

## Napa Valley grower's high-tech management just the start

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Want to see where the art of vineyard management is headed tomorrow? Check out what Napa Valley grape grower Paul Goldberg is doing now.

As Bettinelli Vineyards manager, he looks after the fifth-generation farming family's operations at 10 locations throughout Napa Valley.

The use of computers, software and sensors combined with satellite and Internet communications to monitor vineyard conditions like air temperature, wind speed, soil moisture levels, dew point and the like, have been around for many years. However, some Napa growers, including Goldberg, have taken this wireless technology to a new level of sophistication.

For example, by fitting a sensor-equipped collar, made by Fruition Science, around the trunk or arm of a vine, he can measure the sap flow within the vine.

"The vine itself becomes a sensor," Goldberg says.

This enables him to walk the fine line between stressing the vine to produce top-quality fruit without compromising the overall health of the plant. Weather factors like temperature and humidity affect the plant's demand for water. The vine responds to those factors via the amount of sap or water flowing through it.

The Fruition Science system lets him view graphs on his computer screen that show him, in real time, how sap flows.

"I can set the program to alert me when the vine has run low on water" based on sap flow, he explains. "That's the precise moment when I need to turn on the irrigation."

He can do that from his laptop, tablet or smartphone. He's been able to start and stop his pumps and adjust water application rates remotely for two years.

"The software lets me toggle specially-designed valves to increase or decrease water flow in precise increments with each click of the mouse or tablet screen touch," Goldberg says. "It's all pretty seamless."

This increased level of precision saves time, money and water. "In many cases, this technology has allowed us to irrigate less by holding off the water until later in the season," he says. "And, in some cases, we're now dry farming entire blocks of vineyards that we never farmed without irrigation before."

## High-tech only just beginning

Goldberg is also using this remote monitoring and control to automate frost protection. With wind machines costing \$25,000 each plus the cost of diesel to power them, the less time these machines are running, the better. In the past, he and his managers would drive from one site to the next turning the machines on as thermometers neared the freezing point. Often, they had to turn on the machines earlier than so that they could travel to the next in time to beat falling temperatures.

(See [\*Wine grape frost protection concerns grow with water scarcity\*](#))

Now, instead of spending four to five hours each frost night in his pickup, Goldberg can watch temperatures rise and fall at all 10 vineyards on two computer screens at home. He can remotely control the wind machines. “With this added precision, we’re now running the machines only about half as much as we used to while still protecting the vines,” he says. “This has saved us quite a bit of money in labor, fuel and maintenance costs.”

Other remote sensing applications range from monitoring leaf wetness to assess a powdery mildew threat and being alerted to a possible broken irrigation pipe or a dry well due a drop in water pressure to tracking solar radiation levels that tell Goldberg if the weather at a distant vineyard is sunny, cloudy or foggy.

Much of the remote monitoring equipment and software Goldberg is running was designed by Farming Control Systems and Picovale Services, Inc., of Folsom, Calif.

As dazzling as this high-tech approach may be, it’s only the beginning, Goldberg says. “Right now, we’re just scratching the surface,” he says. “A lot more is on the horizon.”

Still, he remains grounded about the limitations of such systems as well as the consequences of a malfunction. “One missed alert because of a communication failure could cost us millions of dollars,” he says.

He has backup communication links if the satellite signal is lost. On especially critical sites he also has a hard-wired telephone line between the field sensors and his computers.

To ensure these systems are operating properly, he periodically physically verifies that diesel engines, sprinklers and other equipment connected to his computerized control devices actually respond to his computer commands.

“That’s where the smartphone is nice,” he says. “When I’m out and about I’ll stop at a ranch and hit the button on the phone screen to fire up the equipment and make sure it’s running properly.”

There’s also the best backup of all that no technology can replace. “When it comes to growing grapes, there’s no substitute for walking the rows to make sure you’re staying on top of things,” he adds.

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