

# Summerland Research & Development Centre

## Wine Grape Research



## Grape Phylloxera Detection and Control

Aug. 25, 2020.

**Tom Lowery**, Summerland Research & Development Centre, Agriculture & Agri-Food Canada

### INTRODUCTION

Grape phylloxera (*Daktulosphaira vitifoliae*), an aphid-like pest of grapevines, was recorded on Vancouver Island apparently for the first time this summer from leaf galls on a hybrid grape variety. Native to eastern North America, grape phylloxera is now found in most major wine-producing regions, including in the southern interior of British Columbia since 1961. The roots of European *vinifera* varieties are particularly susceptible to this pest, and the accidental introduction of grape phylloxera to Europe in the 1850's devastated the industry within 25 years. The wine grape industry was saved by grafting susceptible varieties onto resistant rootstocks derived from American *Vitis* species or hybrids.

Grape phylloxera have a complex biology. The natural life cycle on native *Vitis* species involves both leaf-galling forms and root-infesting forms, asexual and sexual reproductive stages, and winged and wingless adults. Like most aphids, several generations are produced each season. The sexual forms and ability to create leaf galls has been lost in some areas where grapevines susceptible to the leaf-galling forms are not present. In other regions, biotypes or races have adapted the ability to feed and develop on rootstocks that were previously resistant to phylloxera feeding. Because of this variability and adaptability, phylloxera remain on the Canadian Food Inspection Agency (CFIA) quarantine list, requiring that grapevine nursery material receive a hot water treatment prior to importation.

### DETECTION

The small (0.7-1.0 mm) pale green, light brown or orange adult female grape phylloxera are often undetected on the roots of grapes until significant damage or death of vines raises concern. Infestations in vineyard blocks often expand from an initial focal point, but these areas of poor vine health or death can be confused with other ailments such as nematodes or root rots. A shovel can be used to carefully expose some roots to show the presence of



Phylloxera on the roots of grapevines



Phylloxera leaf galls on the lower leaf surface

phylloxera or the stunted, swollen root galls that their feeding produces. Phylloxera are easier to see under a magnifying glass when sections of roots are placed on a white tray for inspection. Numbers might be low or absent on certain resistant rootstocks selected for this purpose.

Phylloxera leaf galls are very distinctive. Nymphs (immatures) that hatch from overwintered eggs inject a hormone while feeding on the upper leaf surface that causes a wart-like gall to protrude from the lower leaf surface. Galls enclosing the developing females that can each produce up to 200 eggs are about 6.5 mm (1/4") in size. Several generations develop in galls over the season, with nymphs moving to establish new leaf galls or migrating to roots. Leaf galls are uncommon in BC, as they do not develop on *vinifera* varieties or on hybrids with a higher proportion of *vinifera* in their parentage. Foch, Baco Noir, and Frontenac are more susceptible to the leaf-galling form.

## DAMAGE

Except when distortion of leaves is severe, leaf galls cause little or no economic damage to vines. As mentioned above, feeding by phylloxera results in the creation of galls on only a few hybrid wine grape varieties. Controlling this aerial form of phylloxera helps limit infestations and possible movement to susceptible vines.

Significant damage to grapes occurs from the stunting and galling of roots by phylloxera feeding and the injection of toxins. Resulting cracks and deformities also allow the entry of root pathogens. Depending on vine vigour and the size of the infestation, vines can slowly become stressed and chlorotic, or they can decline and die rapidly. Phylloxera numbers are low on roots of vines grown on dry, sandy soils and highest on heavy soils that are prone to cracking. As mentioned previously, the roots of *vinifera* varieties are particularly susceptible to infestation, while hybrid rootstocks display various levels of resistance.



Phylloxera feeding damage to grape roots

## CONTROL

Biological control of phylloxera has not been studied in detail, but natural enemies and diseases are not thought to provide effective control of established colonies on roots of susceptible vines. When establishing a new vineyard, purchase plants from reputable suppliers and ensure that planting material is healthy and free of phylloxera. Resistant rootstocks developed from crosses between several species of wild grapes native to eastern and southern N.A. provide effective control. Provision of additional water and nutrients can maintain vine vigour and help reduce damage. As mentioned, infestations are more damaging and spread more rapidly on heavier soils prone to cracking, while vines planted on sandy soils are nearly immune to attack.

Movento™ (spirotetramat) and Clutch™ (clothianidin) are systemic insecticides registered for the control of grape phylloxera and mealybug. Consult the label and refer to the BC Ministry of

Agriculture website ‘Pest Control Products Recommended for use on Grapes in British Columbia’ for cautionary measures. Do not apply Movento to table grapes.

Regarding the discovery of Phylloxera on Vancouver Island, it is unclear at the moment what measures, if any, the CFIA might need to take. A survey could be conducted in collaboration with industry, and attempts might be made to eradicate localized populations. Further investigation, however, could reveal that small populations have existed on the island for a considerable period of time undetected on the roots of vigorous hybrids. It is hoped that the information provided in this newsletter article will help contain this economically important pest of grapevines.

For additional information see ‘Grape Phylloxera’, Pest Management Program for Grape Series, Ont. Min. Agr. Food & Rural Affairs. <http://www.omafra.gov.on.ca/english/crops/facts/88-125.htm>



Agriculture and  
Agri-Food Canada

Agriculture et  
Agroalimentaire Canada