# Organic Blueberry and Cranberry Production in British Columbia

## Gaps Analysis

Project Report to the Organic Sector Development Program

Fraserland Organics

BC Blueberry Council

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**Executive Summary:**

Despite large and successful acreages devoted to growing blueberries and cranberries in BC, organic production of these crops is limited, though organic berries are successfully produced in other regions of the Pacific Northwest and Canada. To better understand why there is relatively little organic blueberry and cranberry production in BC, a series of surveys were conducted from August to November of 2013.

Growers and industry experts in BC as well as in other regions (Quebec and Washington/Oregon) were surveyed to determine the conventional producers' perceptions compared to the organic producers' experiences in terms of the barriers to organic production. The first survey was directed at industry, e.g. potential packers, processors or distributors for organic BC berries, to evaluate potential marketing channels for local organic blueberry and cranberry production. Three of the eight packers/processors/ distributors contacted for the industry survey responded. All of the respondents deal primarily in blueberries. Ocean Spray, the main packer for BC cranberries, does not currently have a processing line for organic cranberries and is unlikely to open one without a considerable increase in organic cranberry production. The respondents to the industry survey expressed interest in buying or distributing organic blueberries or increasing their volumes, but stated that a minimum volume of 20,000 lbs per grower or grower group would be necessary to make dealing in organic blueberries worthwhile.

The second survey was directed at conventional growers in BC. Ninety-one surveys were distributed to conventional cranberry growers and 986 were distributed to conventional blueberry growers. Response rates were 15% (or 12 growers) for cranberries and 1% (or 8 growers) for blueberries. The third survey was directed at organic growers or industry experts in BC, Quebec, Washington and Oregon. Two organic cranberry growers and one cranberry industry expert were interviewed in Quebec, and four organic blueberry growers, one organic cranberry grower and one blueberry industry expert were interviewed in Washington/Oregon. One organic blueberry grower was interviewed in BC. Insect and weed management were identified as the most significant barriers to successful organic production by both conventional and organic cranberry growers. Conventional blueberry growers identified risk of crop loss, insect/mite and disease management as the biggest barriers to organic production, whereas organic blueberry growers identified weed management, labour costs and lack of organic management knowledge as the most significant barriers. Spotted Wing Drosophila (SWD) management was identified as a major challenge by organic blueberry growers, and there is growing concern over the development of resistance to Entrust, the only effective product that is currently registered for SWD in organic blueberries.

Conventional and organic growers were also asked to indicate their familiarity and experience with a list of organic control tools. The majority of conventional cranberry growers had never heard of one or more of the listed organic control tools. In blueberries, the majority of organic control tools listed were reported as used by at least one of the eight conventional respondents. Conventional cranberry and blueberry growers expressed interest in using biological controls, e.g. nematodes for weevil control, beneficial insect release or conservation of natural enemies. Specific management strategies for insect pests, disease and nutrients as described by organic growers were compiled along with potential management tools found by reviewing literature. Future work should focus on the most significant barriers to organic blueberry production (e.g. SWD) and organic cranberry production (e.g. weeds) as identified by growers and developing a wider array of control tools.

## Introduction:

British Columbia is home to over 800 growers and 11,000 hectares of cultivated highbush blueberries, making it one of the top producers in the world (BCBC 2013). British Columbia is also home to 80 cranberry growers, representing approximately 12% of annual North American cranberry production (BCCGA 2013). Although there is interest among some growers to transition to organics, very little acreage has been converted in BC: fewer than 15 growers are listed on the BC Blueberry Council's website as certified organic or spray-free and there is no known certified organic cranberry acreage in BC. Other regions of the Pacific Northwest are major producers of organic blueberries, for example over half (55%) of the organic blueberries harvested in the United States in 2008 were from certified organic farms in Washington state (Geisler 2013). Organic cranberries are largely grown in Quebec (about 400 acres) and smaller acreage can be found in Oregon (Zeldin 2005). Growers have been able to successfully produce other crops organically in coastal BC, including vegetables, nuts, and tree fruits. While there are concerns regarding yield and pest management in regards to organic production, the market for organics in BC is thriving and price premiums for organic produce are compelling, with prices for organic blueberries in recent years ranging from 20 to 100% higher than those for conventional fruit (Julian *et al.* 2011). The BC organic market is the strongest in Canada, accounting for 22% of national organic food and beverage sales, and British Columbians are the leading consumers of organic produce in the country, with 66% of BC residents buying organic produce on a weekly basis (Mackinnon 2013). The successful production of organic blueberries and cranberries in other regions along with the thriving market for organics in BC points to an untapped sector for BC agriculture that warrants further exploration.

## Objective

The objective of this work was to determine the different types of barriers that may be limiting organic berry production in BC and their potential solutions, with the overarching goal of laying the foundation for subsequent work to address unresolved issues.

## Methods

Project activities consisted of three surveys. Surveys were developed in consultation with industry experts Karina Sakalauskas (Research Coordinator with the BC Blueberry Council) Mark Sweeney (Berry Industry Specialist with the BC Ministry of Agriculture) and Susan Smith (Field Vegetable and Organics Industry Specialist with the BC Ministry of Agriculture).

Industry Survey: The industry survey was aimed at packers/processors/distributors. This survey was designed to determine potential marketing channels for local organic blueberry and cranberry production (Appendix I). The survey was a short one-page list of questions about the buying and processing of organic blueberries and cranberries. This survey was emailed in October to eight packers/processors/distributors.

Conventional Survey: The conventional survey was aimed at conventional blueberry and cranberry growers in British Columbia (Appendix II). This survey was designed to identify the perceived gaps or barriers to organic blueberry and/or cranberry production in BC from a conventional grower's standpoint. The survey first asked growers to rank a list of factors from 0 (not a barrier) to 3 (major barrier) to successful organic production. Growers were then asked to indicate their experience with different control tools (pesticides, physical controls, biological controls, and organic fertilizers) commonly used in organic berry production. This survey was delivered in August using various distribution methods (Table 1).

Table 1. Number of surveys distributed using different distribution methods for survey of conventional growers

| | **Cranberry** | **Blueberry** |
|---|---|---|
| faxed/emailed/hand delivered | 17 | 15 |
| hand delivered at cranberry field day | 15 | 1* |
| sent to list of growers via BC Cranberry Growers Association (BCCGA) or BC Blueberry Council (BCBC) IPM Newsletter | 59 | 270 |
| mailed via BC Blueberry Council Fall Newsletter | n/a | 700 |
| **Total # distributed** | 91 | 986 |

*One respondent was both a cranberry and blueberry grower

Organic Survey: The organic survey was developed for certified organic or transitional blueberry and cranberry growers here in BC and in other regions (Quebec, Washington and Oregon). This survey was designed to identify the gaps or barriers faced in organic production and the potential solutions (Appendix III). The organic survey was essentially the same as the conventional survey, but growers were asked to rank factors according to their experience. Growers were also asked a series of interview questions about marketing, price expectations, insect/mite, weed and disease management, and equipment or infrastructure needs for organic production. A review of the literature on pest management practices suitable for organic production was also conducted to supplement the information gained from the organic survey.

The organic survey was delivered in-person to two organic cranberry growers and one industry expert in Quebec and to three organic blueberry growers, one organic cranberry grower and one industry expert in Washington and Oregon. In November, one organic blueberry grower from BC was interviewed. Grower contacts were established by internet searches and also by contacting industry experts in each region for suggestions of cooperative growers (agronomists in Quebec and researchers and extension agents from Washington State University and Oregon State University). Meetings were set up with interested growers prior to each trip.

## Results and Discussion

Industry Survey:

*Packers/Processors/Distributors:* Eight packers/processors/distributors were sent the industry survey. Of the eight that were contacted, three responded: Silver Valley Farms (Maple Ridge, BC), Earthbound Farm Organic (San Juan Bautista, California, USA) and Bremner Foods Ltd. (Delta, BC). All three respondents deal primarily in blueberries. Ocean Spray, the main packer for cranberries in BC, does not have a processing line for organic cranberries, and without a considerable increase in organic cranberry production it is unlikely that one will be opened (B. Mauza, Ocean Spray, personal communication, July 2013). BC growers interested in organic cranberry production would likely have to find other channels for marketing their product. All respondents expressed interest in buying or expanding their volumes of organic blueberries. Two of three respondents also expressed concern that there are not enough locally produced organic blueberries. The minimum volume required from a grower/grower group varied among

respondents, but at least 20,000 lbs are necessary to make buying/processing organic blueberries worthwhile.

*Market for organic BC cranberries and blueberries:* Of the growers surveyed, 33% of conventional cranberry growers and 63% of conventional blueberry growers expressed interest in transitioning some of their production to organic, and 100% of organic cranberry growers and 60% of organic blueberry growers said they wanted to increase their acreage. Conventional growers expected they would receive anywhere from a 25-100% increase in payment for organic berries. Organic growers reported receiving anywhere from a 20$^{c}$/lb premium up to a 2.5x increase in price for their berries compared to conventional fruit.

The BC organic market is the strongest in Canada, accounting for 22% of national organic food and beverage sales, and over 40% of organic retail sales are fresh fruit and vegetables (MacKinnon 2013). British Columbians are the leading consumers of organic produce in the country – 66% of BC residents buy organic produce on a weekly basis (Mackinnon 2013). From 2006-2012, a five-fold increase was seen in farmer-direct sales of organic product (mainly via farmer's markets) and in 2012, 40% of sales from BC farmer's markets came from certified organic vendors (MacKinnon 2013). Growers interested in transitioning to organic should be encouraged by the current marketplace for organic berries.

Conventional and Organic Surveys:

Although many surveys were distributed for this project, response rates were low and information presented here is from a small subset of growers. Response rates for the conventional survey were 15% for cranberries and 1% for blueberries (Table 2). Response rates were better for the conventional cranberry growers than for conventional blueberry growers which is likely because many cranberry growers were approached in-person at a cranberry field day, and the majority of blueberry surveys were emailed or mailed out. Response rates for the organic survey were 40% for cranberries and 28% for blueberries (Table 3). Industry experts were hesitant to give out contact information for organic growers and several of the growers contacted were not willing to discuss their management practices – particularly larger operations – as this information was considered proprietary. The organic growers that participated in this project were mostly small to mid-scale producers (the largest acreages were 110 and 75 for cranberries and blueberries respectively).

Table 2. Response rates for conventional survey

| | **Cranberry** | **Blueberry** |
|---|---|---|
| Total # distributed | 91 | 986 |
| Total # returned | 12 | 8 |
| # of registered BC growers (numbers from BCCGA and BCBC) | 80 | 800 |
| **% of registered growers responding to survey** | 15% | 1% |

Table 3. Response rates for organic survey and total acreage represented

| | **Cranberry** | **Blueberry** |
|---|---|---|
| Total # growers or industry contacted | 10 (6 growers, 4 industry) | 18 (12 growers, 6 industry) |

| | | |
|---|---|---|
| Total # meetings achieved | 4 | 5 |
| **% of total growers/industry contacted that responded to survey** | 40% | 28% |
| **Total acreage represented by participating organic growers** | 214 acres | 112 acres |

Conventional and Organic Surveys: Ranking of barriers to successful organic production

*Cranberries:* Insect/mite and weed management were identified as significant barriers to successful organic production by both conventional and organic cranberry growers (Tables 4a and 4b). Interestingly, conventional growers identified "risk of crop loss, quality" as a significant barrier (rank of 2.45 out of maximum possible of 3) whereas the average ranking of this factor from organic growers was only 1.00. "Disease management" ranked at 2.25 for conventional growers, but only 0.50 for organic. The majority of factors (79%) were ranked higher by conventional cranberry growers than by organic, which suggests that the perception of potential barriers to successful organic cranberry production is not reflected in practice.

Table 4a. Average ranking of potential barriers to successful organic **CRANBERRY** production – conventional vs. organic responses. Survey participants were asked to rate each factor from 0 (not a barrier) to 3 (major barrier). Top three average rankings (biggest barriers to organic production) are in bold font.

| **Factor** | **Average ranking- conventional growers** | **Average ranking- organic growers** |
|---|---|---|
| Risk of crop loss, quality | **2.45** | 1.00 |
| Access to processing facilities | 1.67 | 0.25 |
| Labour costs | 2.09 | **2.00** |
| Equipment needs | 0.50 | 0.50 |
| Organic management knowledge | 1.67 | 1.50 |
| Extension availability | 2.18 | 1.50 |
| Labour availability | 1.42 | 0.50 |
| Marketing | 1.00 | 0.50 |
| Insect/mite management | **2.33** | **2.50** |
| Disease management | 2.25 | 0.50 |
| Weed management | **2.45** | **2.50** |
| Rodent/Bird management | 0.45 | 0.25 |
| Nutrient management | 1.08 | 1.00 |
| Certification process | 1.08 | 1.00 |

*Blueberries:* As in cranberries, conventional blueberry growers ranked "risk of crop loss, quality" (rank of 2.71) as one of the biggest barriers to successful organic production, whereas the average ranking from

organic growers was only 1.00 (Table 4b). Conventional growers ranked "insect/mite management" and "disease management" as the other two most significant barriers (ranks of 2.25 and 2.57 respectively), with organic growers giving an average ranking of 1.00 for both factors. Organic growers ranked "weed management" (2.00), "labour costs" (1.80), and "organic management knowledge" (1.80) as the top three barriers to successful organic production.

Table 4b. Average ranking of potential barriers to successful organic **BLUEBERRY** production – conventional vs. organic responses. Survey participants were asked to rate each factor from 0 (not a barrier) to 3 (major barrier). Top three average rankings (biggest barriers to organic production) are in bold font.

| **Factor** | **Average ranking-conventional growers** | **Average ranking-organic growers** |
|---|---|---|
| Risk of crop loss, quality | **2.71** | 1.00 |
| Access to processing facilities | 0.57 | 1.00 |
| Labour costs | 1.75 | **1.80** |
| Equipment needs | 0.63 | 0.40 |
| Organic management knowledge | 1.63 | **1.80** |
| Extension availability | 1.20 | 1.50 |
| Labour availability | 1.50 | 1.00 |
| Marketing | 0.86 | 0.20 |
| Insect/mite management | **2.25** | 1.00 |
| Disease management | **2.57** | 1.00 |
| Weed management | 2.13 | **2.00** |
| Rodent/Bird management | 1.29 | 0.20 |
| Nutrient management | 1.25 | 1.00 |
| Certification process | 1.50 | 0.80 |

<u>Conventional and Organic Surveys: Grower experience with commonly used organic management tools</u>

*Cranberries:* In both the conventional and organic surveys, growers were also asked to indicate their experience with a list of organic control tools and several interesting results were observed. First, 75% of conventional growers had never heard of one or more of the organic-approved products listed. Second, 42% of conventional cranberry respondents listed the use of compost/manure for fertilizer as management tools that they had not used and did not think would work (Table 5a). In contrast, 100% of organic cranberry growers use compost or manure (pelletized) as fertilizer with satisfactory results (Table 5b). Both conventional and organic growers expressed interest in biological insect pest controls: 67% of conventional cranberry growers were interested in using natural enemy releases and 58% were interested in conservation of natural enemies (Table 5a), and 75% of organic cranberry growers were interested in each of natural enemy release and conservation (Table 5b). Some examples of biological control tools that have potential in organic cranberry production are nematodes for black vine weevil and girdler (Bruck *et*

*al.* 2005; Georgis *et al.* 2006; Booth *et al.* 2002), *Metarhizium anisopliae* for black vine weevil (Bruck *et al.* 2005) and *Trichogramma* spp. for fireworm in cranberries (Bourchier and Smith 1996; Dutton *et al.* 1996, Smith 1996)

Table 5a. Grower experience with commonly used organic management tools–**CRANBERRIES – conventional**

| | **% of responses** | | | | | |
|---|---|---|---|---|---|---|
| | **Currently use this tool** | **Have used this tool in the past; but not currently** | **Have heard of it but have not used it; I am curious** | **Have heard of it but have not used it; I don't think it would work** | **Have not heard of it before** | **No response (left blank)** |
| **Pesticides** | | | | | | |
| Entrust | 0 | 8 | 42 | 8 | 42 | 0 |
| Dipel/Foray | 0 | 8 | 25 | 17 | 50 | 0 |
| Pyganic | 0 | 0 | 33 | 0 | 58 | 8 |
| Mineral Oil/Dormant Oil | 8 | 25 | 58 | 0 | 0 | 8 |
| Actinovate | 0 | 8 | 17 | 0 | 75 | 0 |
| Serenade or Sonata | 0 | 8 | 17 | 0 | 75 | 0 |
| Copper (e.g. Parasol) | 58 | 25 | 8 | 0 | 8 | 0 |
| Horticultural vinegar | 17 | 8 | 50 | 8 | 17 | 0 |
| Insecticidal Soap | 8 | 17 | 50 | 8 | 17 | 0 |
| | | | | | | |
| **Physical controls** | | | | | | |
| Flame weeding | 0 | 8 | 33 | 42 | 8 | 8 |
| Hand weeding | 75 | 17 | 0 | 8 | 0 | 0 |
| Weed mats (plastic/ mulches) | 25 | 8 | 17 | 8 | 25 | 17 |
| | | | | | | |
| **Biological controls** | | | | | | |
| Beneficial nematodes (e.g. for weevils OR girdler) | 75 | 17 | 8 | 0 | 0 | 0 |
| Natural enemy release (e.g. predator mites, ladybugs, parasitoid wasps) | 8 | 17 | 67 | 0 | 8 | 0 |
| Conservation of natural enemies (e.g. planting flowers) | 17 | 8 | 58 | 8 | 8 | 0 |

| | | | | | | |
|---|---|---|---|---|---|---|
| **Organic fertilizers** | | | | | | |
| Compost/manure | 17 | 0 | 42 | 42 | 0 | 0 |
| Blood/feather meal | 0 | 0 | 67 | 25 | 8 | 0 |
| Fish emulsion | 50 | 8 | 33 | 8 | 0 | 0 |
| Plant extracts (alfalfa, soybean, kelp meal) | 8 | 8 | 67 | 8 | 8 | 0 |

Table 5b. Grower experience with commonly used organic control tools– **CRANBERRIES -organic**

| | **% of responses** | | | | | |
|---|---|---|---|---|---|---|
| | **Currently use this tool** | **Have used this tool in the past; but not currently** | **Have heard of it but have not used it; I am curious** | **Have heard of it but have not used it; I don't think it would work** | **Have not heard of it before** | **No response (left blank)** |
| **Pesticides** | | | | | | |
| Entrust | 100 | 0 | 0 | 0 | 0 | 0 |
| Dipel/Foray | 0 | 25 | 25 | 25 | 25 | 0 |
| Pyganic | 25 | 0 | 75 | 0 | 0 | 0 |
| Mineral Oil/Dormant Oil | 0 | 0 | 50 | 25 | 25 | 0 |
| Actinovate | 0 | 0 | 25 | 25 | 50 | 0 |
| Serenade or Sonata | 0 | 25 | 0 | 25 | 50 | 0 |
| Copper (e.g. Parasol) | 0 | 50 | 0 | 25 | 25 | 0 |
| Horticultural vinegar | 100 | 0 | 0 | 0 | 0 | 0 |
| Insecticidal Soap | 75 | 0 | 25 | 0 | 0 | 0 |
| | | | | | | |
| **Physical controls** | | | | | | |
| Flame weeding | 50 | 50 | 0 | 0 | 0 | 0 |
| Hand weeding | 100 | 0 | 0 | 0 | 0 | 0 |
| Weed mats (plastic/ mulches) | 0 | 25 | 0 | 50 | 0 | 25 |
| | | | | | | |
| **Biological controls** | | | | | | |
| Beneficial nematodes (e.g. for weevils OR girdler) | 0 | 0 | 100 | 0 | 0 | 0 |
| Natural enemy release (e.g. predator mites, ladybugs, parasitoid wasps) | 0 | 25 | 75 | 0 | 0 | 0 |
| Conservation of | 25 | 0 | 75 | 0 | 0 | 0 |

| | | | | | | |
|---|---|---|---|---|---|---|
| natural enemies (e.g. planting flowers) | | | | | | |
| | | | | | | |
| **Organic fertilizers** | | | | | | |
| Compost/manure | 100 | 0 | 0 | 0 | 0 | 0 |
| Blood/feather meal | 0 | 50 | 25 | 25 | 0 | 0 |
| Fish emulsion | 25 | 50 | 25 | 0 | 0 | 0 |
| Plant extracts (alfalfa, soybean, kelp meal) | 25 | 0 | 25 | 0 | 50 | 0 |

*Blueberries:* Of the 19 organic control tools listed, 17 were reported as currently used by one or more conventional growers. Organic growers had familiarity with or were interested in using all of the control tools listed. The only organic control tool listed that organic growers did not think would work was weed mat - they explained that weed mat interferes with nutrient management programs (compost/mulch/manure/sawdust applications are compromised) and also creates habitat for rodents. However, a weed mat that is "zippered" (laid over the row from either side and secured in the middle with removable pins so it can be easily opened to apply soil amendments) has been tested in field trials in Oregon with success (Strik 2013), and may prove to be a valuable weed control tool for some growers. Both conventional and organic blueberry growers expressed interest in biological insect pest controls: 50% of conventional growers were interested in natural enemy release and 63% were interested in conservation of natural enemies (Table 5c). Sixty percent of organic growers reported using conservation of natural enemies as an insect management tool, and 100% were interested in using natural enemy releases (Table 5d). There are a number of aphid parasitoids that are naturally occurring in blueberry fields (Raworth *et al*. 2008) and conservation biocontrol efforts could focus on these species. Recent work in some blueberry growing regions has begun to focus on conservation biocontrol practices such as ground cover management to improve habitat and impact of natural enemies like ground beetles in blueberries (O'Neal *et al.* 2005).

Table 5c. Grower experience with commonly used organic control tools– **BLUEBERRIES - conventional**

| | **% of responses** | | | | | |
|---|---|---|---|---|---|---|
| | **Currently use this tool** | **Have used this tool in the past; but not currently** | **Have heard of it but have not used it; I am curious** | **Have heard of it but have not used it; I don't think it would work** | **Have not heard of it before** | **No response (left blank)** |
| **Pesticides** | | | | | | |
| Entrust | 25 | 0 | 38 | 25 | 13 | 0 |
| Dipel/Foray | 38 | 0 | 50 | 0 | 13 | 0 |
| Pyganic | 0 | 13 | 63 | 0 | 25 | 0 |
| Mineral Oil/Dormant Oil | 50 | 25 | 13 | 0 | 0 | 13 |
| Actinovate | 13 | 0 | 63 | 0 | 25 | 0 |
| Serenade or Sonata | 63 | 13 | 25 | 0 | 0 | 0 |
| Copper (e.g. Parasol) | 63 | 25 | 13 | 0 | 0 | 0 |

| | | | | | | |
|---|---|---|---|---|---|---|
| Horticultural vinegar | 13 | 13 | 50 | 25 | 0 | 0 |
| Insecticidal Soap | 25 | 0 | 38 | 25 | 13 | 0 |
| | | | | | | |
| **Physical controls** | | | | | | |
| Flame weeding | 13 | 25 | 38 | 25 | 0 | 0 |
| Hand weeding | 75 | 25 | 0 | 0 | 0 | 0 |
| Weed mats (plastic/ mulches) | 38 | 0 | 50 | 13 | 0 | 0 |
| | | | | | | |
| **Biological controls** | | | | | | |
| Beneficial nematodes (e.g. for weevils OR girdler) | 13 | 0 | 63 | 13 | 13 | 0 |
| Natural enemy release (e.g. predator mites, ladybugs, parasitoid wasps) | 25 | 13 | 50 | 13 | 0 | 0 |
| Conservation of natural enemies (e.g. planting flowers) | 13 | 13 | 63 | 13 | 0 | 0 |
| | | | | | | |
| **Organic fertilizers** | | | | | | |
| Compost/manure | 63 | 13 | 25 | 0 | 0 | 0 |
| Blood/feather meal | 13 | 13 | 38 | 25 | 13 | 0 |
| Fish emulsion | 25 | 25 | 38 | 13 | 13 | 0 |
| Plant extracts (alfalfa, soybean, kelp meal) | 0 | 13 | 63 | 13 | 13 | 0 |

Table 5d. Grower experience with commonly used organic control tools –**BLUEBERRIES - organic**

| | **% of responses** | | | | | |
|---|---|---|---|---|---|---|
| | **Currently use this tool** | **Have used this tool in the past; but not currently** | **Have heard of it but have not used it; I am curious** | **Have heard of it but have not used it; I don't think it would work** | **Have not heard of it before** | **No response (left blank)** |
| **Pesticides** | | | | | | |
| Entrust | 60 | 0 | 40 | 0 | 0 | 0 |
| Dipel/Foray | 40 | 20 | 20 | 0 | 20 | 0 |
| Pyganic | 40 | 20 | 20 | 0 | 20 | 0 |
| Mineral Oil/Dormant Oil | 20 | 20 | 60 | 0 | 0 | 0 |
| Actinovate | 40 | 20 | 20 | 0 | 20 | 0 |
| Serenade or Sonata | 40 | 20 | 40 | 0 | 0 | 0 |
| Copper (e.g. | 40 | 20 | 40 | 0 | 0 | 0 |

| | | | | | | |
|---|---|---|---|---|---|---|
| Parasol) | | | | | | |
| Horticultural vinegar | 60 | 20 | 20 | 0 | 0 | 0 |
| Insecticidal Soap | 20 | 0 | 80 | 0 | 0 | 0 |
| | | | | | | |
| **Physical controls** | | | | | | |
| Flame weeding | 40 | 20 | 40 | 0 | 0 | 0 |
| Hand weeding | 100 | 0 | 0 | 0 | 0 | 0 |
| Weed mats (plastic/ mulches) | 20 | 0 | 40 | 40 | 0 | 0 |
| | | | | | | |
| **Biological controls** | | | | | | |
| Beneficial nematodes (e.g. for weevils OR girdler) | 0 | 0 | 100 | 0 | 0 | 0 |
| Natural enemy release (e.g. predator mites, ladybugs, parasitoid wasps) | 0 | 0 | 100 | 0 | 0 | 0 |
| Conservation of natural enemies (e.g. planting flowers) | 60 | 0 | 40 | 0 | 0 | 0 |
| | | | | | | |
| **Organic fertilizers** | | | | | | |
| Compost/manure | 80 | 0 | 20 | 0 | 0 | 0 |
| Blood/feather meal | 60 | 0 | 40 | 0 | 0 | 0 |
| Fish emulsion | 60 | 20 | 20 | 0 | 0 | 0 |
| Plant extracts (alfalfa, soybean, kelp meal) | 40 | 20 | 40 | 0 | 0 | 0 |

Organic Management Tools - Organic grower responses and literature review

The second part of the organic survey included a series of interview questions on insect/mite, weed and disease management. Organic grower responses have been compiled along with organic management practices found in the literature review and common practices used here or in other regions (Tables 6a and 6b).

*Cranberries:* Quebec and British Columbia are significantly different growing regions in terms of climate, so pest pressure is also different. Winters are relatively mild in western Canada allowing more insect pests to survive. Interestingly, organic growers interviewed in Quebec reported that tipworm and girdler are not pest issues on their farms, though they are considered major pests in that province (Le Duc *et al.* 2004). However, there are pests in Eastern Canada that are not present in BC such as cranberry

weevil, cranberry blossomworm and red-headed flea beetle (Le Duc *et al.* 2004). Diseases are not typically an issue in Quebec (Le Duc *et al.* 2004) and none of the organic growers surveyed use fungicides. In Western Canada, fungicide applications and good cultural practices usually keep diseases under control (Maurice *et al.* 2000). An important difference between BC and Quebec cranberry production is related to property values – because the price of land is lower in Quebec, organic growers able to afford to plant narrower fields and allow for paths through the fields for ease of access with equipment (Figs 1 and 2). Narrow fields enable spraying pesticides using a boom rather than relying on chemigation. Growers interviewed mentioned that using a boom is beneficial because it allows for more thorough coverage of cranberry beds and increases product efficacy - the concern being that organically approved pesticides are at risk of over-dilution when chemigation is used. If chemigation is the only option for delivering biopesticides such as Entrust, a shorter duration of application (versus what is typically used for broad-spectrum synthetic insecticides) should be implemented to improve the product efficacy (Prasad *et al*. 2010).

Figure 1. Sprayer

Figure 2. Gravel paths through bog for sprayer access (Photos: M. Dessureault)

Table 6a: Organic management tools - **CRANBERRIES**

| | **Management options – Organic respondents** | **Management options– literature review, registered tools, common practices** | **Management options - potential future control tools** |
|---|---|---|---|
| **INSECTS** | | | |
| Fireworm | -Entrust<br>-Pyganic<br>-Trounce (QC). Used early in season for first generation fireworm. | -Entrust (registered) | -mating disruption using pheromones, use limited to small farms (<10 ac) (Fitzpatrick *et al.* 2004)<br>-Trichogramma (not yet commercially available) (Bourchier and Smith 1996; Dutton *et al.* 1996; Smith 1996)<br>-Pyganic (need efficacy data for registration) |

| | | | |
|---|---|---|---|
| Tipworm | Not an issue – no excess N | -limit overgrowth and N excess<br>-preserving natural enemies | -Pyganic and Entrust (need efficacy data for registration) |
| Weevil | Not an issue | -nematodes (Bruck *et al.* 2005; Georgis *et al.* 2006; Booth *et al.* 2002)<br>-flooding | -Met52 (*Metarhizium anisopliae)* |
| Girdler | Not an issue | -nematodes (commercially available biocontrol, commonly used in BC)<br>-flooding (Fitzpatrick 2007)<br>-sanding | -Met52 (*Metarhizium anisopliae)* |
| Cranberry fruitworm | -Entrust<br>-Fall flooding | -fall flooding (DeMoranville *et al.* 2005)<br>-Entrust (registered) | -Pyganic (need efficacy data for registration) |
| Scale | Not an issue | -preserving natural enemies | |
| Sparganothis | Not an issue | -removal of host weed species (yellow loosestrife) (Marucci 1977)<br>-Entrust (registered)<br>-preserving natural enemies | -Pyganic (need efficacy data for registration) |
| **DISEASES** | | | |
| Cottonball | -compost tea; applied every 2-3 weeks (WA) | -removal and destruction of infected fruit during harvest | -Actinovate, Serenade and Regalia (need efficacy data for registration) |
| Twig blight | -compost tea; applied every 2-3 weeks (WA) | -Copper (registered)<br>-avoid shading | -Actinovate, Serenade and Regalia (need efficacy data for registration) |
| Rosebloom | Not an issue | -improve drainage<br>-avoid shading<br>-limit overgrowth and excess N<br>-Copper | -Actinovate, Serenade and Regalia (need efficacy data for registration) |
| Red leaf spot | Not an issue | -avoid shading<br>-frost protection<br>-limit overgrowth and N | -Actinovate, Serenade and Regalia (need efficacy data for registration) |

| | | | |
|---|---|---|---|
| | | excess | |
| Fruit rot | Not an issue | -good water management<br>-pruning<br>-minimizing damage to fruit<br>-good post-harvest practices (drying of fruit, optimizing storage conditions, etc.) | -Actinovate, Serenade and Regalia (need efficacy data for registration) |
| **WEEDS** | | | |
| | -hand weeding using a ramp<br>-horticultural vinegar<br>-Avenger (citrus oil)<br>-flame weeding<br>-"washing" plants before planting to remove weed seeds<br>-keep pH low | -flame weeding (Ghantous 2010)<br>-flooding (Sandler and Mason 2010) | -fungal bioherbicides (e.g. *Phoma macrostoma*)<br>-plant/oil derived bioherbicides (e.g. pepper plants, lemon grass oil, clove oil, cinnamon oil and citrus oil)<br>-Herbicidal soap (salts of fatty acids) |
| **FERTILITY** | | | |
| | -compost tea<br>-fish emulsion<br>-kelp<br>-feather meal<br>-pelletized chicken manure (Actisol)<br>-Biochar<br>-Potassium sulphate<br>-gypsum<br>-Boron and Copper if needed | -compost<br>-manure<br>-fish fertilizer (DeMoranville *et al.* 1993) | |

*Blueberries:* Spotted Wing Drosophila (SWD) has been a major pest concern in blueberries in recent years, and is often named as the reason that organic berry production is not feasible for BC growers. While SWD was identified by organic growers as one of the more challenging pests to manage, none of the four growers interviewed had experienced significant enough crop losses to threaten the viability of their organic production, likely due to diligent monitoring (Fig. 3) for optimal spray timing as well as frequent harvesting. Organic growers are heavily reliant on one product with known efficacy (Entrust) to control SWD, which is cause for concern over the development of resistance. Resistance to Entrust has already been documented in California for SWD (Schrieber 2013), which underscores the importance of prudent use of available insecticides and the need for development of new products for SWD in organic berries. Another issue organic growers are facing is getting through the entire harvest period with maximum use limitations on Entrust – late season varieties may not be protected if the maximum amount of product that can be applied per season has been reached before harvest is over. One tactic to managing SWD in organic blueberries that may work for some growers is planting early season varieties like Duke, as the fruit ripening period occurs before the SWD pest pressure gets very high later in the season and

fewer insecticide applications may be needed (Schrieber 2013). Organic growers have their own innovative strategies for managing SWD. For example, one grower used jugs (approx. 10L) filled with a yeast bait mixture around the perimeter of his field to attract and trap SWD (Fig. 4).

Figure 3 (left) and Figure 4 (right). Yeast-baited hanging traps for SWD monitoring (left) and "Bait and kill" 10L jugs along field perimeter (right) for SWD suppression in organic Washington blueberries. (Photos: M. Dessureault)

Table 6b: Organic management tools – **BLUEBERRIES**

| | **Management options – Organic respondents** | **Management options– literature review, registered tools, common practices** | **Management options - potential future control tools (more research needed)** |
|---|---|---|---|
| **INSECTS** | | | |
| Spotted Wing Drosophila | -Entrust<br>-Pyganic<br>-traps (baited jugs around field perimeter)<br>-diligent monitoring (vinegar or yeast baited traps)<br>-short picking intervals<br>-Oxidate – some efficacy (anecdotal) | -Entrust (emergency registration)<br>-Pyganic (emergency registration, poor efficacy reported) (Schrieber 2013)<br>-planting early season varieties (Duke, Reka, Earliblue) | -biological controls (wasps, entomopathogenic fungi)<br>- Grandevo bioinsecticide (Schrieber 2013) |
| Aphids (Scorch virus vector) | None needed – no Blueberry Scorch Virus pressure. | -preservation of natural enemies (parasitic wasps, syrphid flies, lacewings) (MacFadyen *et al.* 2009; Raworth *et al.* 2008)<br>-insecticidal soap (Tremblay *et al.* 2009)<br>-Pyganic (registered) | |
| Weevils | Not an issue | | -Nematodes (more research needed on |

| | | | |
|---|---|---|---|
| | | | application methods) |
| Caterpillars (spanworm, OBLR) | -Dipel<br>-Entrust | -preservation of natural enemies (parasitic wasps, spiders) (Krugner *et al.* 2007; Lucas *et al.* 2004; McGregor *et al.* 1998)<br>-Dipel/Foray (registered)<br>-Entrust (registered) | -Pyganic (need efficacy data for registration) |
| Midge | Not an issue | -preservation of natural enemies (parasitic wasps) (Sampson *et al.* 2002, Sampson *et al.* 2006) | -Pyganic and Entrust (need efficacy data for registration) |
| **DISEASES** | | | |
| Mummyberry | -Regalia<br>-Actinovate<br>-Serenade<br>-ground spray with lime sulphur in spring<br>-diligent monitoring in spring<br>-planting resistant varieties<br>-mulching | -planting resistant varieties (Stretch *et al.* 2000)<br>-Serenade (registered) (Teasdale 2009; Scherm *et al.* 2004)<br>-Actinovate (registered)<br>-mulching | -honeybee delivery of Serenade to blueberry flowers (Dedej *et al.* 2004)<br>-BlightBan A506 (Langdon 2008) |
| Botrytis | -Kaligreen + sulphur<br>-Oxidate<br>-Serenade | -Serenade (registered) | -BlightBan A506 (Langdon 2008)<br>-Actinovate and Regalia (need efficacy data for registration) |
| Bacterial blight | -Copper<br>-Oxidate<br>-Serenade | -Serenade (registered)<br>-pruning | -BlightBan A506<br>-Actinovate and Regalia (need efficacy data for registration) |
| Canker | Not an issue | -pruning<br>-planting resistant varieties (Baker and Hancock 1995) | -Actinovate, Serenade and Regalia (need efficacy data for registration) |
| **WEEDS** | | | |
| | -Avenger (citrus oil)<br>-Vinegar<br>-Manuka oil<br>-weed mat<br>-flame weeding<br>-specialized cultivator<br>-hand weeding<br>-mulching with sawdust; separated dairy solids | -horticultural vinegar<br>-hand weeding<br>-sawdust applications<br>-cultivating<br>-flame weeding<br>-weed mat (Strik 2013) | -fungal bioherbicides (e.g. *Phoma macrostoma*)<br>-plant/oil derived bioherbicides (e.g. pepper plants, lemon grass oil, clove oil, cinnamon oil and citrus oil)<br>-Herbicidal soap (salts of fatty acids) |

| | | | |
|---|---|---|---|
| | -mowing | | |
| **FERTILITY** | | | |
| | -manure<br>-compost<br>-compost tea<br>-feather meal<br>-separated dairy solids<br>-pelletized chicken manure<br>-fish emulsion<br>-kelp extract<br>-sawdust<br>-clover between rows<br>-Boron as needed<br>-Humic acid | -compost (various sources) (Montalba *et al.* 2010; Costello 2011; Warman *et al.* 2004)<br>-mycorrhizal fungi (Scagel 2005; Yang *et al.* 2002)<br>-Fish and kelp extracts | |

*Research needs:* Organic growers were asked if there are any pest issues that do not currently have effective management tools approved for organic production. Cranberry growers reported weed management as the most difficult aspect of organic production, and even though there are several organic-approved tools available, the industry would benefit from further research to bring new products onto the market. Blueberry growers named mummyberry and SWD as the most challenging pests to manage in organic production; also in need of research to expand the products available for organic management.

*Organic vs. conventional approach to blueberry and cranberry production:* Organic growers pointed out that their tolerance levels for pests and disease are likely higher than their conventional counterparts; and that this is something to keep in mind when considering transitioning to organic. The currently available organic-approved tools for blueberry and cranberry crops are generally effective at keeping pests and diseases at a level acceptable for small scale organic production, but may not provide the same level of control that conventional growers have come to expect with chemical conventional pesticides. In addition, a holistic approach is a fundamental part of organic farming, and several organic growers stressed the importance of soil health and soil structure as a key factor for successful organic production. By focusing management efforts on overall soil and plant health, some growers were able to adopt a more "hands-off" pest management approach, and two of the four organic blueberry growers surveyed use no biopesticides for insect or disease control.

Another important difference between an organic and a conventional approach is marketing and branding of the product. For example, the organic cranberry farm in Oregon supplies a local restaurant with raw cranberry juice designed specifically for cocktails, and one of the organic blueberry growers interviewed

in Washington had expanded into value-added products like jams, dried fruit or candies as well as "grazing passes" for farm visitors and a seasonal "rent-a-bush" program where customers would be able to harvest fruit from "their" bush all season long (Fig. 5). While not feasible for all growers, targeted niche marketing may be a way that some conventional growers could gain experience with organic production practices, diversify their marketing, or develop value added components to total farm revenue.


Figure 5. "Rent-a-bush" program at an organic Washington blueberry farm (Photo: M. Dessureault)

**Next Steps:**

This project was the first step in identifying the main concerns growers have about transitioning to organic cranberry and blueberry production, and the potential solutions. Organic growers identified weed management for cranberries and Spotted Wing Drosophila and mummyberry for blueberries as the pest issues most in need of research and more control tools. Future work should focus on developing the following:

- Weed control program that would include the use of bioherbicides
- Weed control program using zippered weed mats
- Spotted Wing Drosophila control program that would include conservation and release of natural enemies
- Registration of bioinsecticides, especially for control of cranberry tipworm and caterpillar pests in cranberries and Spotted Wing Drosophila in blueberries
- Registration of biofungicides for disease control in blueberries and cranberries
- Effective delivery of product for cranberry production (alternatives to chemigation or increasing the efficacy of chemigation)
- Development of effective application methods for nematodes for weevil control in blueberries.

For growers interested in transitioning to organic blueberry or cranberry production, the control tools and knowledge necessary to sufficiently manage key insect pests, diseases, weeds and fertility are readily available. While there remain management issues that would benefit from further research and a broader range of approved control options, there were no issues identified by organic growers that preclude organic blueberry or cranberry production in the Pacific Northwest. Information about organic production and management gathered from these producers will enable producers here in BC with smaller acreages to begin the transition to organic production with a solid knowledge and resource base. However, without a change in overall production practices and tolerances, e.g. narrower fields in cranberries, more product availability for disease and insect control, and development of direct-marketing and value-added products,

large-scale production (e.g. 100+ acres) of blueberries and cranberries continues to be a challenge that will require long-term development in industry capacity.

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Ferme Atobec, Saint-Rosaire, QC
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Susan Smith, BC Ministry of Agriculture, Abbotsford, BC
Silver Valley Farms, Maple Ridge, BC
Bremner Foods Ltd., Delta, BC
Earthbound Farm Organic, San Juan Bautista, CA

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Appendix I

Industry Survey:

This short survey is part of a project aimed at identifying the gaps or barriers to organic blueberry and cranberry production in BC. Thank you for your time in helping us to collect this information for the Organic Sector Development Program.

-Marjo Dessureault and Kristine Ferris (E.S. Cropconsult Ltd.)

1. Do you currently buy/process organic cranberries and/or blueberries? **YES/NO**

If **NO**:

Would you be interested in buying/processing organic cranberries and/or blueberries produced in British Columbia? Why or why not (lack of quality, lack of volume, storage life, other reasons)?

If **YES:**

Would you be interested in increasing the volume of organic blueberries and/or cranberries you buy/process if there were more produced in BC? Why or why not?

What kind of product(s) do you specialize in buying/processing (ex. fresh, IQF, juice, other)?

Where is your berry processing facility located?

Is there a minimum volume per grower (or grower group) that you would require in order to buy/process organic blueberries/cranberries from BC?

Appendix II

Conventional Survey: Conventional **CRANBERRY** growers: ranking of factors that could be barriers to organic production. Top 3 average rankings (biggest barriers to organic production) are in bold font.

| | **% respondents for each ranking (0 to 3)** | | | | | | |
|---|---|---|---|---|---|---|---|
| **Factor** | **0 (not a barrier)** | **1** | **2** | **3 (major barrier)** | **"I don't know"** | **No response (left blank)** | **Average ranking** |
| Risk of crop loss, quality | 0 | 0 | 50 | 42 | 8 | 0 | **2.45** |
| Access to processing facilities | 33 | 0 | 33 | 33 | 0 | 0 | 1.67 |
| Labour costs | 17 | 8 | 17 | 50 | 0 | 8 | 2.09 |
| Equipment needs | 50 | 50 | 0 | 0 | 0 | 0 | 0.50 |
| Organic management knowledge | 17 | 17 | 50 | 17 | 0 | 0 | 1.67 |
| Extension availability | 25 | 17 | 33 | 17 | 8 | 0 | 2.18 |
| Labour availability | 33 | 25 | 8 | 33 | 0 | 0 | 1.42 |
| Marketing | 33 | 33 | 33 | 0 | 0 | 0 | 1.00 |
| Insect/mite management | 8 | 0 | 42 | 50 | 0 | 0 | **2.33** |
| Disease management | 8 | 0 | 50 | 42 | 0 | 0 | 2.25 |
| Weed management | 0 | 17 | 17 | 58 | 0 | 8 | **2.45** |
| Rodent/Bird management | 58 | 25 | 8 | 0 | 0 | 8 | 0.45 |
| Nutrient management | 25 | 42 | 33 | 0 | 0 | 0 | 1.08 |
| Certification process | 25 | 58 | 0 | 17 | 0 | 0 | 1.08 |

Conventional Survey: Conventional **BLUEBERRY** growers: ranking of factors that could be barriers to organic production. Top 3 average rankings (biggest barriers to organic production) are in bold font.

| | **% respondents for each ranking (0 to 3)** | | | | | | |
|---|---|---|---|---|---|---|---|
| | **0 (not a barrier)** | **1** | **2** | **3 (major barrier)** | **"I don't know"** | **No response (left blank)** | **Average ranking** |
| Risk of crop loss, quality | 0 | 0 | 25 | 63 | 13 | 0 | **2.71** |
| Access to processing facilities | 63 | 13 | 0 | 13 | 13 | 0 | 0.57 |
| Labour costs | 25 | 13 | 25 | 38 | 0 | 0 | 1.75 |
| Equipment needs | 63 | 25 | 0 | 13 | 0 | 0 | 0.63 |
| Organic management knowledge | 13 | 25 | 50 | 13 | 0 | 0 | 1.63 |
| Extension availability | 13 | 25 | 25 | 0 | 38 | 0 | 1.20 |
| Labour availability | 38 | 13 | 13 | 38 | 0 | 0 | 1.50 |
| Marketing | 38 | 38 | 0 | 13 | 13 | 0 | 0.86 |
| Insect/mite management | 13 | 0 | 38 | 50 | 0 | 0 | **2.25** |
| Disease management | 0 | 0 | 38 | 50 | 0 | 13 | **2.57** |
| Weed management | 0 | 25 | 38 | 38 | 0 | 0 | 2.13 |
| Rodent/Bird management | 13 | 38 | 38 | 0 | 0 | 13 | 1.29 |
| Nutrient management | 25 | 38 | 25 | 13 | 0 | 0 | 1.25 |
| Certification process | 25 | 25 | 25 | 25 | 0 | 0 | 1.50 |

Appendix III

Organic Survey: Organic **CRANBERRY** growers: ranking of factors that were/are barriers to organic production. Top 3 average rankings (biggest barriers to organic production) are in bold font.

| | **% respondents for each ranking (0 to 3)** | | | | | | |
|---|---|---|---|---|---|---|---|
| | **0 (not a barrier)** | **1** | **2** | **3 (major barrier)** | **"I don't know"** | **No response (left blank)** | **Average ranking** |
| Risk of crop loss, quality | 25 | 50 | 25 | 0 | 0 | 0 | 1.00 |
| Access to processing facilities | 75 | 25 | 0 | 0 | 0 | 0 | 0.25 |
| Labour costs | 0 | 0 | 100 | 0 | 0 | 0 | **2.00** |
| Equipment needs | 50 | 50 | 0 | 0 | 0 | 0 | 0.50 |
| Organic management knowledge | 0 | 50 | 50 | 0 | 0 | 0 | 1.50 |
| Extension availability | 25 | 25 | 25 | 25 | 0 | 0 | 1.50 |
| Labour availability | 75 | 0 | 25 | 0 | 0 | 0 | 0.50 |
| Marketing | 50 | 50 | 0 | 0 | 0 | 0 | 0.50 |
| Insect/mite management | 0 | 0 | 50 | 50 | 0 | 0 | **2.50** |
| Disease management | 75 | 0 | 25 | 0 | 0 | 0 | 0.50 |
| Weed management | 0 | 25 | 0 | 75 | 0 | 0 | **2.50** |
| Rodent/Bird management | 75 | 25 | 0 | 0 | 0 | 0 | 0.25 |
| Nutrient management | 0 | 100 | 0 | 0 | 0 | 0 | 1.00 |
| Certification process | 25 | 50 | 25 | 0 | 0 | 0 | 1.00 |

Organic Survey: Organic **BLUEBERRY** growers: ranking of factors that were/are barriers to organic production. Top 3 average rankings (biggest barriers to organic production) are in bold font.

| | **% respondents for each ranking (0 to 3)** | | | | | | |
|---|---|---|---|---|---|---|---|
| | **0 (not a barrier)** | **1** | **2** | **3 (major barrier)** | **"I don't know"** | **No response (left blank)** | **Average ranking** |
| Risk of crop loss, quality | 20 | 60 | 20 | 0 | 0 | 0 | 1.00 |
| Access to processing facilities | 40 | 20 | 40 | 0 | 0 | 0 | 1.00 |
| Labour costs | 0 | 20 | 80 | 0 | 0 | 0 | **1.80** |
| Equipment needs | 80 | 0 | 20 | 0 | 0 | 0 | 0.40 |
| Organic management knowledge | 0 | 60 | 0 | 20 | 0 | 0 | **1.80** |
| Extension availability | 20 | 20 | 20 | 20 | 20 | 0 | 1.50 |
| Labour availability | 40 | 20 | 20 | 20 | 0 | 0 | 1.00 |
| Marketing | 80 | 20 | 0 | 0 | 0 | 0 | 0.20 |
| Insect/mite management | 40 | 40 | 0 | 20 | 0 | 0 | 1.00 |
| Disease management | 20 | 40 | 0 | 20 | 0 | 20 | 1.00 |
| Weed management | 0 | 40 | 20 | 40 | 0 | 0 | **2.00** |
| Rodent/Bird management | 80 | 20 | 0 | 0 | 0 | 0 | 0.20 |
| Nutrient management | 40 | 40 | 0 | 20 | 0 | 0 | 1.00 |
| Certification process | 60 | 20 | 0 | 20 | 0 | 0 | 0.80 |

Organic Survey: Interview questions for organic blueberry and cranberry growers

**This section of the questionnaire is designed to learn about management practices for organic blueberry or cranberry production.**

How do you market your organic berries?

What % difference in payment do you expect for organic vs. conventional berries?

Do you want to expand your organic production? Why or why not?

What are the main tools used on your farm for insect control (go over a typical annual insect control program)?

What are the main tools used on your farm for disease control (go over a typical annual disease control program)?

What are the main tools you use for weed control (go over a typical annual weed control program)?

What types of organic fertilizers do you use (go over a typical annual nutrition program)?

Did you experience any problems related to infrastructure or equipment needs when transitioning to organic production?

Are there any pests (insect/mite, disease or weed) that DO NOT currently have effective management tools approved for organic production?

# Organic blueberry and cranberry production in BC: Gaps Analysis

Funding provided by:

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## Background

The majority of cranberry and blueberry production in BC is conventional and large scale organic production is limited. Although some growers are interested in transitioning to organic, very little acreage has been converted in BC while other regions of Canada (Quebec) and the Pacific Northwest (Washington state and Oregon) have succeeded at this task. 55% of the organic blueberries harvested in the US in 2008 were from certified organic farms in Washington state (Geisler, 2013), and about 400 acres of organic cranberries are grown in Quebec plus a smaller acreage in Oregon (Figs 1 and 2).

Figure 1. Organic cranberries in Quebec

Figure 2. Organic blueberries in Washington

- Production cost for organic may be higher than conventional
- Pest and nutrient management may be more challenging, however:
- The potential long term returns are appealing
- There is potential for expansion of organic berry production in BC

In order to address concerns about transitioning to organic production, a study was conducted that surveyed conventional and organic blueberry and cranberry growers.

## Study Objectives

1) To identify the gaps/barriers that cranberry and blueberry growers are faced with when transitioning to organic
2) To identify potential solutions for those barriers
3) To investigate the market for organic cranberry and blueberry in Coastal BC.

## Methods

Activities:

- Literature review
- Survey 1: Local conventional blueberry and cranberry growers
- Survey 2: Organic blueberry and cranberry growers or industry experts from the Fraser Valley, Quebec, Washington and Oregon
- Survey 3: Packers/processors/distributors of organic produce

Survey distribution

- Survey 1 was distributed in-person, by fax/email or as an insert in a newsletter to approx. 700 blueberry growers and 70 cranberry growers
- Survey 2 was distributed in-person during trips to Quebec, Washington and Oregon to 4 blueberry growers, 4 cranberry growers and 2 industry experts
- Survey 3 was distributed in-person or by email to 7 packers/processors/distributors

## Results

Surveys 1 and 2: Ranking of barriers to organic production

- 50% of factors were ranked as more challenging by conventional blueberry growers than organic
- 79% of factors were ranked as more challenging by conventional cranberry growers than organic

Table 1. Top 3 barriers to successful organic production (with ranking); conventional vs. organic responses; 0 (not a barrier) to 3 (major barrier)

| **Blueberry growers** | | **Cranberry growers** | |
|---|---|---|---|
| Conventional | Organic | Conventional | Organic |
| **1)** Risk of crop loss; quality: 2.71<br>**2)** Disease management: 2.57<br>**3)** Insect/mite management: 2.25 | **1)** Weed management: 2.25<br>**2)** Organic management knowledge: 2.00<br>**3)** Labour costs: 2.00 | **1)** Risk of crop loss; quality: 2.45<br>**2)**Weed management: 2.45<br>**3)** Insect/mite management: 2.33 | **1)** Weed management: 2.50<br>**2)** Insect/mite management: 2.50<br>**3)** Labour costs: 2.00 |

Surveys 1 and 2: Organic management knowledge

Conventional and organic growers indicated their experience with a list of organic control tools:

- 75% of conventional cranberry growers and 35% of conventional blueberry growers had never heard of 1 or more of the commonly used organic control tools listed
- 92% of conventional cranberry growers and all conventional blueberry growers expressed interest in learning more about at least one of the organic control tools listed
- Organic growers are able to control pests to an acceptable level with available control tools and their own ingenuity (Figs 3 – 5)

Figure 3. "Hillside cultivator" used in organic blueberries (WA)

Figure 4. Weeding in organic cranberries (QC)

Figure 5. SWD 'bait and kill' style trap in organic blueberries (WA)

Survey 3: Market for BC organic blueberries and cranberries

- All packers/processors expressed interest in buying organic berries
- They expressed concern that there are not enough locally produced organic berries
- There needs to be a minimum volume of 20,000 lbs per grower/grower group to make buying/processing organic berries worthwhile
- BC organic market is the strongest in Canada, accounting for 22% of national organic food and beverage sales, and over 40% of organic retail sales are fresh fruit and vegetables (Mackinnon, 2013).

## Further research needs identified by growers

- Blueberry: Spotted Wing Drosophila and Mummyberry – control
- Cranberry: weed management– more products are needed