Young, middle aged and mature leaf tissue was collected during the growing season from 6 vines each of self-rooted ('Pommard' clone) and grafted (clone '114' on 'Gloire' rootstock) infected with GLRaV-3 from a commercial vineyard in the Willamette Valley. GLRaV-3 RNA was quantified using AgPath-ID® One-Step RT-PCR Kit (Applied Biosystems, USA) with primers we designed for amplification of the Taqman® probe (Fig. 1). A qPCR assay for the host RNA of the NADH subunit, was used to monitor RNA extraction, RT, and PCR efficiency and standardize RNA concentrations. GLRaV-3 titer values were compared to the titer obtained the first week and to healthy plants.

- 684 berries representative of four ripening transition classes were tagged (colored strings) on 3 healthy and 3 GLRaV-3 infected vines. 6 berries per class (n=6) per cluster (n=6) per plant (n=6).
- Each week from mid-ripenation to harvest, one berry per class, per cluster, per plant was sampled, n=144.
- Samples were measured for elasticity using an adapted skinfold caliper, color using a chroma meter with CIeLAB parameters for red grapes, and total soluble solids (brix degree) using a digital refractometer. Comparisons between healthy and infected grapes were made for a 5 week span.

The ΔΔCt values in each graph below show relative exponential increase, assuming 100% PCR efficiency, of virus titer compared to Week 1 samples. The graphs from 2010 contain some samples that did not properly amplify, which are visible in the line breaks. Virus titers in young leaf tissue from each group increased by as much 210 (2^10) approximately a 4000-fold increase, during the growing season for both years. In middle aged leaf tissue the virus titer increased by 220 during the growing season in both years. With the Pinot noir clone '114' grafted onto Gloire the virus titer in the oldest leaves in 2010 increased by 23, while in self-rooted 'Pommard' the RNA was not amplified for ndhB suggesting problems with the RNA extraction from that tissue. In 2011, the virus titer in the oldest leaves of both cultivars increased, by 25 for '114' on 'Gloire', and 26 for the 'Pommard', respectively, relative to the target sample.

Results

- Mean sugar content values in healthy berries converged around 26% by harvest in each mid-season class; whereas berry classes from GLRaV-3 infected plants remained highly variable. Mean elasticity measurements displayed an unusual trend suggesting errors occur during most of the season. Week -to-week fluctuations once maximum titer is reached may be due to environmental conditions, such as collection on extremely warm days.
- GLRaV-3 titer in younger leaves builds throughout the growing season.
- RNA from ndhB in the 2010 'Pommar' mature collection was not thoroughly extracted during the season.
- Sugar content, elasticity and color index properties of four berry ripening classes at mid-ripenation for infected plants all show variation.
- Berries of healthy plants show relative convergence among mid-ripenation classes for all properties.

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