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This Napa vineyard looks totally bizarre. Here's why it could help with climate change

Organic farmer Mark Neal believes his unusual 'stacked' farming technique may be necessary as temperatures rise

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Red grapes are planted on top of white grapes at Neal Family Vineyards in Rutherford.

Until you look closely, Mark Neal's vineyard looks more or less like any other in Rutherford, the prestigious growing region in the geographic center of Napa Valley.

But walk into a row of his vines, which are shrouded in lush, green canopies this time of year, and it starts to look stranger. Where there should be one grapevine, there are two: a succession of red grape clusters hanging over a tier of white ones.

This unorthodox trellis system is a stay against climate change, said Neal. Rutherford is hot and getting hotter, a situation that Neal finds difficult for growing high-quality white grapes, which are more susceptible to sunburn than their red counterparts. But he didn't want to give up growing white grapes altogether. So he decided to create "natural umbrellas," as he put it, by letting the red grapevines and their leaves act as a protective shield.

It's the latest example of a Napa Valley vintner making a major farming shift in response to climate change, which threatens to alter the way grapes grow and the way wines taste throughout the world in the coming decades. In Napa, a county whose agricultural production was worth $746 million last year, the stakes are especially high, and the push to adapt to a warmer future can sometimes seem at odds with business realities here. Calls to replace the valley's signature wine, Cabernet Sauvignon, for example, with hotter-climate — but commercially unpopular — grapes like Alicante Bouschet and Touriga Nacional are often met with incredulity.

Neal's approach is "definitely something new for Napa," said S. Kaan Kurtural, viticulture specialist at UC Davis. (According to Kurtural, there are vineyards in Chile that use a similar type of stacked trellis.) And as temperatures rise, people may be looking for something new. Other grape growers have lately been showing up unannounced at Neal's vineyard, Neal said, hoping to get a glimpse.

Mark Neal started planting red grapes on top of white grapes in 1997. Now, he's converting his whole vineyard to this unusual trellis system as a hedge against climate change.

"This thing is getting to be a tourist trap with farmers," he said.

Some other land owners are now even asking Neal — who farms grapes for 92 other wineries as part of his vineyard management company, Jack Neal & Son — to install the system at their properties. This summer, he did just that at Burgess Cellars' Saint Andrews Vineyard in Napa's Oak Knoll District.

Burgess winemaker Meghan Zobeck, who planted the entire vineyard with climate change in mind, had never seen this style of trellis before. "We thought we might try this as a way to conserve resources," she said, by using "the canopy of the (Cabernet) to shade the (Sauvignon Blanc) and hold on to the acids that we covet in the grapes."

Whether or not the Dual Varietal Trellis System, as Neal has dubbed it, ever becomes the standard in Napa Valley, Neal believes it's urgent for Napa's grape growers to wake up to the fact that they are going to have to change the way they farm — maybe in radical ways, and maybe quite soon.

Vineyard workers dig holes to plant new Greek grape varieties at Neal Family Vineyards.

When Neal was growing up in Rutherford, grapes weren't the only cash crop around. His family, who bought this property in 1966, kept a walnut orchard, vegetable gardens and farm animals. The small amount of grapes they did grow was comprised of now-unfashionable varieties like Berger and French Colombard, as well as Napa Gamay (now known as Valdiguie).

Neal both witnessed and participated in Napa's gradual transformation from a place with diversified agriculture to a relative monoculture. He and his father started their vineyard management company in the late 1960s,

and today Neal is in charge of the farming for about 1,800 acres throughout Napa. (Almost all of that acreage is organic, and about 720 acres are certified biodynamic.) Eventually he bought a 25-acre property on Howell Mountain, but he held on to the original family ranch in Rutherford.

At the time Neal first installed a double trellis in his vineyard, in 1997, climate change wasn't on his mind. He simply wanted to ensure he could sell his product: grapes. Rutherford, here on the flat valley floor, has always been sunny, and in the past Neal had seen some wineries reject Sauvignon Blanc or Chardonnay grapes from nearby vineyards because the berries had "too much amber," he recalled.

That is, the green berries were spotted with brown freckles, an indication of sunburn, which can diminish the quality of the resulting wine. With too much sunlight, grapes can develop compounds such as kaempferol, explained Kurtural, which can make fruit taste astringent or turn it to a raisin.

The standard way to prevent sunburn is to drape a UV-blocking cloth over the fruit, but Neal worried that these shade cloths could trap too much moisture, potentially introducing mold. So he wondered: "How can I grow white grapes in Rutherford without putting up a shade cloth and without getting the amber?"

Vineyard workers dig holes to plant young grapevines.

On a 2-acre section of his vineyard, he tried out a double trellis, overlaying Sauvignon Blanc vines with Zinfandel. For the first few years, Neal wasn't sure it was going to work. The Sauvignon Blanc started crawling into the Zin, disrupting the upper-level plants. But eventually, he dialed in the protocol, and he liked the effects: Because they got less direct sunlight, the white grapes took longer to ripen, allowing them to develop more flavor. There was never any amber.

He also realized that the dual system had some environmental advantages. By irrigating two vines at once, he could use less water. Every tractor pass could be more efficient, leading to fewer greenhouse gas emissions.

For about 20 years, he kept the system confined to that one small area of his 18-acre vineyard, hewing to more familiar methods in the rest of the property. But in the last few years, with hotter temperatures, severe drought and increased pest pressure, Neal decided to make a bigger change. Starting in 2020, he has been converting the entirety of his Rutherford vineyard to the double-trellised system.

This time, he wasn't just planting Sauvignon Blanc. The bottom rows of his vineyards now comprise white grape varieties rarely seen in Napa Valley, like Fiano, Vermentino, Melon and Albariño. As a nod to his Greek heritage — his maternal grandmother is from Crete — he will soon plant Assyrtiko, the main grape on Santorini. While most of the upper-level reds are Cabernet Sauvignon, there is also a section of the Greek red Agiorgitiko. Many of these grapes are grown in hot regions near the Mediterranean, which makes them appealing candidates for a warming climate.

Red grapes act as a "natural umbrella" for the more delicate white grapes planted below them.

The mélange is commercially risky in Neal's ZIP code, where Cabernet Sauvignon grapes can command such a high price — going into wines that cost $200 or more per bottle — that many farmers don't bother growing much else. In fact, very little white wine is made from Rutherford at all: White grapes (almost entirely Sauvignon Blanc and Chardonnay) make up just 14% of the appellation's acreage, according to data provided by the Rutherford Dust Society. Cabernet Sauvignon comprises 71%.

Neal acknowledged it would be hard to justify planting such out-there grapes if he had to sell them rather than using them for his own winery, Neal Family Vineyards. His Vermentino, the first of the newly planted whites to be released, may persuade some naysayers to reconsider this southern Italian variety. Neal's 2021 Vermentino is rich and long, tasting like lemon buttercream and fennel. It's got all the nuance and verve that many drinkers seek in Napa Chardonnays, plus a proven track record in hot Mediterranean climates.

Even if Napa Valley never becomes Vermentino country, however, Neal predicts that the Dual Varietal Trellis System may eventually become widespread. The appeal will partly depend on how seriously Napa's grape farmers take the threat of climate change.

Kurtural, the UC Davis scientist, believes it will be easier to get farmers to change something like a trellis than to abandon Cabernet. "There's not a whole lot of appetite for new varieties at the moment," he said.

But it's already becoming common to move away from vertical shoot positioning, the reigning trellis system of the last half-century, which was designed to maximize sun exposure on the grapes. That sun exposure might have been welcome in the 1980s and '90s, but no longer. Later this year, UC Davis will be releasing a set of new recommended trellis designs that will promote shading.

Maybe the appeal of Neal's wacky trellis for other farmers will simply be financial. The average yield from a Napa Valley vineyard is usually around 5 tons per acre. (Last year, due to drought, it was unusually low, at under 3 tons per acre.) Neal said his dual trellis allows him to harvest 12 to 15 tons per acre. That math may be enough to pique some growers' interest.

Neal compared it to the considerations involved in urban planning. "Everyone in the valley just wants to expand horizontally," he said. Yet Napa is not infinite. To keep vineyards here viable, especially for grapes besides Cabernet Sauvignon, he said, it's time to think about building upward.