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Innovative Cover Cropping For Orchard Nutrient Management

The Science of Organic Agriculture in Canada

Lead Researchers:
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Atlantic Food and Horticulture Research Centre

Industry Partners:

Brian Boates is an organic apple grower and the owner of Boates Farm. His farm is in the Annapolis valley, NS, where he processes the apples into cider and vinegar alongside growing pears.

Adequate tree nutrition is essential to farmers growing apples organically, and this is often hampered by weed competition as well as sourcing organic nutrients. In most organic orchards weeds are controlled between trees in a row and alongside the row by tillage, however, tilling between the trees is difficult. The Swiss Sandwich System is a relatively novel approach to cover cropping in orchards for more efficient weed management; a strip of cover crop is planted between trees in the row and left untilled, with a tilled bare strip on each side of the row. Brian Boates had been thinking about implementing the system for some time but wanted to take it a step further and use it for fertility management also.

Farmer & Researcher Collaboration

This led to a working relationship with Dr. Julia Reekie and her team as part of Activity B10 in Organic Science Cluster 2. Dr. Reekie was a researcher (now retired) with Agriculture and Agri-Food Canada in Kentville, NS. In addition to the in-row cover crop, Brian Boates and Dr. Reekie wanted to test the planting of a legume cover crop in the alleyway to capture nitrogen and blow the clippings onto the tilled zone when mowing in order to provide extra fertility, especially nitrogen, to the apple trees. Brian was hoping to get scientific data on how this system affected his trees.

Results and Adopted Growing Practices

It was found that this modified system did not compete with the apple trees and instead increased fruit yield and quality. An increase in leaf iron content was observed that could have helped produce the measurable increase in leaf chlorophyll which would support greater photosynthesis. Dr. Reekie also found increased available nitrogen and potassium in the soil. These findings provided proof that the trees were in fact getting a fertility boost from incorporating the legumes from the alleyway.

This system was found to be particularly beneficial in young orchards when the ground is cultivated anyway. One indication of young orchard health is consistent growth of 15 to 45 cm per year. Prior to the start of the project, the plants were growing less than 15 cm per year, but after applying the modified system they grew taller and faster.

Brian used the results of the research to further modify the system. He is now growing legume forage elsewhere and bringing it to the tilled area adjacent to rows to further supplement fertility.

Overall, this modified Swiss Sandwich System makes growing apples organically a viable venture. With this approach, nitrogen is generated for the plants through legumes, reducing fertilizer costs. Also, given the huge upfront investments required to plant an orchard, increasing yields in an efficient and cost-effective manner will improve the return on investment.

ABOUT THE ORGANIC SCIENCE CLUSTER

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