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2015 *Winery Equipment* SURVEY REPORT

ALSO:

WiVi Central Coast 2015 Preview

In the Vineyard: The Importance of Uniformity

Cool Product & Category Winners, PAGE 16

How Winemakers are Using Phenolic Measurements to Improve Wine Quality, PAGE 34

Cool Products

In the past two years, *WBM* has written about more than 50 products that advance wine quality via our product reviews, case studies and other articles. From these, *WBM* and the IQ Advisory Board have selected the products that are the most innovative and have the largest impact on quality in the vineyard and cellar.

ACTUAL EVAPOTRANSPIRATION SENSOR/ET DATA PROVIDER

Tule Technologies

Tule Technologies ET sensors are the only technology that can measure the actual ET from an entire vineyard. The Tule actual ET sensor is a hardware device developed by **UC Davis** scientists that is installed in the vineyard above the canopy. The hardware device communicates to Tule's server using a cellular connection. Tule reports the amount of water used in the field, your irrigation application amount, a forecast of atmospheric demand and a recommendation for the amount of water to apply in the coming week based on production goals. *WBM* "What's Cool" columnist **Bill Pregler** says that Tule Technologies' use of Surface Renewal is an exciting new application of a proven science. "When applied to vineyards, it will tell you both the status of the vineyard and how much irrigation is required to meet your objectives. Also by monitoring vineyards 24/7, growers are able to trend conditions and forecast atmospheric demands." For more, see this month's "What's Cool" column on page 22.

ARMBRUSTER ROTOVIB DESTEMMER

Scott Laboratories

The central "pin-shaft" in the Rotovib Destemmer oscillates in addition to rotating relative to the cage. This additional vibration allows a much slower pin-shaft rotation speed relative to the cage. This helps to keep underripe or raisined fruit on the stems, increasing product quality.

CLEANSWEEP NO ENTRY FERMENTER

Spokane Industries

Responding to winemaker concerns of confined space risks and labor availability (especially at crush), **Spokane Industries** developed the CleanSweep No Entry Fermenter, an automated pomace removal system that keeps workers safely outside the tank. Unlike self-cleaning tanks that rely on gravity, the CleanSweep uses a hydraulically driven sweep arm that is powerful yet gentle to the pomace, resulting in controlled removal similar to a fast shovel work crew (that never needs a break). **Juan Muñoz-Oca**, head winemaker for **Columbia Crest** in Paterson, the Pacific Northwest's largest winery, told *WBM* that the new self-emptying tanks offer numerous benefits. First and foremost is quality of wine. With these tanks, he has three methods for doing pump-overs, starting with rack-and-returns, as well as a dedicated pump on each tank. He also has a pulse air system that pushes a bubble of nitrogen into the center of the cap to break it up. This gentle handling minimizes excess maceration, maintaining juice quality. Additionally, the CleanSweep's bottom is conservatively sloped, maintaining tank capacity that is lost with steep-sloped gravity, self-cleaning tanks. A 100-ton tank is cleaned out in less than an hour.

DATA ANALYSIS BY FRUITION SCIENCES

Fruition Sciences

Using proprietary algorithms, sap flow and weather data are analyzed and processed to compute three important parameters: reference evapotranspiration, plant transpiration and vine stress. **Fruition Sciences** has figured out how to interpret and analyze the data so growers don't have to.

SMARTCAP

VinPerfect Closures

VinPerfect's SmartCaps provide three discrete levels of post-bottling oxygen and the most consistent oxygen performance of any closure. With control over post-bottling oxygen, the SmartCap complements the winemaker's style, yielding control over the expressiveness of the wine in the bottle and preventing both oxidation and reduction. Produced in Napa, VinPerfect can deliver customized closures with as little as a week's lead-time. After we selected the IQ Awards this year, a similar product, a new line of screw caps called GTwist with GSeal liners, was introduced by **G3 Enterprises** at this year's annual Unified Wine and Grape Symposium. In addition to the well-established Saranex and Saran-Tin liners, the GTwist

What's Cool

Products that are smart, make your tasks easier and provide cost or labor savings

Bill Pregler has worked in the winery equipment industry for many years and is a staff writer for *Wine Business Monthly*.

Vineyard Water Management From Tule Technologies

The soil-plant-atmosphere continuum, with a new look at evapotranspiration

Bill Pregler

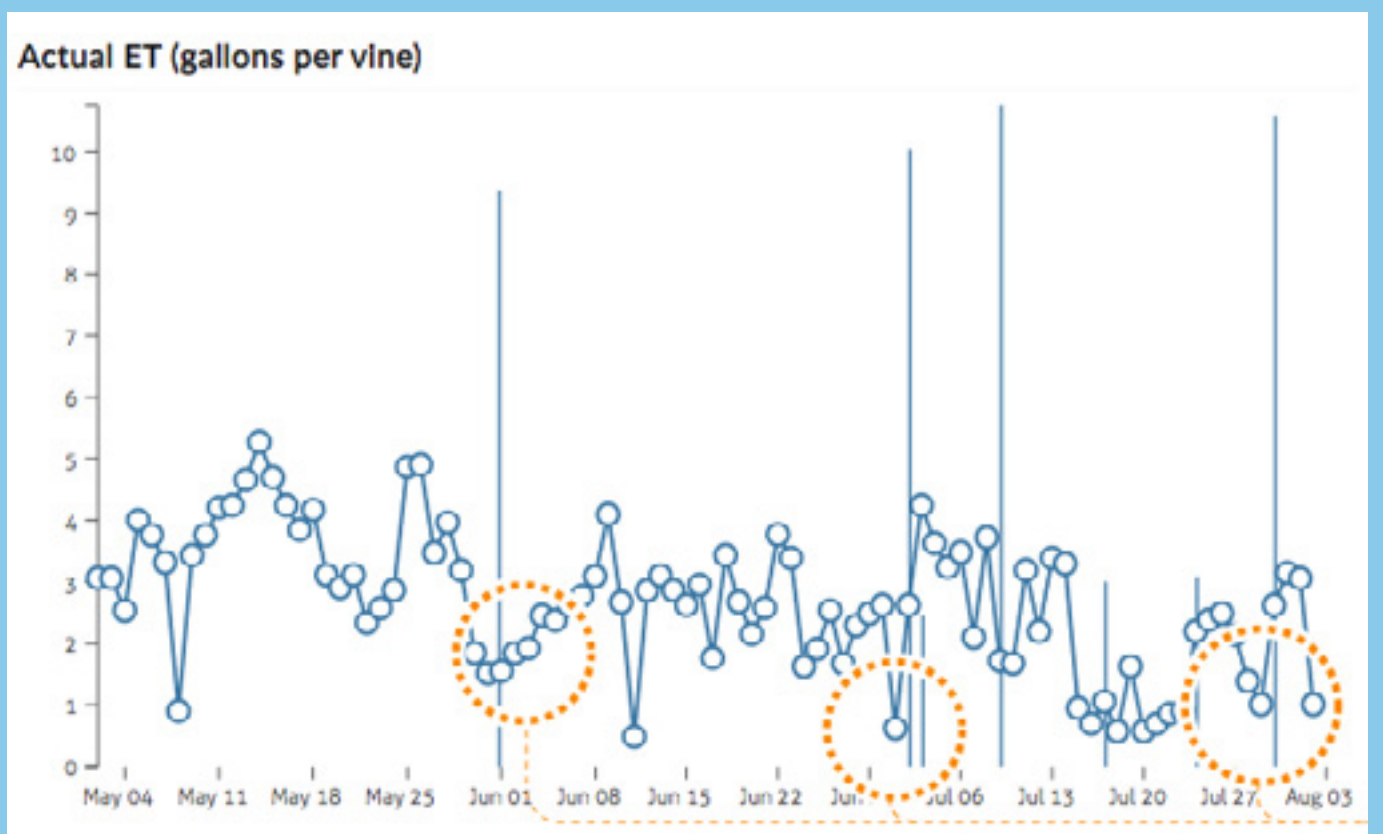
I AM AMAZED THAT proactive water management is embraced by only 26 percent of vineyards across the country. Our most recent *WBM* Vineyard Survey revealed that 74 percent of growers utilize zero technology to monitor water status, schedule irrigation or even measure how much water is used. Zero. And this with a projected drought and depleted water tables a reality for many.

It has been suggested that people resist technology unless it benefits their business. If better management of vineyard stress and the quality/quantity of fruit are not enough incentive to start measuring your water use, perhaps the inevitable government oversight of water resources will tip the scale. But, that being said, Dr. **Mark Greenspan** of **Advanced Viticulture, Inc.** has suggested, "There are many devices in the market that do not produce a clean repeatable signal to quantify moisture patterns … and that growers have become frustrated."

However, there is something new you might want to research—surface renewal. Based on samplings from an area of 1 to 10 vineyard acres, this evapotranspiration (ET) measurement tool is the result of **UC Davis** research that integrates soil-plant-atmosphere-continuum (SPAC) data with ET data.

Surface renewal has been studied in academia since the 1990s but just now made its way into agronomy. Dr. **Tom Shapland**, a member of the original research team, is bringing this technology to market. His company is called **Tule Technologies**, and it aims to combine accuracy with convenience.

Evapotranspiration is the process of soil-plant surface evaporation and transpiration of water through the stomata. Surface renewal monitors the total environment (blocks) of a vineyard with atmospheric demand since wind affects the ET. Surface renewal measures the heat and water vapor being carried away by wind eddies.



An example of the Tule Dashboard. The circles indicate the actual ET (gallons per day per vine) and the vertical bars represent water applied via irrigation (gallons per vine per day). A drop in actual ET (identified by the yellow dashed circles) indicates the vines are regulating their water use in response to soil water deficits. After irrigation, the actual ET increases as vines respond to more water availability.

What's Cool

Vineyard Water Management From Tule Technologies

It also measures actual ET, which is site-specific and not to be confused with reference ET, the traditional approach to estimating evapotranspiration. Reference ET is based on readings from a well-watered grass field at the nearest **California Irrigation Management Information System** station. Unfortunately, this location can be miles from your vineyard, which is probably why many growers have not been secure with the data as it relates to their individual weather zone, temperatures or chaotic wind conditions. Surface renewal and actual ET require no crop coefficients or calculations from this hypothetical grass field.

The ET sensors are capable of monitoring actual ET up to 10 acres each.

UC Davis research into surface renewal is validated against what people call the "gold standard" of monitoring water usage, that being eddy covariance and lysimetry. Also known as eddy flux, it is a measurement technique to calculate vertical turbulent fluxes within atmospheric layers by using wind speeds and temperatures. It is used in everything from micrometeorology to oceanography to agricultural sciences.

Lysimetry is another method for measuring actual ET. A lysimeter examines weight loss from a large cube of soil as the vines planted in that cube lose water to the atmosphere. Tule Technologies uses surface renewal to determine the amount of water vapor that is carried away from your vineyard and the amount of irrigation required to replace the loss.

Growers can decide to replace 100 percent of water loss or induce specific levels of stress. Recommendations are based on the prior weeks' readings to reach individual production goals of crop development.

This information is transmitted from the field station above the canopy via cellular connection to a "Dashboard," which then recommends the amount of irrigation required to replace the water loss. The information is automatically updated each morning and available with a user login to Tule's website. Data is also available via weekly emails, and a mobile app will be available soon.

What is cool is this service is available as subscription-only. Tule owns, installs and maintains the hardware at no cost to the grower. The equipment can be temporarily relocated (if necessary) to accommodate vineyard operations such as spraying, leafing or harvesting.

What's Cool: Tule Technologies' use of surface renewal is an exciting new application of a proven science. When applied to vineyards, it will tell you both the status of the vineyard and how much irrigation is required to meet your objectives. Also by monitoring vineyards 24/7, growers are able to trend conditions and forecast atmospheric demands.

The sensors are placed just above the canopy for a measured area of 1 acre. If placed higher, the surface renewal measures up to 10 acres. This helps considerably, especially when comparing labor needs with the use of conventional measurement, like pressure chambers.

Already there are numerous growers that use surface renewal technology; and as usual, it might be useful to call for references. The application in vineyards is still relatively new, but I recently spoke with managers and viticulturists with **Constellation Brands** who have tried every other monitoring tool available. To them, the accuracy and range of daily ET values from surface renewal were amazing and helped in forecasting, especially when deficit farming.

For more information contact: Dr. Tom Shapland at Tule Technologies at 530-574-0479 or *www.tuletechnologies.com*. **WBM**