

Blueberry Scorch Virus

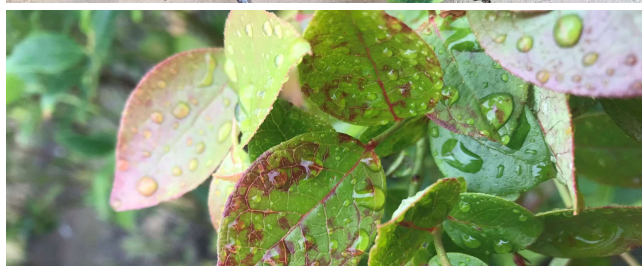
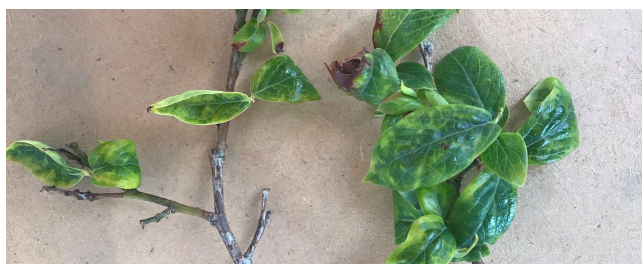
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Blueberry scorch is an aphid-vector virus that is spread through and between fields by winged aphids. Infected plants will generally become symptomatic the year after infection, and die within two to three years. Plants may appear healthy in the spring each year, but symptoms usually start to show during bloom. Different varieties manifest different symptoms, with Bluecrop having the least obvious symptoms. This manual contains integrated pest management (IPM) guidelines geared towards small-scale production, but they are applicable to any operation wanting to improve pest identification, monitoring and management.

Identification

Description of symptoms

- Blossoms and leaves wilt and then turn brown/orange/black.
- Stems around wilted areas initially remain green (contrary to bacterial stem blight), but some blueberry varieties will show dark stem blighting.
- Some leaves will yellow around leaf margins.
- Symptoms may only appear on one or two branches even though the whole bush is still infected with virus.
- Some infected bushes may not show any of the wilting/blighting symptoms. They may only appear off-colour or have fewer flower clusters than neighbouring healthy bushes – this is more common in Bluecrop.



Scorch vs shock virus

- Visual scorch virus symptoms are almost identical to shock virus, which is vectored by pollen. **A lab test is required to differentiate between these two viruses.**
- Scorch virus will eventually kill the plants, whereas plants will recover from shock virus.

The vector - aphids

- Aphids can be many colours, including black, green, orange, and brown.
- When winged, they are typically black/green.
- Colonies form on new shoots or the underside of leaves.
- Winged aphids are mobile and of highest concern for spreading the virus.
- Overwinter on crops as eggs or adults.

Winged aphid



Apteran aphids (no wings)



Natural enemies of aphids

The presence of natural enemies that feed on aphids should factor into management decision making.

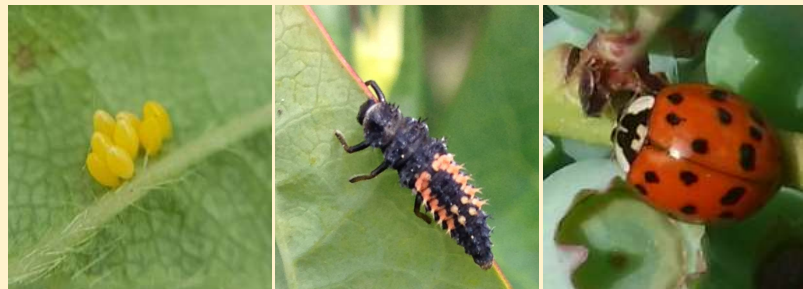
Syrphid flies

- Also known as “hover flies”, adults resemble bees.
- Eggs are off-white, laid singly, and resemble a very small grain of rice.
- Larvae can be confused for caterpillars, but move in a “tapping” motion while looking for aphids.



Ladybugs

- Adults are orange-red coloured with black spots.
- Eggs are yellow-orange coloured, laid in a cluster.
- Larvae have prominent legs, and are often dark purple with reddish-orange markings.



Lacewings

- Adults have lacey/see-through wings and are usually green or brown.
- Eggs are white or green, and sit at the end of a thin stalks.
- Larvae resemble small brown and white alligators with prominent mandibles (mouthparts).



Parasitoid wasps

- Adults fly easily and look like small ants with wings.
- Mummy-aphids are aphids that have been parasitized, appearing as bronze or dark coloured bloated aphids glued to the leaf.
- Use mummy-aphids as evidence of their presence.



How to Monitor

Infected bushes

- Look for scorch symptoms.
- Symptoms are most apparent during bloom.
- Use flagging tape to mark bushes of concern and note their location.
- Sample bushes of concern for lab analysis.
- Keep record using a printout of the data sheet template provided in this guide.

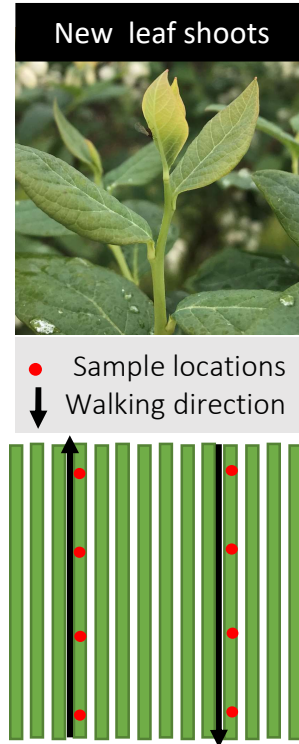


Sampling for lab test

1. Collect a minimum of 10 leaves from on or near branches showing symptoms.
2. Place leaves in a sealable bag, assign a label to track the sample.
3. Flag the bush with the same label and make note of the bush location.
4. Keep the sample in the fridge until it can be sent to a lab.

Monitoring for aphids

- Start in early April and continue monitoring at weekly intervals throughout the growing season.
- **Small planting:** Take a minimum of four samples per planting.
- **For larger fields (more than 10 rows):** sample two different passes taking a minimum of four samples per pass.
- **For each sample inspect** 10 new leaf shoots, record how many have aphids.
- Keep a tally of the number of winged aphids and natural enemies.
- **Keep record** of the numbers using a printout of the data sheet template provided in this guide.
- The monitoring protocol is designed to be used with the action threshold for aphids in blueberries described below.



When to Act

1. Scorch management

- If scorch is detected in your field, remove infected bushes right away.
- Continue to monitor the field for scorch symptoms a few times a year to quickly identify any new bushes with symptoms.

2. Aphid management

- There are two action thresholds for aphids at different times:
 - Pre-bloom: if aphids are present and scorch risk is high, apply a spray.
 - Post-bloom: if more than 30% of inspected leaf/shoot tips have aphids and scorch risk is high, apply a spray control.
- Deciding to spray for aphids involves considering risk factors.

Scorch Risk Assessment Table

Actions are centered on:

1. Removal of infected bushes.
2. Reducing presence of aphids.

| Lower scorch risk | Higher scorch risk |
|--------------------------------------|--|
| Few aphids on leaf/ shoot tips | More aphids on leaf/shoot tips (>30% inspected shoot tips) |
| Few winged aphids | Winged aphids increasing |
| Natural enemies of aphids increasing | Few natural enemies of aphids |
| No neighbouring blueberry fields | Neighbouring fields are blueberries, with scorch history |
| No scorch history within the field | History of scorch in the field |

How to Manage

Management options are listed by blueberry plant stage. Use the **Scorch Risk Assessment Table** to help guide management decision making.

Planting

- Only use **virus-free planting stock** grown according to an accepted propagation protocol that includes virus testing.

Bloom

- **Do not exceed nitrogen needs** of plants during early season fertilization.
 - Overapplication of nitrogen results in excessive vegetative shoot production. New shoots are very attractive to winged aphids. Use resource: [OSU Nutrient Management for Blueberries](#).
- **Completely remove scorch positive bushes**, and destroy (burn).
 - Dig up roots or kill plants with combination of cutting and herbicide.
 - The virus remains within the plant – any regrowth will be infectious and aphids can continue to spread the virus.
 - **Do NOT ONLY prune out symptomatic branches and allow regrowth.**
 - Continue to flag bushes and take samples, especially around where scorch positive bushes were previously located.

Note: It is NOT economical to remove and replace shock virus infected bushes so it is important to confirm diagnostic with a lab test.



Pre-bloom/post-bloom

- Spray the canopy with a bioinsecticide or insecticide to **control aphids**.
- Direct sprays to undersides of leaves and new growing tips.
- Refer to the **BC Blueberry Production Guide** for the most current list of registered options for blueberry aphids.
- Always read the label prior to applying any pesticide products.
- Most aphicides are toxic to bees and should NOT be applied during bloom.



Ongoing

- **Promote natural enemies of aphids** by providing alternative habitat and pollen sources via hedgerows, neighbouring plantings, or other vegetative field edges.
- Track the presence of natural enemies– may delay/avoid decisions to use spray controls if their numbers are increasing.

References and Links:

BC Production Guide – Blueberries

<https://www2.gov.bc.ca/gov/content/industry/agriservice-bc/production-guides/berries/blueberries>

BC Blueberry Council Factsheet – Blueberry Scorch Virus

http://files.tlhort.com/topicassets/attachments/ta_334_blueberry_scorch_virus_info.pdf

BC Blueberry Council Field Guide – Blueberry Scorch Virus

<https://www2.gov.bc.ca/gov/content/industry/agriservice-bc/production-guides/berries/blueberries>

Pacific Northwest Plant Disease Management Handbook – Scorch

<https://pnwhandbooks.org/plantdisease/host-disease/blueberry-vaccinium-corymbosum-scorch>



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