Oregon State University
Oregon Wine
Research Institute

Vine to Wine | November 2018

Increasing accuracy of sampling for Grapevine Red Blotch Virus

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Identification of a problem is always the key step in any disease management program. Many growers rely on symptoms and signs for a problem associated with diseases. Viral diseases are no different. We rely on symptoms expression of the vines infected by a virus, and look for signs of a vector. However, relying on visual symptoms to diagnose viral infections is challenging, as the vines can express similar symptoms caused by different stress related conditions. Both biotic and abiotic stresses such as mite infestation, insect girdling, fungal diseases, viral diseases, mechanical damage, and nutrient deficiencies may result in similar symptoms. Due to the subtle differences underlying the symptomology of different stresses, it is always recommended to confirm the presence of virus in suspect vines with laboratory testing. The best strategy is to test rather than guessing what the problem may be. Depending on cultivar and the time of the growing season, virus-infected vines often remain symptomless adding another layer of uncertainty.

Collecting samples for laboratory testing is a critical factor for accurately diagnosing viral diseases. In the past we have experienced several inconsistencies in Grapevine Red Blotch Virus (GRBV) detection; where a vine that tested negative would show symptoms later in the current or following season, or a vine that tested positive would show mild symptoms or none at all. As more research is underway to understand the epidemiology of this virus, it is becoming clear that GRBV location in an infected vine is highly variable and the accuracy of lab tests depends on the timing of sample collection and type of tissue sampled.

In the summer of 2018, we tested asymptomatic and symptomatic grapevines in a vineyard with a long history of Grapevine Red Blotch Disease. Four leaf petioles were collected from the base, middle, and top of the canopy at three phenological stages including fruit set, verasion, and harvest. Viral DNA was extracted from petioles and amplified using standard primer sets for GRBV via polymerase chain reaction (PCR). Tests from 72 asymptomatic vines were consistently negative regardless of phenological growth stage or canopy location. Tests from 180 symptomatic vines were positive in 53% of the samples. However, the accuracy of PCR tests were highest from samples collected from the base of the canopy and lowest from the samples collected from top of the canopy. Ninety to 100% vines of the symptomatic vines tested positive from samples collected at base of canopy versus 0 to 10% vines from the top of the canopy. Samples collected at harvest from the base of the canopy yielded 100% accuracy of test results. At fruit set, the virus was still detected by PCR on basal petioles on 95% of vines, that number decreased significantly in medium and top petioles to 15 and 5% of vines testing positive, respectively. At veraison detection from the mid-canopy increased to 90% of vines whereas none was

detected from the top of the canopy. At harvest the detection from the middle and top of canopies did not differ significantly from the detection at veraison.

These results suggest that older leaf tissues are more reliable samples to test for GRBV, and the accuracy of test results increases with samples collected later in the season. It is always a good practice to contact the testing facility about their sampling protocols and to keep specific records of the vines you sampled in the field.

This research was made possible through funding provided by the Oregon Wine Research Institute and the American Vineyard Foundation. We are also thankful to our local growers for their tireless support of this research.