

Raspberry Viruses

Virus	Transmission	Symptoms	Control
Mosaic	<i>Amphoraphora agathonica</i> aphid	Small, misshapen leaves, large green blisters	Aphid resistant cultivars
Bushy Dwarf	Pollen/bees	Crumbly fruit, yellow, misshapen leaves	Virus free resistant cultivars
Leaf Curl	<i>Aphis rubicola</i>	Small leaves, tips and margins turn down	Resistant cultivars
Tomato Ringspot	<i>Xiphinema americanum</i> Nematode	Crumbly fruit, spots, yellow leaves turn brown	Resistant cultivars

diseases and they fail to harden adequately and are killed by winter and spring freezes.

Bushy Dwarf virus is pollen transmitted. Viruses spread by bees are very difficult to control. Even though most red raspberries are self-fruitful, they require insect transfer of pollen to set enough drupelets for adequate berry size. Once pollen-transmitted viruses are spread over an area, newly planted virus-free plants will be rapidly infected. Transmission from backyard and escaped plants is rapid due to mode of spread. Rouging can be successful, but every plant must be removed for miles around new plantings. Even then, transfer from pollen from relocated bees is a danger. Bushy Dwarf symptoms do not occur unless other viruses are also present. Therefore, transmission avoidance for the other viruses is a good strategy.

To prevent infection with tomato ringspot virus, plant raspberry stock in soil free of the vector, dagger nematode. Pre-plant fumigation of soil can eliminate the nematode from infested soil. In one study, a 3-year rotation with plants that are non-hosts of tomato ringspot virus and weed-free fallow were as effective as fumigation with methyl bromide in preventing re-infection of raspberry plants with the virus.

Insecticides that provide control of virus transmitting aphids on raspberry include:

- **Malathion.** Do not use during bloom. 1 day PHI¹. 12 hr REI².
- **Esfenvalerate (Asana XL).** Toxic to pollinators. 7 day PHI. 12 hr REI.
- **Diazinon.** Do not use during bloom. 7 day PHI. 24 hr REI.
- **Azinphosmethyl (Guthion).** Do not use during bloom. 14 day PHI. 2 or 4 days REI (depending on field activity).
- **Insecticidal soap.** Apply at 1-2% v/v solution. 0 day PHI. 12 hr REI.
- **Beauveria bassiana (Mycotrol ES).** Live fungal spores. 0 day PHI. 12 hr REI.

¹Preharvest Interval = time between spray and harvest. ²Restricted Entry Interval = time between spray and reentry into the sprayed area.

Viruses can be eliminated from plant material with heat therapy. However, most trials have failed to do this with raspberries. In vitro repeated shoot tip tissue culture trials may produce virus-free plantlets in the near future. Recombinant DNA technology is currently being used to derive transgenic raspberry plants for resistance to Bushy Dwarf virus. These transgenic plants are in field trials. Commercial use is years away.

In the interim, growers should use Bushy Dwarf and Mosaic resistant raspberry plants. Cultivars resistant to Bushy Dwarf virus are: Boyne, Chilcotin, Citadel, Fairview, Restival, Glen Cova, Glen Moy, Haida, Heritage, Hilton, Killarney, Malling Admiral, Malling Jewel, Malling Joy, Malling Promise, Nootka, Puyallup, Scepter, Sentinel, Sumner, and Willamette. Cultivars resistant to Mosaic (the aphid vector) are: Canby, Carnival, Chilliwack, Comox, Glen Moy, Glen Prosen, Haida, Malling Autumn Bliss, Malling Joy, Malling Leo, Nootka, Reveille, and Skeena. Raspberries resistant to both are Haida, Malling Joy, and Nootka. Of these, Haida is the most cold hardy (5, rating 1-5 with 5 most hardy) with Malling Joy (4) hardy, and Nootka less hardy (3).

Until virus resistant plants of our main cultivars can be produced, the best way for Utah growers to successfully grow raspberries in growing districts infested with viruses is to grow Haida or Malling Joy. Nootka is too cold tender. Quality and yield ratings for Haida and Malling Joy are 3, 4 for quality (1-5, 5 best, Canby = 3) and 5, 5 for yield (Canby = 4). In addition to planting resistant cultivars for Bushy Dwarf and Mosaic viruses, plantings should be protected through the season with aphidicides listed above.

More information

http://ohioline.osu.edu/b782/b782_29.html,

<http://www.gov.on.ca/OMAFRA/english/crops/facts/raspvra rc.htm>

<http://www.nraes.org/publications/nraes35.html>

Converse, R.H., Ed, 1987. Virus Diseases of Small Fruits. USDA Ag. Handbook 631.

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