



November, 2016

British Columbia Grape Industry Needs a Comprehensive Approach for the Management of Grapevine Leafroll Disease

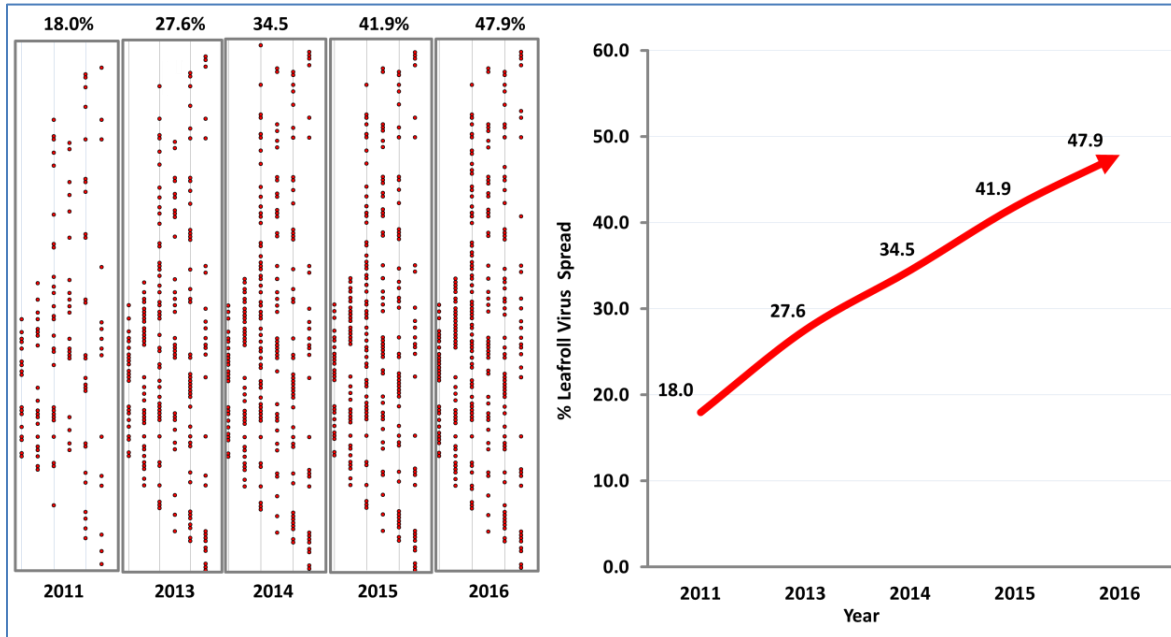
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Grapevine leafroll disease (GLD) is a major and increasing concern across the production regions of British Columbia. Producers in some European regions erroneously believed it improved wine quality, but recent research across the major grape growing regions of the world demonstrated negative effects of GLD on vine growth and fruit quality. Leafroll disease can gradually compromise vine performance and create an economic impact on production by reducing the market value of the fruit. Symptoms of leafroll disease are very distinct on red varieties, with mature leaves at the bottom portion of the canopy turning red color while the veins remain green. Late in the season, the edges of these symptomatic leaves roll downward, hence the name “leafroll virus”. In white varieties, symptoms are difficult to see but they do show variable degrees of chlorosis with downward curling. In BC, symptoms are visible starting from mid-august to the end of the growing season. In addition to the weather, the severity of symptom expression largely depends on the rootstocks, varieties, cultivars, and clones.

GLD is a complex in the sense that it is caused by one or more related viruses collectively called grapevine leafroll associated viruses (GLRaVs). Our recent surveys indicate that GLRaV-3 is predominant among the strains of leafroll viruses in BC vineyards. Propagation and distribution of infected planting material contributes to the primary spread of these viruses. Secondary spread within and between vineyard blocks occurs by several species of mealybug and soft scale vectors. Knowing the vectors that transmit GLD in BC is one of the keys to managing the disease. Recent studies at Summerland RDC have recorded the presence of two species of soft scale and grape mealybug in Okanagan and Similkameen vineyards.

The wine grape research team at Summerland RDC have mapped the locations of diseased vines in five different vineyard blocks of Cabernet Franc, Cabernet Sauvignon, and Merlot for four to six consecutive growing seasons (2011-2016). Each growing season, vines showing leafroll virus symptoms were recorded and selective vines were tested to verify leafroll virus infection. Virus spread was evaluated based on the spatial data recorded in each growing season. These vineyard blocks were also monitored for the presence of mealybug and scale insect vectors. Mapping the secondary spread of the

virus in commercial vineyard blocks with low numbers of vectors has shown an annual increase in infection rates of 5-10%. Rates of increase in vineyards with large populations of mealybugs and or scale insects are much higher. Our mapping data also shows a clustering of infected vines spread from the primary site of infection, indicating vine to vine movement of virus through insect vectors. In addition, increased spread of GLRaV was particularly high in rows that bordered heavily infected neighboring blocks.



Spatial maps showing the spread of grapevine leafroll virus during 2011 - 2016 growing seasons in a block of Cabernet Franc (left) and the graph showing increase in percent of infection (right)



Symptoms of leafroll virus on Merlot



Grape Mealybug

Photos and captions: Sudarsana Poojari, AAFC- Summerland RDC.

The first line of defense for the management of GLD is to plant certified virus-free nursery material and to reduce the source of virus in established vineyards. To prevent secondary spread, a comprehensive approach is necessary to manage mealybug and scale vector populations. The status of leafroll diseases in BC vineyards underlines the need for a domestic clean plant program and importation into the province of plant material from legitimate sources that have a virus-testing program. The wine grape research team at Summerland RDC would like to thank growers for access to their vineyards and British Columbia Wine Grape Council for funding the research with matching funds provided by Agriculture and Agri-Food Canada's AgriInnovation Program (AIP).

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For additional information on grapevine virus diseases in British Columbia please refer:

Poojari, S. Boulé, J., DeLury, N., Lowery, T., Rott, M., Schmidt, A-M., Úrbez-Torres, J.R. 2016. Current status of grapevine viruses in British Columbia. Poster presentation at the American Phytopathological Society Annual Meeting. July 30 - August 3, 2016. Tampa, FL, USA.

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<http://www.ipmcenters.org/index.cfm/center-products/ipm-eacademy/upcoming-events/red-blotch-speakers/>

