

Final Report

Developing Long Cane Raspberry Production in Nova Scotia

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Prepared for:

Horticulture Nova Scotia under the Long Cane Raspberry Pilot Program Funded by Nova Scotia Department of Agriculture

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Background

Currently, raspberry and blackberry acreage in Nova Scotia is estimated to be about 100 acres, with a farm-gate value of approximately \$1 million. Despite a good market and price potential for local producers, most raspberries sold through the four major retailers in Atlantic Canada are imported from elsewhere. The total annual consumption of raspberries in Atlantic Canada is estimated at 1.5 million kilograms, with 600,000 kilograms of that sold in Nova Scotia.

The traditional method for raspberry production is limited in its ability to achieve reliable, long-term success for a number of reasons. The build-up of soil-borne disease, nematodes, viruses, susceptibility of raspberry canes to winter injury, frost during bloom, and vulnerability to weather events such as precipitation during harvest challenge growers and cap expansion. In an industry where little growth has taken place in recent years, innovation and re-evaluation of current production practices is necessary to re-invigorate local production and meet the growing retail demand for raspberries.

Recognizing an opportunity using novel alternative production systems to increase consumption of local raspberries and displace imports, the Nova Scotia Department of Agriculture partnered with Horticulture Nova Scotia and Perennia Food and Agriculture to launch a two-year pilot program in 2021 through 2023.

While this novel production system facilitates a high-quality supply of locally grown berries for extended season retail markets, there were some challenges to overcome on the farm level to make this a reality. Transitioning to hydroponic production for season extension requires understanding the complexities that come with the production system, including identification of suitable varieties, identifying economically important pests and disease, and optimizing fertilizer and water use to maximize yield. A more specific example is related to the accelerated accumulation of growing degree hours resulting from protected production and the implication it has on crop progression, management, as well as disease and pest pressures, which takes proper training and hands-on experience to optimize. The use of tunnels gives producers more control over the environment, and understanding how to manipulate that environment is crucial to maximizing the benefits of a protected system.

Understanding the challenges associated with bringing a novel production system to Nova Scotia, the Long Cane Raspberry pilot program supported two farms in their adoption of this novel growing system. Delphy, a European agriculture consulting agency, facilitated training to anyone who was be interested in long cane raspberry in the province and contributed to the knowledge base and experience of Perennia extension specialists and participating pilot farms, Vital Berry Farms and Webster Farms. This knowledge contributed to the expansion of the traditional harvest season of three weeks, to a continuous harvest over four months in 2022. The information generated through the pilot program provides growers with basic information about the two main varieties for this system, production tools, a variety of information delivery methods, and a basic cost of production needed to produce high-quality berries in a cost-effective and sustainable manner.

Project objectives

The overall objective of the project was to create a high-quality supply of Canadian-grown berries for off-season retail markets to displace imports and create new economic opportunities for Nova Scotia berry growers.

More specifically, the pilot program was developed with the following goals in mind:

1. To have farms in Nova Scotia develop and produce long cane raspberry hydroponically.
2. To provide producers with knowledge and training, through consultants and soft fruit course, on long cane raspberry production to provide growth in the industry.
3. To develop a comprehensive production guide for growing long cane raspberries in Nova Scotia that can be shared with industry.
4. To develop cost of production estimates for long cane raspberry production in Nova Scotia.
5. To determine the increase in value of Nova Scotia raspberry industry based on 2020 established baseline.

Project Deliverables and Milestones:

While COVID created some complications surrounding construction timelines and anticipated in-person training sessions, the project team was able to adjust accordingly and generate useful experiences and knowledge and technology transfer surrounding this novel production system. Both farms were delayed in construction of their tunnels during the 2021 growing season, however they were able to produce one batch of canes before November 2021. The second year allowed a normal production timeline, and allowed for experimentation with staggered planting for those that were interested. While the limited year production in year one was not ideal, it allowed project participants to go through a 'test run' before a full production season in 2022.

The project deliverables from the project can be found in Table 1, along with corresponding information to highlight the work completed to address each of the main project deliverables.

Table 1. Project deliverables and outcomes achieved throughout the long cane raspberry pilot program.

Project Deliverables and Milestones	Achievements
1) Project updates provided to Horticulture Nova Scotia and Nova Scotia Department of Agriculture	Project updates were delivered to both parties monthly
2) Farms build system and produce long cane raspberry hydroponically	Vital Berry Farms and Webster Farms installed the structure and irrigation infrastructure required for hydroponic production of long cane raspberries in spring 2021
3) Provide recommended plan for fertilization and advise on general production practices through 2021 and 2022	<p>Perennia crop specialists were on site every month from April – October in 2021 and 2022.</p> <p>Hosted eight meetings with Delphy UK focusing on pre-season planning and fine-tuning production through the season in 2021.</p> <p>Hosted seven meetings with Delphy UK focusing on pre-season planning and fine-tuning production through the season in 2021.</p>
<p>4) Organize and assist with monitoring programs to ensure smooth delivery including, but not limited to:</p> <ul style="list-style-type: none"> - insect and disease pressure - variety performance - yield - correct delivery of irrigation and nutrients 	<p>Perennia was on farm every week from April – October to complete a series of measurements and monitoring protocols to better understand crop production trends as well as ideal management strategies.</p> <p>Tests included:</p> <ul style="list-style-type: none"> - Weekly crop scouting for insects and disease - Weekly climate monitoring – calculations of growing degree hours to track crop progression - Assessment of nursery stock quality - Weekly irrigation measurements (EC, pH and leachate tracking) - Collect and submit tissue, substrate, and water

	<p>samples for nutrient analysis</p> <ul style="list-style-type: none"> - Assess marketable berries (size, taste, quality (ex. Crumbly)) for variety comparison <p>Each round of monitoring/assessment was summarized in a follow-up email sent to each participating farm with a summary of the findings for that week.</p>
5) Host formal training sessions on long cane raspberry production to interested Nova Scotia farms	<p>Horticulture Nova Scotia and Perennia organized six online teaching sessions with Delphy UK:</p> <ul style="list-style-type: none"> - Four courses surrounding fruiting production in January 2021 - Two courses surrounding nursery stock production in January 2022 <p>Horticulture Nova Scotia, Nova Scotia Department of Agriculture and Perennia organized an in-person learning opportunity to discuss specifics surrounding long cane raspberry production with Delphy UK during the Nova Scotia Minister of Agriculture Conference in November 2022.</p>
6) Develop a comprehensive guide for growing long cane raspberries in Nova Scotia	<p>Used data and knowledge compiled through the course of the project to write and electronically publish a production guide on protected hydroponic production of long cane raspberries</p>
7) Collect information surrounding the cost of production for hydroponic long cane raspberry delivery.	<p>Nicole Burkhard, a business development officer with the Nova Scotia Department of Agriculture, summarized costs (annual and one-time infrastructure investments) based on two years of long cane raspberry production. Information collected summarized the volume and value of new crop produced.</p>

In addition to supporting the development of experience and knowledge in this novel production system amongst the participating farms and program participants (Horticulture Nova Scotia, Perennia, Nova Scotia Department of Agriculture), Perennia engaged in opportunities to share the project and general findings with the industry through various knowledge and technology transfer avenues. These engagements with industry include:

- The creation and sharing of eight posts highlighting the pilot program through social media channels
- Virtual presentation at Horticulture Nova Scotia Congress in January 2022
- Organized an industry tour of the production system at Vital Berry Farms in September 2022. The Minister of Agriculture was in attendance. Fifty additional attendees showed up, representing a wide range of commodity groups and farm sizes.
- Produced five in-season walk-through videos in 2022 showcasing the production system and timely management activities to be aware of
- Published an article in the November 2022 edition of Fruit and Veg Magazine on Nova Scotia's long cane raspberry pilot program
- In-person presentation at Horticulture Nova Scotia Congress in January 2023, presenting an overview of long cane raspberry production in Nova Scotia. Approximately sixty participants attended the session.
- Virtual presentation for Truro Agromart in March 2023, with a focus on pest and disease findings through the first two years of long cane raspberry production in Nova Scotia.
- In-person presentation on long cane raspberry at the New Brunswick Horticulture Conference March 2023

Program Timeline:

Timeline	Project Activity
Fall 2020	Call out for submissions to industry
Fall 2020	Participate in the selection of producers, development of agreements and coordination of information and data delivery for deliverables and reporting
Fall 2020	Consultant is contracted for infrastructure and system designs; formalize contract for ongoing consultation throughout the Project
Fall 2020	Offer support to participants in proper selection of varieties for evaluation when ordering their nursery stock
Fall 2020	Offer support to participants when ordering infrastructure and supplies
Fall 2020 - Spring 2021	Offer support to participants during tunnel construction, and related infrastructure and equipment installation
Winter 2021	Delphy UK provides long cane raspberry production training to project participants, Perennia specialists and other local farms
Fall 2021, 2022	Ensure Cost of Production modeling work, using data, is collected
Spring 2021, 2022	Support producers as needed as they begin installation of nursery stock for fruit production
Summer 2021, 2022	Execution of seasonal monitoring program for system operations and plant evaluations, including evaluations on fruit quality
Summer 2021, 2022	Ensure on-farm presence of Perennia staff to provide on-going on-farm support through project implementation.
Summer 2021, 2022	Program highlighted through virtual walk-through videos, industry field tour, and social media posts
November 2021, 2022	Monitor completion of harvest and the summary of yield data
Winter 2022	Delphy UK provides long cane raspberry nursery production training to project participants, Perennia specialists and other local farms
January 2022, 2023	Presentation during HNS Congress
March 2023	Comprehensive Production Guide & sharing with industry

Next Steps:

While the pilot program was successful at meeting the 2021-2023 project objectives and supporting the initial stages of establishing a new production system in the province, there continues to be opportunities to support sustained success and resiliency of the long cane raspberry industry.

The in-person farm tour entertained many interested farmers from a variety of commodity backgrounds, however most of the concerns surrounding system adoption revolved around cost of production and long-term feasibility. There are a few areas within the cost of production generated from the pilot program that needs attention to better understand system longevity.

One of the areas requiring further investigation is an examination of the ideal structure used for production to limit the amount of overhead involved while still accessing the best quality extended-season berries. Infrastructure decisions made by the two participating farms in the pilot program did not allow for side-by-side comparison of different protective structures, which would be the ideal method to understand if initial overhead could be reduced and therefore increase profits on farm.

In addition to evaluating the ideal structure for the local climate, labour costs associated with long cane raspberry production need a closer examination. As farms worked to incorporate and optimize a new production system in addition to their normal on-farm operations through the pilot program, production efficiencies may not have been realized for long cane in the initial two years. With a limited amount of raspberry production in 2021, and one full season in 2022, labour costs were higher compared to other commodities that has been grown on farm for multiple years. Understanding where efficiencies can be realized takes time and would not have been captured in the information gathered through the pilot project. These artificially high labour numbers could be a barrier to adoption by other farms, or expansion amongst current producers, and is worth spending additional time and resources to understand the long term costs of the system. The final consideration for further examining long cane raspberry costs would be the state of the economy through 2020-2023. Record levels of inflation and COVID pricing resulted in higher input costs compared to previous years, and reduced on-farm income as a result which may not be representative of future economies.

Further areas for on-farm research include variety trialing to ensure that the varieties best suited for Nova Scotia are being used. Variety selection can make or break an industry, either through consumer interaction or complexity with on-farm production. Varieties should be evaluated to maximize success on both fronts.

Evaluation of pest and disease management strategies would also be a large benefit to producers. This would limit the number of conventional chemicals on farm and maximize efficiencies of the inputs introduced into the system.

Local nursery production of long cane raspberry planting stock would reduce the cost of the canes by reducing transportation cost from Quebec and Ontario. Nova Scotia is currently home to four well established berry nurseries. By producing canes in Nova Scotia, the nurseries would expand into a commodity that is rapidly gaining popularity across Canada and could significantly increase Nova Scotia's national profile, as well as greatly increase its exports.

In addition to the creating a more robust cost of production resource for interested growers and answering some of the questions which evolved through the pilot program, efforts to increase the profile for long cane raspberry for consumers would play a big role in solidifying it as a long-term commodity in Nova Scotia. While this new production system has been well advertised amongst the farming community, consumers are not aware that the raspberries available in July, or October, are in fact locally produced. Long cane raspberry has a longer shelf life compared to that of a field berry. A campaign to raise awareness on these 'new' locally produced berries would increase commodity uptake and help drive demand at the retail level.

The local and national interest that has been generated in response to the pilot program highlights a demand for this growing industry across the country. Nova Scotia has established itself as one of the leaders for long cane raspberry adoption in Canada outside of Quebec, and continuing to support the development of this industry locally will reduce our reliance on imports and increase local food production and consumption by Nova Scotians. Continual investment in building this industry out of its infancy stages will play a significant role in the long-term adoption and resilience of this industry into the future and have long lasting impacts on the farming community.