

# Stubby Root Nematode Control Using Mustard Biofumigation

RESEARCH SUMMARY | ON-FARM DEMONSTRATION RESEARCH & MONITORING | 2024

## RESEARCH LOCATION

- Abbotsford, BC

## FARMER COLLABORATORS

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## AUTHORS

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## HIGHLIGHTS

- Biofumigation with Brassica plants (like mustard) can offer some control over soil-borne pests (like stubby root nematode) because of glucosinolate compounds that brassicas produce.
- This project evaluated the efficacy of mustard biofumigation on suppression of stubby root nematode populations.
- Biofumigation decreased nematode levels, but levels were relatively low prior to mustard incorporation.
- Levels should be evaluated again in July and Nov. 2024 to gain confidence in the results as nematode levels in the soil can vary based on time of year.

## MOTIVATION

- Stubby root nematodes are soil-borne pests that can cause a decrease in crop yield and health.
- Biofumigation with mustard and other plants in the Brassica family have been shown to offer some control over these pests because of the glucosinolate compounds that they produce.
- There are many parameters that can affect the effectiveness of biofumigation. On-farm demonstration research is a way to evaluate which approach will work best for individual farmers.

## RESEARCH OBJECTIVE

- The objective of this on-farm demonstration research was to evaluate biofumigation using a mustard cover crop.
- The research question this project addressed was: Does biofumigation with mustard suppress stubby root nematode populations?

## METHODS

### MUSTARD PLANTING & INCORPORATION

- 4.5 acres (previously blueberries) was chosen for the project.
- Mustard was planted at 15 lbs/ac on June 1, 2023.
- In mid-July, within 2 weeks of flowering, plants were finely cut and incorporated into the soil (Fig. 1a). The surface was then rolled to seal in the biofumigant (Fig. 1b).

### MUSTARD STAND RATING

- Prior to mowing, the mustard stand was rated on a scale from 1-5 with 1=poor, 2=fair, 3=good, 4=very good, and 5=excellent.

### NEMATODE SAMPLING

- Soil samples were collected and analyzed by Tom Forge, at Agriculture and Agri-Food Canada, at the following timings:
  - July 20 and November 15, 2022: when the field was still planted with Elliot blueberries;
  - July 20, 2023: Prior to mowing the mustard;
  - August 15, 2023: three weeks after mustard incorporation.
- Nematodes were identified and counted.

## WHAT IS ON-FARM DEMONSTRATION RESEARCH?

- Demonstration research is small-scale testing of an innovative practice on a working farm.
- Guided by producers' goals, demonstration research provides the farming community with experience and information about a new practice, product or technology.
- This research summary is intended to share information and is not official guidance.



**Figure 1.** The mustard was first mowed (a), then incorporated using a rototiller (a&b), and finally sealed, using a roller (b).

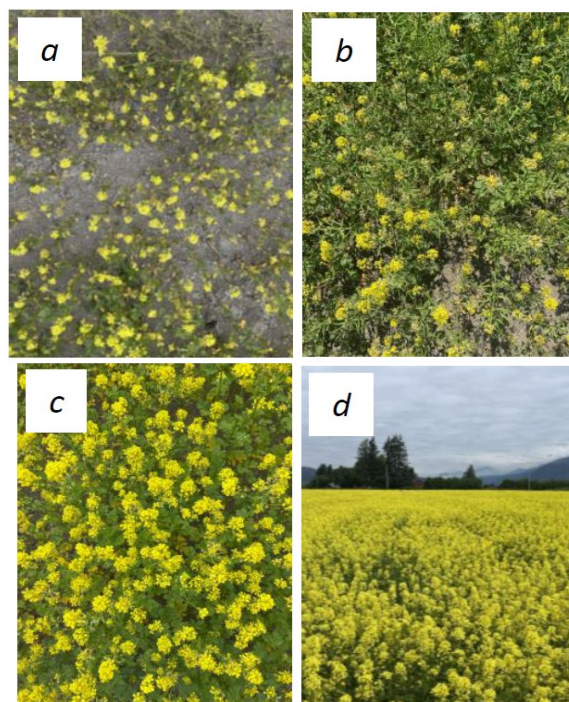
## RESULTS

### MUSTARD STAND RATING

- Mustard stand was overall rated as a 4 (very good) (Fig. 2c&d). There were small patches with a lower performance (Fig. 2a&b) but they represented a small portion of the field.
- Mustard stand developed well, growth was even, reached a good height and bloom percentage was high.

### NEMATODE LEVELS

- Prior to fumigation the field had *Pratylenchus* spp., *Paratrichodorus* spp., and *Paratylenchus* spp. nematodes present. Although it should be noted that levels of nematode were considerably lower than other fields in the area.
- Post fumigation on August 15, no stubby root nematodes were able to be detected in samples from the field.
- Nematode levels vary greatly over a year. Samples should be taken in July and November 2024 to evaluate levels compared to the same timing the previous year.



**Figure 2.** Small patches of lower stand ratings were observed during mustard stand evaluation prior to mowing on July 20, 2023 (a&b) but these patches represented a small portion of the field. The overall mustard stand was very good (c&d).

**Table 1.** Number of *Pratylenchus* spp., *Paratrichodorus* spp, and *Paratylenchus* spp., nematodes in 100 cc of soil in the year prior to mustard establishment (July 20, 2022 and November 15, 2022), when mustard was established (July 20, 2023) and post incorporation of the mustard (August 15, 2023).

Date	<i>Pratylenchus</i>	<i>Paratrichodorus</i>	<i>Paratylenchus</i>	Total
	Number per 100 cc of soil			
July 20, 2022	1	3	0	4
Nov. 15, 2022	11	1	7	19
July 20, 2023	5	0	3	8
Aug. 15, 2023	0	0	0	0

## CONCLUSIONS & NEXT STEPS

- Nematode levels did decrease post-fumigation but levels were relatively low prior to mustard incorporation.
- Levels should be evaluated again in July and November 2024 to gain confidence in the results as nematode levels in the soil can vary based on time of year.
- This was an observation trial with no replication of treatments or untreated control. Data collection over multiple years is recommended to gain confidence in the results.

### FIND MORE INFORMATION:

**Read the research manual:**

[https://www2.gov.bc.ca/assets/gov/farming-natural-resources-and-industry/agriculture-and-seafood/programs/regional-extension/stubby\\_root\\_nematode\\_control\\_using\\_mustard\\_biofumigation.pdf](https://www2.gov.bc.ca/assets/gov/farming-natural-resources-and-industry/agriculture-and-seafood/programs/regional-extension/stubby_root_nematode_control_using_mustard_biofumigation.pdf)



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