Canadian Agri-Science Cluster for Horticulture 3

Update to Industry

2019-2020

Activity title: The Canadian Berry Trial Network

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Names of Collaborators and Institutions:

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Activity Objectives (as per approved workplan):

The Canadian Berry Trial Network (CBTN) project involves testing new varieties and selections of strawberry, raspberry and blueberry in four provinces across Canada: British Columbia, Ontario, Quebec and Nova Scotia.

- The objective for Phase I (2018-2019) was to initiate the project through an in-person meeting and the development of an experimental design. Phase I also included plant propagation, field preparation and the acquisition of research materials and supplies.
- The objective for Phase II (2019-2023) is to establish and evaluate standard varieties, new varieties and advanced selections of raspberry, blueberry and strawberry in the four provinces.
- The objective for Phase III (2020-2023) will be to share the results of the trials with our industry partners and to discuss commercial opportunities for some of the new trial varieties and selections.

Research Progress to Date (use plain language):

Replicated Trials

In 2019-2020, we began our work in Phase II by planting new trials of strawberry and raspberry. The varieties planted in 2019 are listed below. Please feel free to contact the researcher responsible for the trials in your region for more information.

Day Neutral Strawberry

Trial Varieties:

Albion	A standard variety bred at the University of California with good quality and medium yields
Seascape	A standard variety bred at the University of California with good quality and medium yields
Cabrillo	A trial variety bred at the University of California with good quality and strong yields
AAC Dynamik	A trial variety bred at AAFC St-Jean with good quality and strong yields
BC 10-2-1	A trial selection bred at AAFC Agassiz with good quality and medium yields

Trial Design:

The trial plants have been established in ten plants plots on plasticulture mulch beds with trickle irrigation. At each location, the trial is repeated four times in a randomized design. The plots were established from bare root plants in mid-summer 2019 and will be evaluated for fruit quality and yields in 2020. An exception is BC 10-2-1 which was

established from plug plants in late summer 2020 and will be fruited with the rest of the trial in 2020. The plots are managed under conventional crop protection and fertility programs as recommended by the berry production guides and specialists in each province.

June Bearing Strawberry

Trial Varieties:

Darselect	An early season standard variety bred in France with good quality and strong yields
AAC Lila	An early season trial variety bred at AAFC Kentville with good quality and medium yields
Jewel	A mid-season standard variety bred in New York State with good quality and medium yields
Cavendish	A mid-season standard variety bred at AAFC Kentville with intermediate quality and medium yields
Summer Daisy	A mid-season trial variety bred at the University of Guelph with good quality and medium yields
AAC Audrey	A mid-season trial variety bred at AAFC Kentville with good quality and medium yields
AAC Evelyn	A mid-season trial variety bred at AAFC Kentville with good quality and medium yields
AAC Kate	A mid-season trial variety bred at AAFC Kentville with good quality and moderate yields
K04-12	A mid-season trial selection bred at AAFC Kentville with good quality and medium yields
K04-21	A mid-season trial selection bred at AAFC Kentville with good quality and medium yields
K12-12	A mid-season trial selection bred at AAFC Kentville with good quality and medium yields
K12-14	A mid-season trial selection bred at AAFC Kentville with good quality and medium yields
K09-04	A mid-late season trial selection bred at AAFC Kentville with good quality and moderate yields
Valley Sunset	A late-season standard variety bred at AAFC Kentville with good quality and medium yields
Summer Evening	A late-season trial variety bred at the University of Guelph with good quality and strong yields

Trial Design:

The trial plants have been established in ten plants plots with different planting systems depending on location. In Quebec and British Columbia, the trials were planted on plasticulture mulch beds with trickle irrigation. In Ontario and Nova Scotia, the trials were planted in straw matted rows with overhead irrigation. At each location, the trial is repeated four times in a randomized design. The plots were established from bare root plants in mid-summer 2019 and will be evaluated for fruit quality and yields in 2020. The plots are managed under conventional crop protection and fertility programs as recommended by the berry production guides and specialists in each province.

Floricane Raspberry

Trial Varieties:

Nova	A standard cold hardy variety bred at AAFC Kentville with good quality and medium yields
Killarney	A standard cold hardy variety bred in Manitoba with good quality and medium yields
Tulameen	A standard cold sensitive variety bred at AAFC Agassiz with excellent quality and medium yields
Meeker	A standard cold sensitive variety bred at AAFC Agassiz with good quality and strong yields
Chemainus	A trial variety bred at AAFC Agassiz with excellent quality and strong yields
AAC Eden	A trial variety bred at AAFC Kentville with good quality and medium yields
K14-03	A trial selection bred at AAFC Kentville with good quality and strong yields
K14-04	A trial selection bred at AAFC Kentville with excellent quality and moderate yields
BC 10-84-9	A trial selection bred at AAFC Agassiz with excellent quality and strong yields

Trial Design:

The trial plants have been established in five plants plots with different planting systems depending on location. In British Columbia, the trials were planted on plasticulture mulch beds with trickle irrigation. The BC plants will be loop-trellised for machine harvest after the establishment year. In Ontario, Quebec and Nova Scotia, the trials were planted in un-mulched soil beds with trickle irrigation. The ON, QC and NS plants will be t-trellised for hand picking. At each location, the trial is repeated four times in a randomized design. The plots were established from plug plants in mid-summer 2019 and will be evaluated for early fruit quality and yield potential in 2020. The plots are managed under conventional crop protection and fertility programs as recommended by the berry production guides and specialists in each province.

Primocane Raspberry

Trial Varieties:

Heritage	A standard cold hardy variety bred at Cornell University with good quality and medium yields
Polka	A standard cold hardy variety bred in Poland with good quality and strong yields
K14-09	A trial selection bred at AAFC Kentville with good quality and medium yields
K14-13	A trial selection bred at AAFC Kentville with good quality and medium yields
K14-14	A trial selection bred at AAFC Kentville with good quality and medium yields
K14-19	A trial selection bred at AAFC Kentville with good quality and medium yields

Trial Design:
The trial plants have been established in five plants plots using the same planting system as the floricane trials. In British Columbia, the trials were planted on plasticulture mulch beds with trickle irrigation. The BC plants will be loop-trellised for machine harvest after the establishment year. In Ontario, Quebec and Nova Scotia, the trials were planted in un-mulched soil beds with trickle irrigation. The ON, QC and NS plants will be t-trellised for hand picking. At each location, the trial is repeated four times in a randomized design. The plots were established from plug plants in mid-summer 2019 and will be evaluated for early fruit quality and yield potential in 2020. The plots are managed under conventional crop protection and fertility programs as recommended by the berry production guides and specialists in each province.

Early Observations from Replicated Trials
Nova Scotia:
A very late spring delayed planting substantially in 2019. The mid-June planting date was later than the typical planting time of mid-May for strawberry, which led to some challenges with establishment. However, both the June bearing matted fields and day-neutral were able to catch up by October thanks to the mild conditions in Kentville, Nova Scotia during fall 2019. The blossoms and fruits were removed from all strawberry plants in 2019 to promote establishment in preparation for a full fruiting season in 2020. The raspberry plants also grew well in 2019. All plants survived the September 2019 hurricane with minimal foliar damage. Winter 2020 had below normal lows with two nights of -20°C in February. Winter survival for both strawberry and raspberry plants will be assessed in spring 2020. The strawberry and raspberry plants will be fruited in 2020, and plant performance data will be collected throughout the 2020 growing season.

Québec:
Strawberry trials were established late (July) later than what is the usual practice in the province. Establishment went well for most June bearing and day-neutral selections to the exception of June bearing K04-12. Blossoms and fruits were removed during 2019 season. Winter temperatures were normal so we do not expect particular problems. In the spring of 2020 winter survival will be assessed. Raspberry trial was established late (July). Establishment went well during the rest of 2019 season. Winter injury and survival will be assessed in spring 2020.

Ontario:
Weather conditions in Ontario were very wet early in the season and planting was delayed. June bearing strawberry trials and raspberry trials grew well once established. Flowers were removed to promote good vegetative growth and the plots looked good going into the winter. Raspberry trellises were built during the summer. The winter of 2019/2020 was mild; survival and/or winter injury have yet to be assessed. These plots will be fruited in 2020, and plant performance data will be collected throughout the 2020 growing season. Day neutral plots were established at the Simcoe Research Station but plant quality was poor due to the plants being misplaced at another research station. These plots will be re-established in spring 2020.

British Columbia:
Strawberry trials were established relatively late (July), but establishment proceeded well for the remaining portion of the 2019 growing season. Evaluations of winter damage have not yet been possible do to site access restrictions, though there is likely some losses to be expected for some genotypes. Consequently, yields will likely be lower than typical, but harvest is anticipated beginning in June if access to the facilities is granted. Likewise, raspberries were planted later than is ideal, and so floricanes were pruned to the ground in winter of 2020 and first evaluations will take place in 2021. Aside from late establishment, the planting is currently in good shape with

trellising in place, and we are not expecting significant losses due to winter damage.

British Columbia On-Farm Trials

In addition to the replicated trials in four provinces, Dr. Eric Gerbrandt has continued on-farm observational trials in British Columbia throughout 2019-2020. In continuation of the work funded during Growing Forward II and the first year of the Canadian Agricultural Partnership, observational trial data were collected on established plants in growers' fields in BC. This work focused on continued observation of established blueberry, raspberry and strawberry trials, which are primarily comprised on cultivars and advanced selections obtained from breeding programs and propagators based in the US. For blueberry trials, this work primarily focuses on the continued evaluation of several trial sites that include replicated on-farm plantings of five recent releases from the Fall Creek Farm and Nursery (Lowell, Oregon) breeding program: 'Cargo', 'Last Call', 'Top Shelf', 'Clockwork' and 'Blue Ribbon'. Additionally, numerous field trials of Fall Creek Farm and Nursery's recent release, Valor™, and trial plantings of a new Michigan State University cultivar, 'Calypso', are under observation. In facilitating bidirectional communication of observations throughout the Pacific Northwest with collaborators in Washington and Oregon, an oral presentation was delivered at the Oregon State University Blueberry Field Day at the North Willamette Research and Extension Centre in Aurora, Oregon on July 19, 2019. For raspberries, the focus has been on evaluation of advanced selections from the Washington State University (WSU) breeding program with large, unreplicated blocks being compared across one or more sites to determine commercial suitability. Coordination of these trials is also connected with collaborators in Washington and Oregon by replicating these selection trials in parallel with efforts funded in the US by the Washington Red Raspberry Commission. In the last six years, there have been two cultivars released that were included in evaluations in both BC and Washington ('Cascade Harvest' and 'Cascade Premier'). In strawberry, evaluations have primarily focused on recent releases from the breeding programs at the United States Department of Agriculture / Oregon State University (USDA/OSU) and the University of California (UC) as well as the Rutgers University and Michigan State University breeding programs. For all three crops, plants for these selections and cultivars are primarily evaluated in large blocks in growers' fields throughout BC's Fraser Valley and Lower Mainland, but they are also often included in the replicated variety trials at the Clearbrook substation in Abbotsford, BC, to compare with selections from the breeding program. Further, these trials rely on communication with breeding programs, propagators and researchers in Washington and Oregon, which facilitates access to genetic material and knowledge of its potential for Canadian growers to flow through to the CBTN.

Next Steps

We are currently getting ready to plant our second year of strawberry trials this spring. We plan to have more selections bred in Kentville and Agassiz, as well as some new international material. We also hope to plant our first blueberry trials in autumn 2020. The blueberry trials will feature advanced selections from the BC berry breeding program led by Dr. Michael Dossett. We will plant the next raspberry trials in 2021, and will include some international selections. Along with our new trials, we are also starting to evaluate productivity, fruit quality and general plant performance traits for the strawberry and raspberry trials planted in 2019. While we would normally be excited to invite you to visit our field trial sites, we recognize that that may not be possible in 2020. We are therefore looking at other ways to connect with you and share our observations during the 2020 fruiting season.

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

The project team made a few presentations to growers and stakeholders during 2019-2020:

- Pierre Lafontaine: 'CBTN project goals, objectives and teams.' Presentation made at: *Quebec growers association (APFFQ) meeting.* Montreal, Quebec, Spring 2019
- Michael Dossett and Eric Gerbrandt: 'Blueberry breeding update and performance of new varieties in B.C.' Presentation made at: *Oregon State University Blueberry Field Day*. North Willamette Research and Extension Centre, Aurora, Oregon. July 19, 2019.
- Beatrice Amyotte: 'Strawberry breeding at Agriculture Canada.' Presentation made at: *New England Vegetable and Fruit Growers Conference*. Manchester, New Hampshire, December 2019

- Beatrice Amyotte: 'Strawberry breeding at Agriculture Canada.' Presentation made at: *North American Strawberry Growers Association (NASGA) Annual Meeting.* San Antonio, Texas, January 2020
- Beatrice Amyotte: 'Update from the Agriculture and Agri-Food Canada Berry Breeding Program.' Report presented at: *Nova Scotia Berry Nurseries Biennial Meeting*. Kentville, Nova Scotia, February 2020
- Meetings planned by John Zandstra for berry growers in Ontario were unfortunately canceled due to covid-19.

The CBTN Share Drive is a folder of meeting notes and presentations from our project. We invite you to check the folder from time to time and browse our presentation notes.

Early Outcomes (if any) or Challenges:

We had a difficult start to the 2019 season and an overall challenging year which unfortunately is reflective of commercial berry production conditions across the country. Due to the late spring which delayed nursery production in Nova Scotia, our strawberry trials were planted quite late, and in some cases, did not have time to properly establish. Some of the challenges were mitigated by favourable fall weather, however, we are planning to replant most of the 2019 strawberry varieties this spring to get better data in the next fruiting year. The 2019 raspberry trials overall did well in comparison with the strawberries and we are looking forward to planting our first blueberry trial in fall 2020.

More recently, all four research centres involved in this project are currently restricted to essential services only due to the covid-19 pandemic. These work restrictions are being evaluated weekly by federal and provincial governments. Some locations may not be permitted to plant new trials in 2020. Some locations may also be restricted from conducting certain evaluations of the trials planted in 2019. Despite these restrictions, we are doing our best to continue meaningful research and to keep the project going. As the situation evolves, we are following all guidelines provided by provincial and federal governments as they relate to public safety and social distancing.

Key Message(s):

The Canadian Berry Trial Network team is pleased to have planted our first replicated trials of strawberry and raspberry in four provinces in 2019. Our plan is to collect field and fruit data on these trials and to plant new trials of strawberry and raspberry in 2020. However, since March 2020, we are in a unique situation. The global covid-19 pandemic has restricted our work, and we may not be able to proceed with all trials as planned. As the situation evolves, we will do our best to manage the research objectives with health and safety as our first priority. Lastly, we are exploring no-contact methods to share field updates with our growers and stakeholders. At this time, we invite you to contact us by email or by phone if you have any questions about the trials.

Thank you for supporting this project and best of luck for your 2020 production season. Stay safe.

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