NOTE FROM THE EDITOR

The 2018 vintage was one that felt relatively average. But looking over summer weather data, a slightly different picture is painted. First, while we were saved from weeks of scorching triple-digit temperatures, we are tracking ahead of long-term average heat accumulation. While the spring seemed wet with above-average precipitation in January and early spring, the general lack of moisture since May has us tracking well below-average for annual precipitation. Smoke was a constant for the month of August, coupled with the unusually quick return of rapid diurnal temperature shifts at the end of August and early September, prompting many a dewy morning.

Looking toward future winter forecasts, we remind growers to be vigilant with fall watering for vine health. The coming fall and winter months are forecast to be on the drier side. But until then, happy harvest!

Michelle M. Moyer
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WSU-Prosser

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It is also a valuable site for downloading our most recent Extension publications, in addition to archived articles and newsletters you can print on demand. Find quick links to AgWeatherNet, the Viticulture and Enology Degree and Certificate programs, as well as to other Viticulture and Enology related resources.

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Grapes are classified as moderately sensitive to salt [1]. In the wine grape production areas of Washington, saline and sodic soils can occur naturally where groundwater sources are used for irrigation. Many such vineyards are either partially or entirely irrigated from deep wells, and most deep wells in central Washington contain high concentrations of carbonates and bicarbonates. They may also be high in sodium, depending on the chemistry of the groundwater.

Long-term use of water with high concentrations of carbonates, bicarbonates and/or sodium can lead to soil degradation, as soils become either saline, sodic, or both saline and sodic. Growers have increasingly brought in soil sample results or requested help with struggling vineyards, where the test results clearly indicate that the soils are saline and/or sodic (>1.5 dS/m or > 13 % ESP [Exchangeable Sodium Percent]) [2].

While soil salinity and sodicity are not limited to wine grapes, use of deficit irrigation in vineyards can accelerate the development of the problem. Additionally, growers may increase the use of deep well groundwater in drought conditions when district water sources are limited (e.g., 2001 drought).

The goal of this project was to survey vineyards in south central Washington for water and soil chemical properties related to salinity and sodicity. Vineyards across multiple water sources, including wells (groundwater) and irrigation districts (surface water) were identified, and soil and irrigation water samples were collected between fall 2016 and spring 2018 to look at time of season of sampling as well as consistency or changes with time.

The sites selected were in several American Viticulture Areas (AVAs): Columbia Valley (CV) near Pasco, Horse Heaven Hills (HHH), Red Mountain (RM), and the Yakima Valley (YV). Sites included both red and white wine grape varieties and also grapes intended for regular or high tier wine production. These factors were chosen to see if degraded soil characteristics show as a differentiation between irrigation practices as it relates to water practice differences between red and white wine grape production, and water practice differences between grapes destined for difference markets (e.g., regular pricing or “higher tier”).

Several soil and water chemical properties varied with water source and AVA. In general, the soils were low in electrical conductivity (EC) (Table 1), the parameter which measures the soil salinity, however soils from HHH had EC values in the medium risk category [3]. The average value for soils irrigated with ground water is just below the medium risk level, so monitoring those soils will be important.

The trend towards sodicity is more concerning (Table 1). The average ESP for CV and YV soils is <5, thus unlikely to be risky, but the averages for HHH and RM soils were in the medium risk classification of 5 – 15 ESP [3]. This is also true of soils irrigated with groundwater. They may also be high in sodium, depending on the chemistry of the groundwater. Water chemistry was similar to soil chemistry in terms of variability with AVA and water source (Table 2, next page).

To better evaluate the impacts of these results, the data were classified by qualitative characteristics (Table 3). These risk categories are based on both EC (C) and SAR (S) of the irrigation water. They are classified as low (1), medium (2), high (3) or very high (4) for each factor (Table 3). Thus, a C1-S1 (EC < 250, and SAR < 10) is low risk for prolonged irrigation use on most crops.

The results from the qualitative

![Saline Soil: A nonsodic soil containing sufficient soluble salts to adversely affect the growth of most crop plants.](image)

![Sodic Soil: A nonsaline soil containing sufficient exchangeable sodium to adversely affect plant production and soil structure.](image)

Table 1 - Soil chemistry values by AVA or water source. Values followed by different letters are statistically different. ESP = exchangeable sodium percentage.

<table>
<thead>
<tr>
<th>AVA</th>
<th>pH</th>
<th>EC dS/m</th>
<th>Ca meq / 100 g soil</th>
<th>Na meq / 100 g soil</th>
<th>ESP</th>
</tr>
</thead>
<tbody>
<tr>
<td>Columbia Valley (CV)</td>
<td>8.14 B</td>
<td>0.48 C</td>
<td>12.76</td>
<td>0.338 B</td>
<td>2.65 C</td>
</tr>
<tr>
<td>Horse Heaven Hills (HHH)</td>
<td>7.98 B</td>
<td>0.85 A</td>
<td>12.23</td>
<td>0.927 A</td>
<td>7.16 B</td>
</tr>
<tr>
<td>Red Mountain (RM)</td>
<td>8.51 A</td>
<td>0.69 AB</td>
<td>11.33</td>
<td>1.099 A</td>
<td>10.34 A</td>
</tr>
<tr>
<td>Yakima Valley (YV)</td>
<td>7.46 C</td>
<td>0.54 BC</td>
<td>11.82</td>
<td>0.357 B</td>
<td>2.80 C</td>
</tr>
<tr>
<td><strong>Level of Significance</strong></td>
<td>0.001</td>
<td>0.001</td>
<td>0.391</td>
<td>0.001</td>
<td>0.001</td>
</tr>
<tr>
<td>Ground water</td>
<td>8.33 A</td>
<td>0.74 A</td>
<td>11.07 B</td>
<td>1.07 A</td>
<td>9.81 A</td>
</tr>
<tr>
<td>Surface Water</td>
<td>7.84 B</td>
<td>0.56 B</td>
<td>12.61 A</td>
<td>0.38 B</td>
<td>3.35 B</td>
</tr>
<tr>
<td><strong>Level of Significance</strong></td>
<td>0.018</td>
<td>0.016</td>
<td>0.022</td>
<td>0.001</td>
<td>0.001</td>
</tr>
</tbody>
</table>
Irrigation Water Quality, continued.

characterization of the samples (Tables 4, 5) support the findings described above. The qualitative soils data (Table 4) supports that regardless of water source, soil EC in central Washington vineyards is low to medium. However, it also shows that Na build up is of concern.

Surface water irrigated blocks in this study showed some slight increases in ESP over time, and in spring 2018, 30% of the water samples had S3 rankings (Table 5). The trend is even more concerning in groundwater irrigated vineyard blocks, where in spring 2018, up to 50% of the blocks had irrigation water categorized in S4, which is considered unsuitable for irrigation, and 17% in S3, which is considered suitable only if C categories are 1 or 2 (which they are) and routine Ca amendments are made to the soils.

In summary, surface water sources were generally low in salt and Na and do not pose a long-term threat to vineyards. However, untreated groundwater (deep wells) was high in Na, and is resulting in Na accumulation in central Washington soils. This has the potential to adversely affect productivity by reducing the ability of water to penetrate the soil, and could result in Na induced Ca deficiency in vines. In vineyards that rely on deep wells, management includes treating water to reduce Na or amending soils with gypsum or another source of Ca. Regardless, routine water and soil tests at deep well irrigated vineyards is important to determine the quality of the water and the subsequent impact on vineyard soils.

References:
2. US Salinity Laboratory Staff, 1953, Diagnosis and improvement of saline and alkali soils. USDA Agricultural Handbook No. 60, Washington, DC.
As far as pests go, nematodes are difficult. Difficult to see (they are microscopic), difficult to diagnose (symptoms can often be confused with other plant stresses), and impossible to get rid of once you have them. Managing for nematode pests can be equally difficult. They can be in soil or in plant roots, depending on what species and where they are in their life cycle. In the past, nematodes have primarily been managed using soil fumigation or nematicides, but both options are becoming more difficult with the phase-out of many products and more stringent regulation.

The nematode of concern in WA vineyards is the Northern root-knot nematode *Meloidogyne hapla*. This nematode’s life cycle goes through several stages. The life stage that moves through the soil and infects root tips is the second-stage juvenile (J2). These microscopic worm-shaped J2 sneak through the root until they get to the root cortex. Here, using chemicals in their saliva, they modify five to seven root cells into resource-rich giant cells. These giant cells are densely packed with food for the nematode, which once established, will not move again and will feed off these cells for the rest of its life.

The nematode molts through two more juvenile stages into an adult female. The big pear-shaped adult female and the giant cells can restrict water and nutrient flow from the roots, as well as consuming plant resources. She lays eggs in a protective gelatinous matrix, which hatch into J2 that will move through the soil looking for new roots to invade. Most products or management tactics focus on controlling the invasive, soil-motile J2 stage. Eggs have a protective coating, and females are protected by the root, so the relatively-exposed out-in-the-open-soil juvenile is the target of choice. Application at the right time of year is important for controlling this nematode pest. But when is the right time?

To answer this question, we took soil samples in an infested vineyard every week during the growing season and every month in the dormant season over two years. From these soil samples, we extracted and counted J2s, root tips, and eggs. We also dyed the extracted root tips to count the in-root females. Looking at the relative amounts of each life stage over the course of the year, we can see some interesting trends (Fig. 1):

1. J2 densities in soil cycle from low density in midsummer, around the 4th of July, to high density over the late fall and winter, from October to March.
2. Egg density is greatest around midsummer (August), right before the increase in J2.

It appears that this species of nematode shows consistent timing of life stage development in vineyards. That means there’s the potential to optimize timing of management applications to target the highest number of nematodes and get the most impact.

So, if you were to manage for the J2 stage in soil, the time of year that might have the most significant impact would likely be sometime between the late fall to early spring, when J2 densities are greatest. Management for J2s in late spring to early fall would likely not be as effective, as there are fewer J2s in the soil during this time. If you were using a product with ovicidal activity, application around early August would likely be most effective.

To truly say when the best application time would be (Late fall? Early spring?) we need to evaluate products applied during those windows. We are currently evaluating some spring versus fall applications, to test the efficacy of these products based on the life cycle we are showing here.
Fall is an optimum time of year to change worn or broken sprayer components before winterizing the machine. One component of sprayer maintenance that is often over-looked is the pressure gauge.

Pressure is one of the more important components when conducting in-season sprayer calibration. It can change your product output, and your droplet size. Many people equate pressure with the type of pump mounted on a sprayer, but pumps create flow, not pressure. Pressure is the resistance to the pump's flow. This is why different types of pumps can produce different ranges of pressure based on the mechanism of how the pump operates.

When operating the sprayer, it is likely that the pressure gauge is visible from the seat of the tractor. This is a convenient way for the operator to monitor how the sprayer is functioning by watching the gauge for changes. A pressure gauge is an indirect representation of what the pressure is at the sprayer nozzle; the actual pressure at the nozzles could be a much as 10-20% less then what is being displayed on the gauge.

The percentage of pressure drop at the nozzles also increases as flow rate increases, so higher application rates can also lead to a reduction of pressure. Making sure the pressure gauge is reading correctly is the first line of defense in avoiding issues with application rate, unwanted change in droplet size, and keeping the sprayer in an appropriate working pressure range.

Steps to Better Spray Practices with Accurate Pressure Monitoring:

Step 1 – Make sure the pressure gauge can be seen easily or without obstruction.

Step 2 – Buy the right pressure gauge for the job. Gauges can be purchased to show the pressure in bars or psi (pounds per square inch), so make sure you are buying a pressure gauge that displays your preferred pressure units. There is also the decision of how high a gauge should read when being used on a sprayer. It is suggested that gauges go to double the psi that the sprayer will be operating at during an application. The difference between a pressure gauge used on a weed sprayer and an airblast can be a big jump, so make sure the appropriate gauge is on the sprayer when making applications.

Step 3 – Make sure your pressure gauge isn’t broken. Pressure gauges used on sprayers should always be filled with an oil to reduce the noise, or bouncing, of the needle from the vibration of the machinery. Without that reduction in noise, it can be difficult to get an accurate reading of measured pressure. If the pressure gauge has a substantial air bubble, or no long contains a liquid, replace it. Any damage to a gauge, including a smashed face plate, should result in its replacement. If the needle does not return to the zero, this is an indication for replacement.

Step 4 – Make sure your pressure gauge is working as described. Checking a pressure gauge periodically to ensure correct readings is always suggested. A new pressure gauge does not always guarantee a working one. There are many affordable pressure gauge testing tools available that can also help you determine if yours is properly reading pressure.

Without a functioning pressure gauge, sprayer calibration the following spring will be challenging. Take the few minutes to evaluate the pressure gauge on a sprayer, to avoid being “under pressure” at the start of the next spray season.
Research Program Addresses Key Issues in WA

By Melissa Hansen, Research Program Manager, Washington State Wine Commission

The industry-driven and supported wine research program in Washington State includes a diverse portfolio of research projects, from cultural and pest problems to winemaking, sensory and sanitation. All of the projects share two common goals – improve the overall wine quality in Washington, and make the project outcomes available to all growers and wineries regardless of size.

In the current funding cycle (July 2018 - June 2019), 18 projects—totaling more than $1 million in grant funding from the Washington State Grape and Wine Research Program—are underway. The statewide research program, administered by Washington State University, is funded by four entities:

- Washington State Wine Commission ($225,000)
- Auction of Washington Wines ($287,250)
- Washington State University ($214,455)
- State wine sales tax ($290,000)

To show the depth and breadth of research that is currently underway, here’s a brief rundown of current projects:

Cultural Practices

Low Volume Root Zone Deficit Irrigation (Year 3 of 3) – Dr. Pete Jacoby, Washington State University plant ecologist, has explored ways to conserve water by putting it where it’s needed at the root zone (2 feet below the soil surface) instead of surface drip irrigation. Preliminary results show this “proof of concept” project has potential to conserve water while enhancing factors related to higher grape quality. Data continues to be collected from commercial vineyards where research trials are located and the long-term effects on vine health evaluated.

Influence of Cultivar, Environment and Management on Grape Yield Components and Quality (Year 5 of 5) – Dr. Markus Keller, WSU viticulturist, initiated a partial rootzone drying field trial that alternates irrigation between each side of the vine row to evaluate its value to white wine grape varieties in Washington. Fruit will be made into wine this fall to evaluate phenolics and aroma compounds. Keller is also working to identify the water sensitivity of cultivars (water pessimists or optimists) to develop irrigation strategies for individual or groups of cultivars. His project helped leverage the award of a Specialty Crop Block Grant focused on heat and drought stress that is studying the feasibility of low-flow hydro-cooling Cabernet Sauvignon vines as a way to mitigate negative impacts of heat, especially during soil water deficit.

Climate Variability on Grapevine Phenology (Year 2 of 3) – Dr. Melba Salazar, agricultural sciences crop physiologist, is working to identify wine grape temperature thresholds from woolly bud through first leaf. Data will help develop a guide for crop management that includes such information as when to activate frost protection during spring, based on stage of growth and early prediction of budbreak.

Mechanization

Smartphone - based Crop Estimation Tool (Year 1 of 1) – Dr. Manoj Karkee, WSU agricultural engineer, is studying the potential of using smartphones to estimate wine grape crop load, thus saving labor to collect, count and weigh clusters. A major hurdle he must overcome is how to capture images of clusters located behind leaves.

Precision Vineyard Shoot Thinning (Year 1 of 2) – Dr. Qin Zhang, WSU automation engineer, is developing a machine vision system and prototype to improve the precision of mechanical shoot thinning. Existing machines are not selective enough and lack real time adjustment for the height and speed to satisfy variation in the cordon location and density of the shoots.

Economics of Mechanizing Northwest Vineyards (Year 1 of 1) - Dr. Clark Seavert, Oregon State University agricultural economist, is developing benchmarks to help wine grape growers in Oregon and Washington determine size of scale required to make mechanization feasible, vineyard task that generates the highest return on investment by integrating mechanization and compare economics of retrofitting or planting new vineyard designed for mechanization. This is the first jointly-funded project of the Washington and Oregon wine industries.

Pest Management

Assessment of Application Technologies (Year 4 of 4) – Gwen Hoheisel, WSU Area Extension Educator, is in the last year evaluating different commercially available sprayer technologies that will be used to develop best management practices for Washington vineyards. Results from her project have been widely shared at field days, WAVEx and conventions. In her final season, she is collecting data from airblast sprayers.

Leaffolders (Year 1 of 2) – Dr. David James, WSU entomologist, is focused on a new pest in Washington vineyards, leaf-eating...
caterpillars. He is working to identify distribution and damage, species, study biology, identify natural enemies and outline low-input, biologically-based sustainable management strategies.

**Plant-Parasitic Nematodes (Year 2 of 3)** – Dr. Michelle Moyer, WSU Viticulture Extension Specialist and U.S. Department of Agriculture scientist Dr. Inga Zasada are evaluating vine response to nematodes in commercial vineyards and greenhouse settings under varying population densities, nutrient and irrigation regimes and rootstocks for long-term impact of nematodes on vineyard establishment and productivity. The team is also studying the efficacy of pre-plant fumigation and post-plant nematicides under Washington vineyard conditions. A previous project found that Chardonnay and Riesling are better hosts for northern root-knot nematode than red wine grape varieties and identified the best sampling depth and time of year for northern root-knot and dagger nematodes.

**Grape Powdery Mildew Fungicide Resistance and Crown Gall Incidence (Year 2 of 3)** – Dr. Michelle Moyer, in collaboration with USDA’s Dr. Walt Mahaffee, found that nearly 96 percent of the powdery mildew samples from Washington tested positive for the resistance allele (gene) and that more than 90 percent would have likely had full-field resistance. She is working to monitor and map the incidence of fungicide resistance of powdery mildew in commercial vineyards and develop sampling and testing techniques to improve the ability to predict resistance. This project was valuable in leveraging a just-announced federal Specialty Crop Research Initiative grant for more than $2 million, with Moyer as the lead.

**Viral Diseases in WA Vineyards (Year 2 of 3)** – Dr. Naidu Rayapati, WSU plant virologist, has developed a faster diagnostic test to detect both Grapevine Leafroll Associated Virus-3 and Grapevine Red Blotch Virus, monitored the spread of virus through commercial vineyards and developed science-based strategies for managing viral diseases in vineyards. Focus is now on symptomless white varieties. His collaborative work with the University of Florida recently made international headlines for finding a way to clone leafroll virus 3, a first step to understand how the virus works and how to help plants defend against it.

**Survey of WA Vineyards for Potential Insect Vectors of Red Blotch Disease (Year 2 of 2)** – Dr. Doug Walsh, WSU Extension Entomologist, spent 2017 and this year surveying vineyards for buffalo treehopper, a potential vector of red blotch disease. Although the alfalfa three-cornered treehopper, which has been identified as a vector of red blotch in California, is not present in Washington State, the buffalo treehopper is in the same insect family. In addition to surveying the state for distribution of the buffalo treehopper, Walsh established a buffalo treehopper colony so he can evaluate the insect’s efficiency of transmitting red blotch disease to caged grapevines.

**Quantifying Grape Mealybug’s Efficiency as a Vector of Leafroll Associated Viruses (Year 2 of 3)** – Dr. Doug Walsh is working to learn how many grape mealybug crawlers are needed to feed on potted grapevines to successfully vector leafroll disease and identify the time lag between initiation of feeding by mealybugs and cessation of feeding as a result of exposure to systemic insecticides. Lastly, he aims to learn if there is an amount or titer of insecticide in a grapevine that inhibits feeding and would prohibit transmission of the disease.

The information will help finetune mealybug control strategies for growers.

**Enology**

**Smoke Taint Risk in Grapes and Resulting Wines (Year 3 of 3)** – Dr. Tom Collins, WSU Extension Entomologist, spent 2017 and this year surveying vineyards for buffalo treehopper, a potential vector of red blotch disease. Although the alfalfa three-cornered treehopper, which has been identified as a vector of red blotch in California, is not present in Washington State, the buffalo treehopper is in the same insect family. In addition to surveying the state for distribution of the buffalo treehopper, Walsh established a buffalo treehopper colony so he can evaluate the insect’s efficiency of transmitting red blotch disease to caged grapevines.

**Microbiology and Chemistry of WA Wines (Year 1 of 3)** – Dr. Charles Edwards, WSU food scientist, recently found that the yeast Brettanomyces bruxellensis can overwinter and survive in grape pomace in vineyard; can penetrate the wood of oak barrels; and the interaction of storage temperature and alcohol concentration can help suppress Brett populations. His research now looks at the influence of single and continuous additions of sulfur dioxide in helping control the spoilage yeast in red wines, the three-way antagonistic effects of sulfur dioxide, storage temperature and alcohol levels and the impact of non-Saccharomyces yeasts on wine quality.

**Phenolic Compounds in Vineyard and Winery (mechanical pruning and grape maturity) (Year 1 of 3)** – Dr. Jim Harbertson, WSU research enologist, completes his look at wine quality differences between continued on page 8
Research Program, continued.

hand pruning and fully mechanized pruning this season. As he recently found that ethanol plays a large role in the sensory profile of wine, he is now evaluating the impact of grape ripening and alcohol manipulation on the sensory and chemical profile of red and white wines. A third component of his project is to use Raman spectroscopy to develop predictive modeling for wine phenolic analysis.

Impact of pH on Wine Microbial Ecology and Wine Quality (Year 2 of 3) - Dr. Hailan Piao, WSU molecular biologist research associate, is evaluating how the initial starting pH and addition of various types of acids by the winemaker affects the microbial population dynamics of a wine and how different timing of malolactic starter culture additions affect native bacteria and yeast populations. In 2017, a method was developed to create high acid wine.

Sensory Characteristics and Consumer Acceptance of WA Wines (Year 2 of 3) – Dr. Carolyn Ross, director of WSU Sensory Evaluation Center, is studying the sensory influence on Washington wines from non-Saccharomyces yeasts and determining the chemical changes associated with non-Saccharomyces yeasts in red and white Washington wines. Preliminary results show differences in the sensory profiles of wines from non-Saccharomyces yeasts and that a cocktail of non-Saccharomyces yeasts during fermentation reduced ethanol concentration compared to the control fermented with Saccharomyces cerevisiae. Information from this project will help winemakers understand the influence that non-Saccharomyces yeasts have in producing wines with low alcohol and factors that influence mouth-feel.

Once research projects are completed, results will be available to all Washington wine grape growers and wineries through a variety of channels, including presentations at the Wine Commission and WSU sponsored research seminar called WAVE (Washington Advancements in Viticulture and Enology), WSU field days and workshops, research articles published in trade magazines, the WAVE Report (a quarterly research newsletter distributed by the Wine Commission), research reports posted on the Wine Commission’s website (www.washingtonwine.org/research/reports) and other industry meetings.

Please contact me for more information about research projects or to receive the WAVE Report: mhansen@washingtonwine.org.

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This service allows you to customize the information you receive. Choose from topic areas, including: Tree Fruit (apple, cherry, stone fruit, nursery, automation/mechanization), Grapes (juice, wine, table, winery), Other Small Fruit (blueberry, raspberry), Vegetables (potato, onion, sweet corn, peas, carrots, other vegetables), Cereals/Row Crops (wheat/small grains, corn [grain and silage], dry edible beans, alternative crops), Forages (alfalfa, timothy, other grasses/legumes, mint), Livestock (cattle, swine, sheep, goats, pasture management), Ag Systems (high residue farming, soil quality/health, organic ag, direct marketing, small farms), Water and Irrigation (center pivot irrigation, drip irrigation, surface irrigation, water availability/rights).
NW Harmonizes Nursery Certification and Quarantines

By Washington Wine Industry Foundation

Funded by USDA APHIS, the Washington Wine Industry Foundation is helping harmonize PNW (Washington, Oregon, Idaho) nursery certification and grape quarantines.

In May, a series of outreach sessions were held titled “Regionalizing Grape Quarantine & Certification Programs in the PNW” bringing together industry stakeholders: growers, nursery representatives, subject matter experts, regulators, state Departments of Agriculture and partners. The series tour stopped in Yakima, WA, Central Point, OR and McMinnville, OR. Well-attended, the meetings covered: “clean” vs. certified plants; multi-state harmonization efforts; impending regulatory changes in ID, OR and WA to harmonize efforts in the three states; grapevine viruses and best management practices in the vineyard and more.

The rich discussions that came out of these meetings between growers, nursery representatives, educators, and regulators evidenced that face-to-face meetings with a safe space for honest dialogue are integral in advancing the greater Northwest industry and its commitment to sustainable practices.

In addition to this multi-state harmonization effort, the Foundation and its partners are conducting outreach to other states developing or modifying state certification programs for grapevines (New York, Texas, California, and others). Many components of this same work are being mirrored at the national level through the efforts of the National Clean Plant Network.

The Washington Wine Industry Foundation will continue work with stakeholders, meeting with growers and nurseries in each state to develop the first-ever harmonized multistate certification program for grapevine nursery stock in the United States. The project will provide a blueprint for future multistate harmonization of certification programs for other specialty crops by utilizing the strength of a stakeholder-driven effort.

For more information, include access to presentation handouts, visit: http://washingtonwinefoundation.org/grant-update-free-outreach-series/

2019 Winegrowers Convention & Trade Show

Mark your 2019 calendars! The Washington Winegrowers annual Convention & Trade Show is coming soon! Join growers, vintners, viticulturists, enologists, tasting room staff, and marketers from all around the PNW, and nation, to make intentional impact in our industry and leverage the power of intentionalty from grape to glass. We cannot wait to see you!

**WHEN:** February 5-7, 2019

**WHERE:** Three Rivers Convention Center, Kennewick, WA

You won't want to miss our session line-up featuring topics on: labor shortage; technology tools; making wine for a unique identity; DtC vs. distribution; using alcohol on purpose; vector management on rogue & replant; and best management practices resources. Also, our special sessions include a grand tasting on Rosé; the State of the Industry with a focus on strategies for a changing market; and the toasting of our Grower of the Year, Grand Vin, and Industry Service award winners! Click here to nominate your industry leaders!

Are you a student wanting to showcase your research? We are holding our annual Poster Session in conjunction with our 2019 Convention. Click here submit an application.