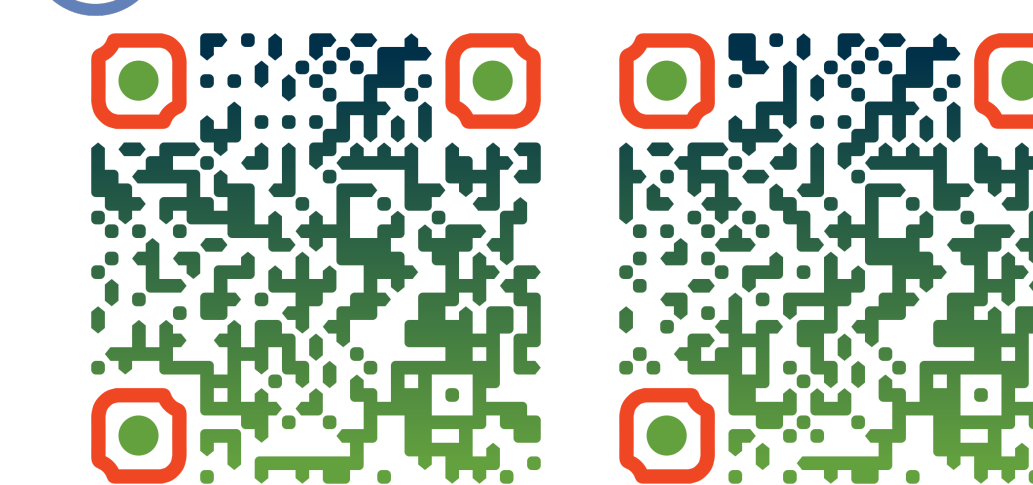
### 5 Harmonized protocols



EN

FR

### 6 Questionnaires



EN

FR

Table 1. Genetic herbicide resistance tests available for common waterhemp in Canada.

Resistance to Herbicide Group	Resistance target site mutation*
2	S653N, W574L, A122T, A205V, D376E, S653T
5	A251V, S264G, V219I, F274L
9	P106S & EPSPS gene amplification
14	ΔG210 in PPX2L, R128I**

\*All tests are developed by Dr. Martin Laforest lab et. al at AAFC's Saint-Jean-sur-Richelieu Research and Development Centre, QC, unless specified (see \*\*).

\*\* Test developed by the Laboratoire d'expertise et de diagnostic en phytoprotection, Ministère de l'Agriculture, des Pêcheries et de l'Alimentation du Québec (LEDP-MAPAQ).

## ACKNOWLEDGMENTS

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