



Sonoma County Viticulture Newsletter

April 2014

Announcements:

Announcements and links to publications:

http://cesonoma.ucanr.edu/viticulture717/Viticulture_Newsletter/April_2014/

In this issue:

Online temperature inversion data for sites in the Russian River

Rhonda Smith, Farm Advisor Sonoma County and Mark Battany, Farm Advisor San Luis Obispo County

Agriculture has been and is increasingly scrutinized for the amount of water used for irrigation and frost protection. North coast growers in many frost prone areas utilize overhead sprinklers to protect vineyards from spring frosts; however, increasingly growers are contemplating purchasing conventional wind machines to reduce the reliance on water for frost protection. Wind machines provide frost protection only when a temperature inversion exists, thus local inversion conditions need to be quantified in order for growers to make a decision on the method of active frost protection to utilize in a vineyard. If a site does not have a temperature inversion, then a wind machine cannot protect vines from a spring frost.

When an inversion is present, air temperature increases with height above the ground surface. A wind machine fan moves warm air located above the blades downward toward the ground. It also blows cold air upward where it mixes with warm air. The amount of temperature increase near the ground depends on the inversion "strength" and consistency. An inversion can be considered useful if the difference in temperature at 5 feet and 35 feet heights on most nights is at least 2 °F.

Central Coast Study of Vineyard Inversion Conditions

The first vineyard temperature inversion study in coastal regions was designed and conducted in 2011 in two vineyard sites by UCCE San Luis Obispo County Viticulture and Soils Farm Advisor Mark Battany. Towers were placed in planned future vineyard locations and temperature sensors were located at 5 ft. and 35 ft. heights above the ground on each tower. Record freezing temperatures occurred on two nights in April that year and severe frost damage occurred in regions within San Luis Obispo and Santa Barbara Counties. In the [December 2011 issue of the UC Cooperative Extension Grape Notes newsletter](#), Mark discusses the inversion strength measured at tower sites within the two vineyards and explains the predicted increase in temperature at the vine level.



Expansion of Temperature Inversion Study Includes Sonoma County

Beginning in 2012 UC Cooperative Extension began an assessment of springtime temperature inversion conditions in over 60 sites located in Sonoma, San Luis Obispo and Santa Barbara counties that will be completed in 2014. Funding was provided by a CDFA Specialty Crop Block Grant. In each county, approximately 20 towers, identical to those used in the previous study, are placed in vineyards that do not have frost protection or in unplanted areas. The towers are installed in February. Temperature data are downloaded from the dataloggers when the towers are removed in June each year.

The UCCE project is a broad scale assessment of spring inversion conditions. It will provide growers with information to make informed choices regarding the potential effectiveness of wind machines to provide adequate frost protection within a region. Site conditions in a specific vineyard will affect the inversion conditions; for growers facing critical decisions on frost protection strategies for a given location, measuring the inversion condition at that location can be very beneficial. Growers can evaluate the inversions in their specific frost prone sites by installing their own towers as some did starting in 2013. Instructions on how to build a tower and select and install dataloggers are available at the [Frost Protection section of the UCCE San Luis Obispo County website](#).

NOAA-UCCE Temperature Inversion Tower Project

In the Russian River watershed, water use for vineyard frost protection has been increasingly scrutinized due to concerns on its potential impact on endangered and threatened salmonid species. To provide growers with improved frost forecasting for vineyards, as well as determine if wind machines are a viable alternative to using sprinkler frost protection, funds provided by NOAA in late 2013 allowed UCCE to install eight, additional and “enhanced” towers. These eight towers are located in the Russian River watershed; five in Sonoma County and three in Mendocino County. These towers enable wireless transmission of temperature data at each location that can be viewed in real-time on a NOAA website. The data from these 8 towers will augment data from several grower-owned weather stations in the watershed that are utilized by a frost forecasting system operated by NOAA. Temperature data on the NOAA website is constantly updated. Click on the following link to view the station locations of the NOAA-UCCE towers located in Sonoma County and southern Mendocino County.

<http://www.esrl.noaa.gov/psd/data/obs/datadisplay/index.php?ProjectID=9>

The inversion conditions for each station are difficult to view on the NOAA website. In the future, a University of California website will convert the NOAA data to a more user-friendly format that will allow users to easily determine if temperature differences exist between the two sensor heights. In the meantime, an explanation of the NOAA charts is provided at the following link (opens in a different window): <http://cesonoma.ucanr.edu/files/188802.pdf>

Additional NOAA-UCCE towers to be installed

This summer, funding from NOAA will enable UCCE advisors to install additional towers that can provide real-time temperature inversion information. It is critical that we locate installation sites in frost prone areas within the Russian River watershed that are not impacted by active frost control measures such as sprinklers, wind machines or heaters. Towers can be placed on the edge of blocks inside unprotected vineyards if over-the-row farming equipment is not utilized. Towers can also be installed in nearby non-cropped areas and in locations in which vineyards may be developed in the future. These towers are intended to be long-term installations that will provide useful data for many years to come.



Selecting tower locations that are appropriate for this project requires a significant amount of time and scouting. Towers should not be placed in the path of air movement off a nearby slope or adjacent to structures. If you know of potential site in the Russian River watershed, please contact UC Cooperative Extension Advisors [Rhonda Smith](#) or [Glenn McGourty](#) in Sonoma or Mendocino counties respectively.

