

Canadian Agri-Science Cluster for Horticulture 3



Update to Industry

Semi-Annual – Fall 2021

Activity title: ASC-18-19 Hort Cluster Activity 12A - Potato Cluster - CHC - Common Scab: Increasing profitability of Canadian potato producers by controlling common scab.

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Names of Collaborators and Institutions: Rick Peters (AAFC, Charlottetown), Louis-Pierre-Comeau (AAFC, Fredericton), Martin Filion (Université de Moncton), Newton Yorinori (Cavendish Farms), Tracy Shinnars-Carnelley (Peak of the Market), David MacMullin (Carleton University), Mario Tenuta (University of Manitoba), Khalil Al-Mughrabi (New Brunswick Department of Agriculture, Aquaculture and Fisheries)

Activity Objectives (as per the approved work plan):

Common scab results in significant economic losses every year in Canada. Common scab symptoms are characterized by brownish lesions on potato tubers that can result in declassification of tubers in seed production, rejection for the table market and difficulty in peeling the tubers leading to significant losses in the processing industry. There is currently no chemical registered specifically to control common scab in Canada.

The overall objective of the project is to evaluate several methods to control common scab of potato under a range of environmental conditions and soil types across Canada.

The specific objectives of this project are to:

Sub-activity 1.1 Characterize the genetic diversity of *Streptomyces* spp. causing common scab and develop tools to measure specific genotype,

Sub-activity 1.2. Evaluate methods to control common scab using small plot and field-scale trials in commercial potato fields,

Sub-activity 1.3. Determine the effect of common scab control methods on soil health and quality parameters,

Sub-Activity 1.4. Determine the concentrations of soil isothiocyanates produced through the degradation of a mustard meal and mustard residues

Sub-Activity 1.5. Evaluate the effect of common scab control methods on microbial communities.

Research Progress to Date (use plain language, not to exceed 500 words):

Sub-activity 1.1 A collection of pathogenic *Streptomyces* spp. isolates obtained from common scab infected tubers from PEI, NB, QC and MB were classified into genetic groups using a molecular method. More than 20 genetically-different groups were identified. Genome sequencing of some of the most representative groups is ongoing. Fourteen novel qPCR bioassays to detect and quantify specific genotypes under field conditions were developed and additional bioassays are in development.

Sub-activity 1.2.1 In 2020, the foliar application of the auxin 2,4-D Ester in trials done in MB resulted in a 61% decrease in common scab severity compared to the untreated control and produced 69% marketable yield compared to only 4.4% marketable yield in the untreated control. Given the success of the 2020 trial, the auxin application was tried under different field conditions and using different potato cultivars in 2021. The effect of auxins including 2,4-D Ester and Fruitone on common scab severity was tested in MB (Peak of the Market), NB (AAFC), and PEI (Cavendish Farms and AAFC). The evaluation of common scab severity is ongoing.

Other field studies in PEI A study was performed to evaluate the efficacy of peroxide-based products (used as a drench) in controlling common scab severity in a field trial under irrigation. Assessment of the common scab severity is underway.

Sub-activity 1.2.2. Field studies in PEI

The effect of the rotation crop system on common scab severity in commercial potato fields was evaluated. In summer 2021, four field sites in PEI with different previous rotational crop splits were used as follows: 1) brown mustard vs multi-mix species, 2) corn irrigated vs non-irrigated, 3) pea irrigated vs non-irrigated, 4) sorghum Sudan grass vs ryegrass vs tillage radish. The disease assessment is ongoing.

Sub-activity 1.3. Rhizosphere and tuber surface soils and tuber peels were collected from the auxin trial done in NB and PEI. The quantification of the abundance of the common scab pathogen in soils and tubers is ongoing.

Sub-Activity 1.4. The effect of mustard-based products on the abundance of the common scab pathogen will be evaluated under controlled conditions.

Extension Activities (presentations to growers, articles, poster presentations, etc.):

Shinners-Carnelley, Tracy. 2021. Presented field trials and preliminary results to control common scab to growers. Peak of the Market Field Day, Winkler, August 12th.

Yorinori, Newton. 2021. Presented field trials and preliminary results to control common scab to growers. Cavendish Field Day, Annan, PEI. September 17th.

Peters, Rick. 2021. Presentation on the impact of rotation crops on common scab - 2020 split fields at the East Prince Agri-Environment Meeting. Emerald, PE. (attended virtually), January 27

Peters, Rick. 2020. Television interview for CBC News done by Nancy Russell on research focusing on management of common scab. September 29

Peters, Rick. 2020. News Release for CBC News titled 'P.E.I. research scientists look for ways to grow scab-resistant potato' done by Nancy Russell. Posted October 2, 2020 at 6:00 am.

<https://www.cbc.ca/news/canada/prince-edward-island/pei-potato-research-scab-1.5745940>

COVID-19 Related Challenges:

COVID19 required sanitary precautions and paperwork thus complicating the field season but the trials went ahead without changes. There were no interruptions of the laboratory work however, work proceeded with extra sanitary precautions and paperwork.

Key Message(s):

This project will identify possible methods to control common scab to reduce economic losses to the growers. This project improves our understanding of the diversity of the common scab pathogen in NB, PEI and MB and leads to the development of detection methods that target specific species or strains of the common scab pathogen.

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