

# Blueberry Scorch Virus

Blueberry Scorch Virus (BISV) was first found in BC in 2000, but it is likely that BISV was present in BC for several years prior to detection. BISV causes severe blossom and shoot blighting, dieback and significant yield loss. BISV is spread by aphids, or by propagating and planting infected stock.

The BC Blueberry Council, the BC Ministry of Agriculture and Lands, and Agriculture & Agri-Food Canada have funded research over the past 5 years to better understand the virus and to develop effective management strategies. Research is ongoing. This fact sheet is a summary of what we have learned about the virus so far.



*Figure 1. Blighted blossoms of infected blueberry variety 'June'.*



*Figure 2. Blighted blossoms and leaves of blueberry variety 'Berkeley' infected with BC 1*

## Blueberry Scorch Virus strains

- There are believed to be at least 5 strains of BISV present in BC. The most common are BC-1 and BC-2. These are distinct from the Northwest strain (first found in Oregon and southern Washington 20 years ago) and the East Coast strain (identified in New Jersey over 25 years ago). The East Coast strain and the Northwest strain were formerly thought to occur in BC.
- BC-2 is widespread in the Fraser Valley and is thought to cause severe symptoms on all varieties. BC-1 is much less prevalent and varietal susceptibility is not well understood. Further research is being conducted to understand the other strains of BIScV and how they affect different blueberry varieties.

## Where has the virus been found?

- The virus has been found in Abbotsford, Matsqui, Pitt Meadows, Port Coquitlam, Richmond, Cloverdale, Delta, Aldergrove, the Saanich Peninsula of Vancouver Island and the Okanagan valley – it is widespread in all blueberry production regions.
- BISV is found in both young fields and in older fields.
- Over 120 commercial fields in BC have now been identified as BISV infected fields.
- BISV strains have also been detected in cranberry, huckleberry, and wild blueberry.
- The virus has been detected in wild hosts as far away as the Kootenay region of BC

## Symptoms

- The best time to look for symptoms of BISV 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 (Figures 1, 2 and 3). Sometimes only blossoms are blighted (Figure 1) or a scattering of infected shoots may be observed.
- Many of these symptoms can resemble blueberry shock virus, mummy berry, frost injury, bacterial blight, spanworm damage or other diseases. A laboratory diagnosis is required to identify scorch.
- Symptoms 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 detectible levels in the plant following infection.
- Blighted blossoms may remain on the bush over the summer and into the following year.
- Symptomless plants are often seen next to diseased ones.
- Leaves may become yellow along the margins. Plants with these symptoms tend to decline and die back over a period of years.
- Infected plants will never regain normal productivity.
- Re-growth as the season progresses may appear to be healthy, even though it is infected with the virus.
- In some cases, infected plants may show few or no symptoms. All varieties are susceptible to infection, although several are thought to remain symptomless.
- Infected 'Bluecrop' may show only subtle signs of infection, or show no symptoms at all. Infected 'Bluecrop' may be more 'yellow' in color than uninfected plants (Figure 4) and do not always show the dieback symptoms that are more common with other varieties. Although symptoms on these bushes may be slight, the 'yellowed' bushes have lower yields because they produce fewer blossoms and smaller fruit.
- Subtle signs of infection can include red line patterns on leaves (oak leaf patterning), especially in the fall, and 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.** Flower and leaf blighting of blueberry variety 'Bluecrop' infected with BC-2 strain



**Figure 4.** Yellowing and lack of blossoms on 'Bluecrop' believed to be infected with BC-3 strain. The bush with the pink tag is infected; the neighbouring bush is healthy.





**Figures 5 and 6.** Blueberry variety 'Concord' infected with the New Jersey Strain, before and after plant removal. Note the reddening of infected 'Concord' in July.

## 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 BCMAL Plant Disease Diagnostic Lab 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. There will be no charge for testing field samples at the BCMAL Diagnostic Lab in 2006, to a maximum of 10 samples per field. Information about the BCMAL Diagnostic Lab and submission procedures can be found at <http://www.agf.gov.bc.ca/cropprot/lab.htm>, or call (604) 556-3001.



**Figure 7.** Oakleaf pattern that developed in October on 'Bluecrop' infected with the New Jersey Strain.

**3. Remove infected plants.** Infected plants should be removed as soon as possible and destroyed. Infected plants should be removed entirely including roots and all other plant materials. Infected plants that are left in the field will act as a source of virus infection for healthy plants in the field. 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 can become infected within 3 to 7 years.

**4. Aphid control.** BISV is transmitted by aphids, therefore, an effective aphid control program should be used by all growers. In growing regions where scorch is present, an area-wide approach to aphid control is recommended. All fields should be treated before bloom with registered aphicides to control the overwintering generation before they produce young and disperse within and between fields. After bloom, monitor fields for aphids and, if necessary, apply sprays before populations build. Scout several locations in

each field, especially around field margins. Do not spray until after bees have been removed from the field, and be sure to follow pre-harvest intervals on the labels.

Information on registered aphicides and rates can be found in the BC Berry Production Guide. Fulfill 50WG (pymetrozine) has received an emergency registration in 2004 and 2005 and is being pursued for the 2006 growing season. If the emergency registration goes through, Fulfill 50WG can be used prior to bloom and after harvest. Admire 240F (imidacloprid) can be used post-bloom, after bees have been removed from the field and up to 14 days before harvest. Contact the BCMAL or your chemical supplier for up-to-date information on chemical registrations and use restrictions. Full registration of additional effective aphicides is being pursued.

**5. Do not propagate from infected plants.** All stock should be tested for BLSV prior to propagating. Aphid control is critical throughout all phases of propagation to prevent virus introduction and spread. **Only purchase planting stock that has been grown according to an accepted propagation protocol, including virus testing.**

Blueberry Scorch Virus is a very serious disease that is widespread in all blueberry production regions of BC. With over 14,000 acres of blueberries now planted in BC, management and control of BLSV is going to require region-wide cooperation between growers to control aphid populations and remove infected plants as soon as possible in order to slow the spread of the disease within affected fields, between fields, and between farms.

**Remember:**

1. Monitor fields for scorch
2. Test plants with suspicious symptoms
3. Remove any infected plants
4. Maintain an effective aphid control program
5. Only purchase planting stock that has been grown according to an accepted propagation protocol – including virus testing

More research will be conducted through 2006 and 2007 in order to gain a better understanding of the virus and to develop better testing methods for virus detection and effective control strategies.

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