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Swiss Study Finds Divico Grapes Reach a Stable Sugar Plateau Before Harvest

Researchers said the disease-resistant variety kept consistent pH across four vintages, giving growers more flexibility on picking dates.

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Researchers in Switzerland have published new field data on how Divico, a disease-resistant red grape, ripens from vine to harvest, offering growers and winemakers a clearer picture of when the variety reaches maturity and how stable its composition remains across different years and sites.

The study, published Friday in the journal OENO One, followed Divico grapes during the 2019 to 2022 vintages in two Agroscope experimental vineyards, one in Leytron in the canton of Valais and the other in Pully in the canton of Vaud. The team also used Pinot noir as a comparison variety because both grapes belong to the same early ripening group in the traditional Pulliat classification and because Pinot noir remains a common benchmark in Swiss vineyards.

The authors said Divico was developed in response to a long-standing problem in viticulture: the high sensitivity of many Vitis vinifera grapes to fungal diseases, which often requires repeated pesticide use. Divico is described as highly resistant to downy mildew and powdery mildew and as showing low sensitivity to grey mold. Earlier work had already suggested it could produce deeply colored red wines with good sensory potential, but the new paper says there had been no published description of its ripening dynamics in the vineyard, a gap that matters because harvest timing strongly affects wine quality.

To address that, the researchers tracked changes in berry sugars, total acidity, tartaric acid, malic acid, pH and phenolic compounds after veraison, the stage when grapes begin to soften and change color. They collected berries over four vintages for technological ripeness and over three vintages for phenolic ripeness, then used mathematical models to describe how each parameter changed over time.

Their results point to two traits that stand out for growers. First, Divico reached a stable sugar plateau at the end of ripening instead of showing a rapid late climb. The authors said that pattern can give producers more flexibility in harvest decisions because waiting a little longer may not lead to major changes in sugar concentration. Second, pH at full maturity remained steady across vintages at each site, with values of 3.3 in Leytron and 3.1 in Pully, despite differences in weather from year to year. The paper describes that consistency as a sign that the variety responds in a stable way under

varying climatic conditions.

The study also found that Divico accumulated high levels of anthocyanins, the pigments that give red grapes and wines their color. The concentration exceeded 1000mg/kg, a level the authors highlighted as strong color potential for red winemaking. They also monitored the total polyphenol index, another measure linked to the structure and style of red wine.

That matters beyond vineyard research because wineries need reliable ripening data to decide when to pick fruit, how to manage fermentation, and what wine style to target. In practical terms, a grape that combines disease resistance with stable ripening indicators could help producers reduce some crop protection risks while making harvest scheduling less vulnerable to short weather swings. For the wine business, that may support planning for a variety already promoted as a lower-input option in the face of climate pressure and tighter expectations around pesticide use.

The field work was carried out in two non-irrigated vineyards with different soils. Leytron sits on very stony, deep soil with lower water-holding capacity, while Pully has deep clayey sandy soil without stones and higher water-holding capacity. By using both locations, the researchers aimed to test whether Divico would behave differently under contrasting site conditions. They also took account of climatic variability between vintages by using weather data from April through October for each site.

Pinot noir served mainly as a reference point. The paper notes that Pinot noir is more susceptible to grey rot and that Divico is often harvested later, which can improve wine structure, tannin quality and complexity. Earlier Swiss work had shown that for some red grapes, including Gamaret, tracking anthocyanin accumulation can help identify an optimal harvest window. Pinot noir has been harder to manage that way because its anthocyanin curve tends to rise more continuously without a clear peak. The new study was designed in part to see whether Divico followed known patterns or showed its own ripening behavior.

According to the paper, the answer is that Divico has distinct but useful kinetics. Sugar accumulation followed a logistic curve toward a plateau. Total acidity and malic acid declined as ripening progressed, while tartaric acid and pH showed more linear

changes over the monitoring period. Anthocyanins followed a bell-shaped pattern, rising after veraison and then stabilizing or declining near harvest. The authors used those models to estimate indicators such as the date when grapes reached 95% of maximum sugar and the timing of peak anthocyanin accumulation.

The paper places the work in a broader shift inside Swiss viticulture. Resistant grape varieties account for 3.7% of the country’s total vineyard area, the authors said, citing recent figures. Divico, approved in Switzerland in 2013, is now the country’s leading disease-resistant variety by planted area. With 104 hectares recorded in 2024, it represents more than one-third of all disease-resistant red grapes planted in Switzerland.

That growing footprint appears to be one reason the research was carried out now. The authors wrote that winegrowers’ interest in Divico has increased and that field observations have raised practical questions about how the variety should be monitored for ripeness and how it should be handled in the winery. Because red wine quality depends on more than sugar alone, they argued that a full picture must include acidity, phenolic ripeness and, eventually, aromatic development as well.

The study does not present Divico as a cure-all, and it remains focused on two Swiss vineyards rather than all growing regions. But the data give producers a clearer technical basis for working with a grape that is already spreading in commercial plantings. For growers, the main value is a better measure of when the fruit has stopped actively loading sugar and how acids and pH behave near maturity. For winemakers, the main value is a firmer expectation of color potential and harvest flexibility from a resistant red variety that could fit more sustainable production strategies.

The research was led by Marie Blackford and colleagues from Agroscope and other institutions. The paper was received on March 2, accepted on August 24 and published on September 18 in OENO One.