

What Happens When a Vineyard Becomes a Laboratory

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From unexpected grapes in Napa to regenerative farming in Temecula, experimental vineyard blocks are helping wineries figure out what may work next.



Research blocks give wineries a place to test new grape varieties, farming methods and other ideas on a smaller scale before making bigger bets across the vineyard. Larkmead Vineyards' Research Block in Calistoga. | Photo Credit: Bob McClenahan

These days, wine regions are very good at theorizing about the future. Warmer vintages. Increasingly erratic weather. Changing consumer behavior. New farming methods. Grape revivals. New ways of thinking about what should go on in a vineyard and, ultimately, what should go into a bottle.

At some point, though, somebody has to put their money where their mouth is. You know, plant something and see what happens. The ol' mess around and find out.

Putting Vines in the Ground

At Larkmead Vineyards in Calistoga, that jump from ideation to action is taking place in a three-acre research block planted in 2020 with a range of grape varieties, clones, and rootstocks. The goal was to see how they would respond to Larkmead's soils and Napa Valley's ever more unpredictable growing conditions over actual seasons, harvests, and fermentations.

The project has now produced its first two red wines. The 2023 Contour blends Tempranillo, Cabernet Sauvignon, Aglianico, Malbec, and Zinfandel. The 2023 Keyline brings together Shiraz, Malbec, Petite Sirah, Charbono, Touriga Nacional, and Zinfandel. If that all feels like a mouthful, so do the wines in the actual mouth.

For a historic Napa estate built around Bordeaux varieties, neither blend is exactly expected. Winemaker Avery Heelan is also quick to point out that the project was by no means meant as a referendum on Cabernet Sauvignon.

“The question was never whether Bordeaux varieties still belong at Larkmead—they absolutely do,” says Heelan. “Rather, we wanted to ask what additional varieties might perform exceptionally well here, how they might contribute to our broader viticultural knowledge, and whether they could open new possibilities for the estate in terms of blending, portfolio diversity and accessibility. In that sense, the Research Block is both practical and philosophical, but at its core it is a continuation of Larkmead’s longstanding culture of experimentation.”

Climate conversations in California often get reduced to an either-or question: Cabernet forever, or rip it all out and start planting, say, Southern Italian grapes. Larkmead’s approach, however, is much less dramatic. Cabernet remains central to the estate’s identity. The Research Block simply gives the team room to test what else might work alongside it.



Larkmead’s 2023 Contour and Keyline are the first red wines to emerge from the estate’s Research Block, translating years of vineyard experimentation into two distinctly different Napa blends. | Photo Credit: Robb McDonough

Some varieties have performed well. Some have not. Those underperforming vines have already been top-grafted, allowing the Research Block to keep evolving rather than freezing the original planting in place.

“We did not begin with a fixed idea of which grapes had to be in the wines,” explains Heelan. “We began with the vineyard itself—looking closely at which varieties showed the strongest adaptation, balance, and character on the estate—and then carried those best-performing lots into blending trials. The result is two blends that feel cohesive and intentional, even as they pull from grapes not traditionally associated with Napa red wine. In that way, the wines are contemporary in composition but still very classical in discipline.”

What the Vineyard Gave Them

Indeed, there is something that still feels unmistakably Napa about both wines, even though each has a distinct identity. Contour keeps a clear connection to Larkmead’s Cabernet history. Tempranillo leads the blend, but Cabernet Sauvignon provides structure alongside the other supporting characters. Keyline is the more extroverted of the two, with darker fruit, more texture, and a lineup of grapes that rarely appear together on a label, in Napa or elsewhere.



“I had a stylistic destination in mind for each wine, but the vineyard ultimately determined the vocabulary,” says Heelan. “The varieties that succeeded here, and the way they spoke in a given vintage, shaped the final blends in a very real way.”

There is a consumer-forward piece to the project, too, which feels especially relevant in today’s wine industry. Larkmead sees the Research Block wines as more immediately approachable, both stylistically and in price, than the kind of Napa Cab someone might buy with plans to lay down. They also give the estate a way to offer something genuinely different without pretending that the winery’s entire identity has changed.

“For Larkmead, these wines are not a rejection of Napa’s identity; they are an expansion of it,” says Heelan. “They suggest that the future of Napa will still be anchored by Bordeaux varieties, but enriched by greater diversity—in the vineyard, in the cellar and in the kinds of wines that consumers are excited to drink.”

Different Questions, Different Experiments

Other wineries are using vineyard research to ask different questions. At Essentia, Moët & Chandon’s vineyard conservatory in Champagne, the focus is preservation. The house has collected diverse vine material from old plots, including plants with different bunch sizes, leaf shapes, growth habits, and yields. The team is monitoring them for traits that may become increasingly useful, including later ripening and resilience to frost, drought, and disease. Historic grapes such as Arbane, Petit Meslier, Troyen, and Gouais are also preserved alongside Chardonnay, Pinot Noir, and Meunier.

Larkmead is testing which additional grapes might perform well in Calistoga. Moët is looking more closely at the diversity Champagne already has and whether some of that material could prove valuable under different conditions.

At Wilson Creek Winery in Temecula Valley, the vines themselves are not the main experiment. The farming is. Block 9 is the estate’s most intensively monitored regenerative vineyard block. The program combines plant-sap analysis, soil-health assessments, beneficial insects, insectary plantings, and ongoing tracking of yields, pathogen pressure, microbiome health, and cost.

“Block 9 has taught me that there is not a single, simple solution but rather stacked practices that have a combined beneficial effect greater than the sum of the individual practices,” says vineyard manager Greg Pennyroyal.

But the biggest surprise showed up in the cellar. “Although improvements in biological measurements were consistent, the shift in the fermentation curve was remarkable, leading to complex, integrated wines with virtually no secondary fermentation issues,” he says.

Small Blocks, Bigger Bets

These are all still early projects. Larkmead’s block was planted only a few years ago. Wilson Creek is gathering results over a limited number of seasons. Moët’s conservatory is intended to preserve material whose real value may not become clear for decades.

They also don’t offer easy answers. What they do offer is a place for wineries to test ideas before making much larger, potentially riskier bets. Sometimes the experiment is a new grape. Sometimes it’s old vine material worth preserving. Sometimes it’s a farming system built from a long list of small, overlapping practices.

The answers require patience. But in the meantime, some of them are already making it into the bottle.