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Título artículo: Projected effects of climate change on Tempranillo and Chardonnay varieties in La Mancha Designation of Origin.

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RESUMEN: Climate is one of the components of terroir that most influences grape growth and development. Vines might suffer significant impacts under climate change, although they can be different depending on the variety and location. The aim of this study was to analyze vine phenology and grape composition variability related to weather conditions in La Mancha Designation of Origin, in Spain, and potential changes caused by climate change. The research focuses on the Tempranillo and Chardonnay varieties. Phenological dates and grape composition at ripening were evaluated for the period 2000–2019 and related to climatic variables. This information was used to project the potential variations under different emission scenarios (Representative concentration pathways RCP4.5 and RCP8.5) for 2050 and 2070. An advance in phenology is projected under climate change, for the two varieties, in agreement with that observed in years with different weather conditions. The advance for 2050 could be of 6, 11, 9, and 8 days for Tempranillo and 4, 9, 9, and 10 days for Chardonnay, respectively, for bud break, flowering, veraison, and maturity under the RCP4.5 scenario, and up to 50% higher under the PCP8.5 scenario. This advance in the phenological timing will imply ripening under warmer conditions, which could affect grape quality. A decrease in titratable acidity in both varieties is projected due to the increasing temperatures, which would have negative implications for the two varieties, and anthocyanin concentrations in Tempranillo are projected to suffer changes due to variations in temperature and in water deficits. The research presents a novelty for La Mancha DO, where there is no previous analysis in this respect. This is the first study in this vine-growing region in which projections are made on the potential changes for aforementioned vine cultivars, whose response is analyzed for expected warmer conditions in relation to those observed in cooler areas.