Evaluating Cover Crops to Provide Habitat for Predatory Ground Beetles

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

RESEARCH LOCATION

- Langley, BC

FARMER COLLABORATORS

- Gurprit Brar; Virasat Farms Ltd.

AUTHORS

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HIGHLIGHTS

- This project evaluated the efficacy of cover crop mixes at providing habitats for predatory ground beetles in blueberries.
- The cover crops established well, however, none performed better than the typical grass alleyway in providing ground beetle habitat. The impact of cover crops might be stronger when compared to bare soil alleyways.
- The soil disturbance from cover crop seeding may have disrupted ground beetle habitat or it may take multiple seasons for a cover crop to have a positive impact on ground beetles, and subsequently improve pest management.

MOTIVATION

- Ground beetles are generalist predators that help control many blueberry pests, such as spotted wing drosophila and weevils.
- Previous studies have shown that planting flowers and cover crops can help increase the number of ground beetles by creating ideal habitats.
- On-farm demonstration research is a way to evaluate which approach will work best for individual farmers.

RESEARCH OBJECTIVE

The objective of this research was to evaluate the efficacy of different cover crop mixes at providing habitats for predatory ground beetles in blueberries.

The research questions this trial set out to address are:

1. Will cover crops planted between rows in blueberry fields increase predatory ground beetle populations?
2. Which cover crop mixes provide the best habitat for ground beetles?

METHODS

COVER CROP PLANTING

- Three different cover crop mixes were planted May 4, 2023 by the grower (Fig. 1). All three had the Oats, Peas, and Vetch (OPV) Spring Mix (Terralink Horticulture Inc., Abbotsford, BC) included.
  - Mix 1: 49% OPV, 10% white clover, 29% barley, 12% flaxseed
  - Mix 2: 57% OPV, 14% crimson clover, 11% sunflower, 18% annual ryegrass
  - Mix 3: 29% OPV, 10% millet, 38% fababean, 19% buckwheat, 4% mustard
- The control was mowed grass as per the farm's standard practice.

COVER CROP ASSESSMENT

- Plant coverage was measured on July 4. Four sub-samples were taken from each treatment and rated on a scale of 0-4 where 0= no plants, 1= 1-25%, 2= 26-50%, 3= 51-75%, and 4= 76-100% coverage.

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.

BEETLE COLLECTION

- Three pitfall traps were set up at the ¼, ½ and ¾ positions in each row for a total of 12 traps per treatment. A pitfall trap consisted of a 6 cm diameter plastic cup set up in a fitting hole so that the top of the cup was at the soil level (Fig. 2).
- After three days in the field, traps were collected. Ground beetles were separated from other trap contents and numbers were recorded. In some cases, a microscope was used to confirm ground beetle characteristics. Two collections were done, one on June 16 and one on July 7.

Figure 1. The cover crop mixes were planted May 4, 2023 by the grower.

Figure 2. A pitfall trap set up in the field.

RESULTS

COVER CROP ASSESSMENT

- Overall good coverage was observed in all treatments in this study with plots being rated 3 (50-75%) or 4 (75-100%). The Control (Fig. 3d) had the lowest percent coverage and Mix 3 (Fig 3c.) had the highest coverage (Fig. 4).

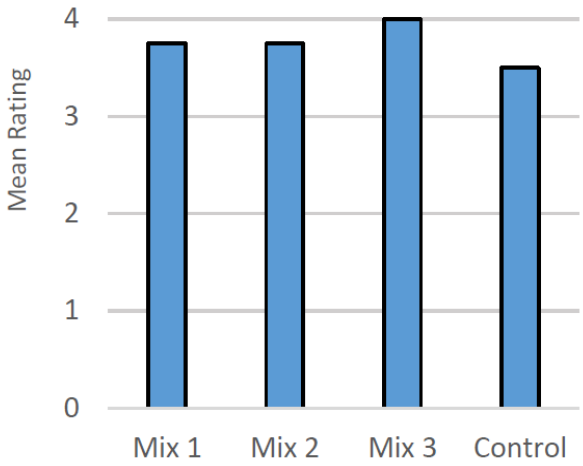

Figure 4. Average cover crop assessment rating for the three cover crop Mixes 1, 2, 3 and and the Control (mowed grass) where 0= no plants, 1= 1-25%, 2= 26-50%, 3= 51-75%, and 4= 76-100% coverage.

Figure 3. View of cover crop a) Mix 1, b) Mix 2, c) Mix 3 and d) Control in early July, 2023.

BEETLE COLLECTION

- A large variety of carabid beetles were found over the two collections in June and July (Fig. 6).
- More beetles were caught in traps during the collection in July (Fig. 5).
- For both collection dates, the control rows had the highest number of beetles caught in traps compared to the cover crop mixes. When comparing the three cover crop mixes, Mix 1 had the highest number of beetles in June whereas Mix 2 had the highest number of beetles for the July collection (Fig. 5).

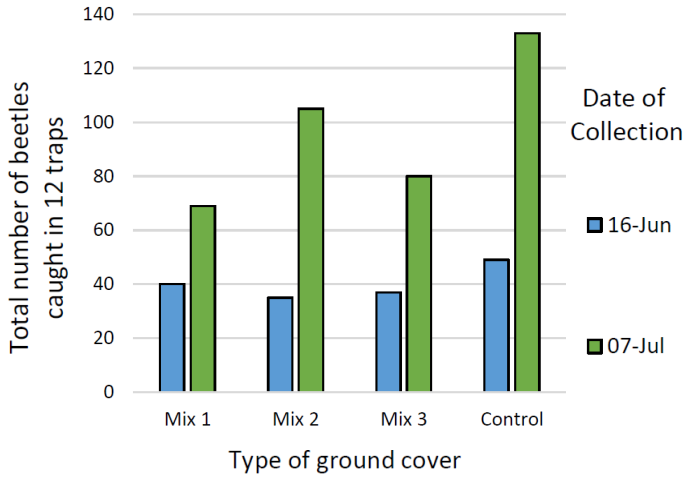

Figure 5. The total number of ground beetles caught in 12 pitfall traps in each of four types of ground cover (three different cover crop mixes and a grass control) in collections in June (blue) and July (orange), 2023.

Figure 6. A variety of ground beetle species were collected in the pitfall traps.

CONCLUSIONS & NEXT STEPS

- All of the cover crops established well during this project.
- Overall, none of the cover crop mixes performed better than the control in providing a habitat for ground beetles.
- The standard practice for this farm is to have grass alleyways, which may have impacted the comparative effect of the cover crops tested here. The impact might be stronger for a farm with bare soil alleyways.

CONCLUSIONS & NEXT STEPS (cont'd)

- The soil disturbance (soil preparation and planting) caused by the seeding of the cover crops may have disrupted ground beetle habitat, giving a disadvantage to the cover crop plots compared to the already established grass in the control. Testing different cover mixes alongside a grass control plot that is established at the same time would be a more accurate comparison.
- It may take multiple seasons for a cover crop to have a positive impact on the ground beetles, and subsequently improve pest management. A longer collection period and investigating this over multiple years may provide additional insights.
- This was an observational side by side trial with no replication of treatments. 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/evaluating_cover_crop_mixes_best_suited_to_provide_a_habitat_for_predatory_ground_beetles.pdf

Find more demonstration research:
https://www2.gov.bc.ca/gov/content/industry/agriculture-seafood/agricultural-land-and-environment/agricultural-regions/south-coast

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