

Resurrecting Ancient Wines That Can Survive Climate Change

A Catalan winery is preparing for the industry's future by reviving its past.



Bodegas Torres, a winery in Catalonia, is researching and rediscovering wine varieties long thought to be extinct.

Andrea Marks

MATTHEW SEDACCA

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The Spanish region of Catalonia is proud of its traditions. The official language, Catalan, [has thrived](#) for centuries, despite the establishment of Spanish as the rest of the country's official language in the 1700s. *Castells*, or adults and children climbing on each other's shoulders to form human towers, continues to be a popular activity at festivals. And in Vilafranca del Penedès, an hour outside of Barcelona, the local winery Bodegas Torres is researching and rediscovering wine varieties long thought to be extinct.

It just so happens that many of these revived regional varieties thrive in hotter, drier climates. So Bodegas Torres is regrowing these ancestral vines to assuage the wine industry's looming climate-change crisis.

Growers in Mediterranean-climate regions in Western Europe, California, and Australia report that increasing temperatures are leading to early harvests. For the time being, these early harvests result in higher-quality wines. But as temperatures climb higher and higher, driven by human-related greenhouse gas emissions, researchers believe that climates throughout these regions will become unsuitable for growing popular varieties. A 2013 study [reported](#) that lands suitable for growing wine grapes will decline by 25 percent (Chile) to 73 percent (Australia) by 2050. In 2016, a paper [analyzing](#) viticulture data in France and Switzerland from 1600 to 2007 found that climate change is indeed behind the higher temperatures driving the reported early harvests across Western Europe.

Benjamin Cook, the 2016 paper's lead author, explains that although early harvests may be a boon for growers in some areas, the increased heat will have different effects on wine-grape production in wetter climates like France, compared to drier regions like California or Spain. "In California, it doesn't rain from May to September, so if you don't have the water stored in the ground, or water available from reservoir to irrigate, that can have a negative impact on grape production," Cook says. He added that in addition to California, "areas that already have dry summers—the Mediterranean climates—those are the areas where the adaptation for drought is going to be very important."

Grapes in the Bodegas Torres vineyard (Andrea Marks)

Despite Spanish winemakers' imminent need for a solution to these increasing temperatures, Bodegas Torres' ancestral-wine project was actually motivated by a desire to preserve local heritage. "All this research that we are doing by the ancient Catalan varieties, it's something we are doing for the land, for the history of Catalonia," Mireia Torres Maczassek, the winery's director of research and development, said. Climate adaptability, it turns out, is a happy side-effect.

During the 19th century, many vineyards in Western European countries like France and Spain suffered from phylloxera, a microscopic aphid that attacks the grapevines' roots and causes rot. The Penedès region lost many red wine varieties to the scare, and afterwards, wineries planted white varieties that had been grafted with phylloxera-resistant American rootstock. But decades later, the local winemaker Miguel A. Torres believed that the Penedès region might still host a few survivors of the pest eradication. During the 1980s, Torres posted ads in local newspapers, asking farmers to respond if they spotted any unidentified or unusual vines in their fields. By 1996, Bodegas Torres, with Miguel A. Torres as its president, produced its first healthy ancestral grape species: *Garró*, a tannin-heavy, dark blue grape.

Now, almost 30 years later, this viticulture-flecked archaeological research project has led to an environmental research collaboration with France's National Agricultural Research Institute, as well as the rediscovery of 46 grape varieties (although only a few are capable of producing wine). Inside the winery's experimental greenhouse, rows of bright green vines stretch toward the sun, awaiting their replanting in micro-test fields.

Torres Maczassek explains that the process of identifying and reviving a wine variety is a tedious one. After conducting identification and DNA analyses to determine whether the supposedly unknown vine already "exists," they extract tissue from the tip of the ancestral plant's shoot. The tissue is then grown *in vitro* for a year, and afterwards grown in a soilless mineral solution to gain more biomass. The healthy vines are then planted in experimental vineyards in different nearby climates, and finally, their berries are used to create wine.



The Torres vineyard in Catalonia (Andrea Marks)

Some of these varieties thrived extremely well in the arid testing environments, due to characteristics like their berries ripening near the end of autumn, and to water-retention mechanisms like restricting or slowing leaf growth. A century from now, when hotter weather has made some of the grape varieties used today obsolete in Catalonia and other regions, these ancestral vines will be more capable of bearing fruit.

Even if the future's higher temperatures are anthropically induced, Markus Rienh, a professor of viticulture at Changins, a school in Switzerland with a focus on viticulture and oenology, says that the reason the varieties rediscovered by Bodegas Torres are better suited for hotter global temperatures is that numerous regions have gone through their own climate changes in the past. "We had this Climatic Optimum during the Middle Ages, and temperatures were pretty similar to now. Then it cooled down, and now it's heating up again," Rienh said. "That could be a reason those varieties perform better now."

Elizabeth Wolkovich, an ecologist at Harvard University and co-author on the 2016 study, says these ancestral varieties alone don't carry the burden of keeping the world supplied with wine during a hotter future. In a review [published](#) this past June, she and her co-authors wrote that although the amount of genetic diversity among well-known and commonly used wine varieties is extremely small, differences in their seasonal development are vast. Wineries, she hypothesized, could crossbreed to produce super-climate offspring. In the case of Bodegas Torres' ancestral-wine project, that means producing varieties that both taste great and can thrive in hotter temperatures.

Despite the predictions of higher global temperatures in the near future, speed unfortunately is not something Torres Maczassek and her colleagues can promise. Even after regrowing a healthy variety, it can take nearly 20 years for the Spanish and Catalan governments to officially recognize these living dinosaurs and green-light them for mass production. But if their plan works, we'll at least have decent reds and whites to sip on—perhaps at a time we need them most.

"In the future, I don't know what is going to happen," Torres Maczassek said. "We are trying to do as much as possible."

ABOUT THE AUTHOR

MATTHEW SEDACCA is a writer based in New York. His work has appeared in *Nautilus*, *Eater*, and *Quartz*.

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