National Pest Alert

Blueberry Shock Virus

Origin and Distribution

Blueberry shock virus was first observed in the U.S. in 1987 in blueberry plants growing in Washington. It has since been found throughout the Pacific Northwest and more recently in midwestern and northeastern blueberry growing areas. Since 2014 blueberry shock virus has also been detected in cranberries growing in the same regions.

The Pathogen

Blueberry shock virus (BlShV) is an *Ilarvirus* belonging to the *Bromoviridae* family, which contains single-stranded, positive-sense RNA viruses. Virions are quasi-isometric spheres and 26–29 nm in diameter. BlShV has been detected in all highbush blueberry cultivars tested. BlShV has been more recently detected in cultivated cranberries. There are no other natural hosts.

courtesy S. Ring, British Columbia Blueberry Council

Blighted flower clusters due to blueberry shock virus infection.

Symptoms

Symptoms on blueberries include sudden death of blossoms and young vegetative shoots just before bloom. This may happen on an entire bush or on some of the branches. Blighted tissues fall off followed by a second flush of foliage later in the summer. At the end of the season, the plants appear quite normal except for the lack of fruit. However, curved remnants of dead shoots may still be visible on affected canes, which may be excessively branched at the tips due to death of the growing point. Infected bushes also appear less vigorous than nearby healthy bushes. All blueberry cultivars are susceptible to blueberry shock virus and exhibit similar symptoms.

Plants typically develop symptoms 1 to 2 years after infection, starting on one or two branches. All parts of the plant eventually become infected, including the roots. Infected plants show symptoms for 1 to 4 years, then recover and remain symptomless. The cultivar Rubel may show red flecks on the leaves the year after initial symptoms. After recovery, infected plants can produce good quality fruit but continue to serve as virus reservoirs.

courtesy R. Isaacs, Michigan State University

Blueberry shock virus can spread via infected pollen carried by bees.

Shock symptoms may resemble mummy berry shoot strikes, Phomopsis twig blight or Botrytis blossom blight. However, shock can be differentiated by the scattered distribution of symptomatic bushes among perfectly healthy bushes, the absence of fungal growth on blighted tissues, and a second flush of green leaves on symptomatic branches.

Yield losses of 34 to 90% due to blueberry shock have been documented in the Pacific Northwest. The magnitude of loss varies from year to year and is directly related to symptom severity. In the Pacific Northwest, good yields are possible in well-managed fields after the plants recover. It is not known whether this also would be the case in other regions.

In cranberries, BlShV has been associated with fruit scarring, premature reddening and reduced yields in plants with symptoms. Similarly to blueberry plants recover and yields are normal.. The virus does not appear to spread via pollen but rather by the vegetative propagation of plants. As BlShV is more recently described in cranberries the long-term impacts are unknown.

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USDA United States Department of Agriculture National Institute of Food and Agriculture

Biology

Infected plant material is the primary source for the movement of BlShV to new areas. Once present, the virus can spread quickly within a field via infected blueberry pollen. Virus transmission takes place when bees and other pollinators transfer pollen from infected plants to flowers of healthy plants. The rate of spread within a field varies by cultivar. In susceptible cultivars, the number of infected plants approximately doubles every year until eventually all plants become infected. Virus spread is most likely between cultivars that flower during the same period. The virus can survive in infected pollen in the hive for 1 to 2 weeks and can be moved between fields in beehives. The virus has not been detected in native vegetation surrounding blueberry fields or in weeds in infected fields. Virus transmission does not occur via contact between plants and is highly unlikely to occur via pruning shears.

Management

Management strategies are aimed primarily at preventing introduction of the virus by use of virus-tested, clean nursery stock. Plants should be monitored carefully for symptom development during bloom and suspicious plants marked. If shock is suspected, send fresh samples of multiple symptomatic branches to a diagnostic lab for virus testing.

courtesy R. Michelutti, Agriculture and Agri-Food Canada

Blueberry shock virus-infected blueberry bush.

Once BlShV has been detected in a planting, there are two options. The first is to allow the virus to run its course and wait for the plants to recover and return to full production. This approach is common in regions where the virus is endemic. However, in areas where the virus is not known to be present and the infection is localized, removal and destruction of the bushes is recommended. The disease cannot be eliminated by removing plants based on visual symptoms alone as plants may not show symptoms for several years after infection, and destruction of the entire field may be necessary. Applying a herbicide before plant removal ensures that the root system is killed as well. The field should be monitored for sucker development from left-over roots the following spring. Suckers can be killed by repeated cultivation and/or use of herbicides. Do not move beehives from an infected field to healthy blueberry fields without discontinuing blueberry pollination activity for at least 2 weeks. Some states have quarantine laws prohibiting importation of non-virus-tested blueberry planting material, so growers should check with their state prior to acquiring any plant material that has not been virus tested.

courtesy A. Schilder, Michigan State University

Bushy top and remnants of blighted shoots on BlShV-infected blueberry cane in late summer.

courtesy R. Michelutti, Agriculture and Agri-Food Canada

Numerous blighted leaves on BlShV-infected blueberry bush.

courtesy J. Pscheidt, Oregon State University

Red flecks on leaves of 'Rubel' blueberry one year after first shock symptoms.

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