

Blueberry Scorch Virus

March, 2016

Blueberry scorch virus (BIScV) was first found in B.C. in 2000, but it is likely that BIScV was present in B.C. several years earlier. It is now widespread in all blueberry growing areas of the province. Severity of the symptoms depends on the cultivar and viral strain, but all highbush blueberry varieties grown in B.C. appear to be susceptible. BIScV can cause severe blossom and leaf blighting, and decreased yields. Once infected, plants do not recover. Infected plants show symptoms each year, and should be removed. BIScV is spread by aphids or by planting infected stock.



Figure 1. Blighted blossoms
Photo credit: E.S. Cropconsult



Figure 2. BIScV infected bush next to healthy plants
Photo credit: E.S. Cropconsult

Symptoms

- The best time to look for symptoms of blueberry scorch is during bloom. Monitor your fields carefully at this time.
- In the most severe cases, blossoms and leaves rapidly blight and dry up following early bloom. Sometimes only blossoms are blighted, or only a few infected shoots may be observed.
- Blighted blossoms and leaves remain attached to green stems.
- Blueberry scorch symptoms can resemble blueberry shock, mummy berry, frost damage, bacterial blight, spanworm damage or other diseases. Laboratory testing is required for a proper diagnosis.
- Symptoms usually develop 1-2 years after infection. This period is called the latent period (the length of time it takes for the virus to build up to detectable levels in the plant following infection).
- Symptomless plants are often found next to diseased ones.

Symptoms (cont.)

- BISCv infected plants decline and die-back over a period of years.
- Infected plants never regain normal productivity.
- As the season progresses, plants may put out new growth that appears to be healthy, but remain infected with the virus.
- In some cases, infected plants may show few or no symptoms, but all varieties are susceptible to infection.
- 'Bluecrop' plants may show only subtle symptoms, or show no symptoms at all. Infected 'Bluecrop' foliage may be a paler green than that of healthy plants. They do not usually show the blighting and dieback symptoms that are more common with other varieties. Although symptoms on these bushes may be slight, the infected bushes have lower yields. They produce fewer blossoms and smaller fruit.
- Other signs of infection can include red line patterns on leaves (oak leaf patterning) in the fall, yellowing of leaf margins, leaf mottling, overall pale color, low number of blossoms, or even a 'twiggy' appearance. **If anything looks suspicious, have it tested.**
- All parts of the plant become infected, even the roots. If an infected plant is mowed down, the new shoots will still be infected with the virus.



Figure 3. Blossom blighting



Figure 4. Leaf blighting on 'Northland' variety



Figures 5 and 6. Healthy 'Bluecrop' (left) versus Scorch Virus infected 'Bluecrop' (right). Note the lack of fruit and pale leaf colour on the infected bush. Photo credit (Figs. 3-6): BC Blueberry Council.



Figure 7. Regrowth on mowed BISCv infected plants. The new shoots will act as a source of infection as long as these plants remain in the field. Photo credit: BC Blueberry Council.



Figure 8. Infected 'Bluecrop' plants that are slightly yellower than surrounding, healthy plants. Photo credit: E.S. Cropconsult.

Management Strategies

1. **Monitoring.** All blueberry fields should be carefully monitored starting at bloom time for blossom and shoot blighting and other scorch-like symptoms.
2. **Test plants with any suspicious symptoms.** Send leaves from suspicious plants to the Ministry of Agriculture Plant Health Laboratory (or other qualified lab) for testing to confirm whether the virus is present. Collect at least 10 fresh leaves per bush, as close to the affected (symptomatic) region as possible. BISCv samples submitted to the lab must be accompanied by a BISCv laboratory submission form. Growers can submit up to 10 samples per field, free of charge.
3. **Remove infected plants.** Infected plants should be removed as soon as possible and destroyed. Infected plants should be removed entirely including roots. Infected plants that are left in the field will act as a source of virus infection for surrounding, healthy plants. In the absence of plant removal and/or aphid control, the virus can spread through a field at a rate of 5% per year. Whole fields will eventually become infected and non-productive.
4. **Aphid control.** BISCv is transmitted by aphids (vector). In growing regions where scorch is present, all growers should follow an effective aphid control program. All fields should be treated before bloom with a registered aphicide to control the over-wintering aphids before they reproduce and disperse. After bloom, monitor fields for aphids and, if necessary, apply aphicide before populations increase. Scout several locations in each field, especially around field borders. Do not spray until after bees have been removed from the field, and be sure to follow pre-harvest intervals as indicated on the aphicide labels. Refer to the BC Berry Production Guide for further information on pesticide recommendations and management of aphids.
5. Start with clean plants. Do not propagate infected plants. All mother plants should be tested for BISCv prior to propagating. Aphid control is critical throughout all phases of propagation to prevent virus introduction and spread. **Only purchase planting stock from reputable nurseries that follow an accepted propagation protocol, including virus testing.**

The following products are recommended for aphid control:

Timing	Product	Rate (see label)
Pre- or post-bloom application	Fulfill	(50% pymetrozine) at 193 g/ha (77g/acre) for overwintering aphid control prior to bloom. Fulfill can be used post-harvest if aphid population increases. Do not apply more than twice per season. Do not apply within 85 days of harvest.
	Exirel	(100 g/L cyantraniliprole) at 750 – 1500 mL/ha (i.e. 300 – 600 mL/acre). Use the high rate at high insect pressure. Toxic to bees. Do not apply at bloom when bees are present. Do not apply more than four times per season. Do not apply within 3 days of harvest.
	Sivanto Prime	(200 g/L flupyradifurone) at 500 – 750 mL/ha (i.e. 196 – 295 mL/acre). Use the high rate at high insect pressure. Toxic to bees. Do not apply at bloom when bees are present. Do not exceed 2000 ml/ha (787 ml/acre) per season. Do not apply within 3 days of harvest
	PyGanic ECI.4	(1.4% pyrethrins) at 2.32 – 4.65 L/ha (i.e. 0.93 – 1.86 L/acre). Do not apply more than eight times per season. It is approved for organic production and can be used up to harvest.
Post-bloom application	Admire 240F or Alias 240SC	(240 g/L imidacloprid) at 175 mL/ha (i.e. 70 mL/acre). Toxic to bees; therefore, apply after pollination and in the absence of bees. Do not apply more than two times per season. Do not apply within 14 days of harvest.
	Assail 70WP	(70% acetamiprid) at 56 to 86 g/ha (22 to 34 g/acre). Do not apply more than 4 times per season. Allow 12 days between applications. Toxic to bees. Do not apply during bloom. Do not apply within 7 days of harvest.
	Concept Liquid	(75 g/L imidacloprid, 10 g/L deltamethrin) at 560 mL/ha (224 mL/acre) as foliar spray in enough water to ensure good coverage. Apply post bloom after bees have been removed from the field and up to 14 days before harvest. Do not apply more than 3 times per season.
	Movento 240SC	(240 g/L spirotetramat) at 220 – 365 mL/ha (i.e. 88 - 146 mL/acre). Toxic to bees; therefore, apply after pollination and in the absence of bees. Do not apply more than 1.8 L/ha (i.e. 0.72 L/acre) per season. Do not apply within 7 days of harvest.

Blueberry scorch is a very serious disease that is widespread in all blueberry production regions of B.C. With over 11,000 hectares (28,000 acres) of blueberries now planted in B.C., management and control of BISCv requires region-wide cooperation of all growers to control aphid populations and remove infected plants in order to slow the spread of blueberry scorch within fields, between fields, and between farms.

Remember:

1. Monitor fields for scorch virus symptoms, especially during bloom
2. Sample and test any plants with suspicious symptoms
3. Remove all infected plants
4. Maintain an effective aphid control program
5. Only purchase planting stock that has been grown according to an accepted propagation protocol that includes virus testing.

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