

# Projected changes in vine phenology of two varieties with different thermal requirements cultivated in La Mancha DO (Spain) under climate change scenarios

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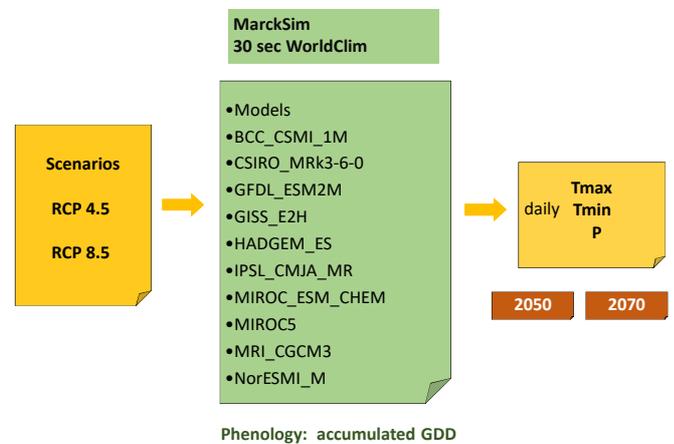


## Objective

The aim of this work was to analyze the phenology variability of Tempranillo and Chardonnay cultivars, related to the climatic characteristics in La Mancha Designation of Origin, and their potential changes under climate change scenarios.

## Material and methods

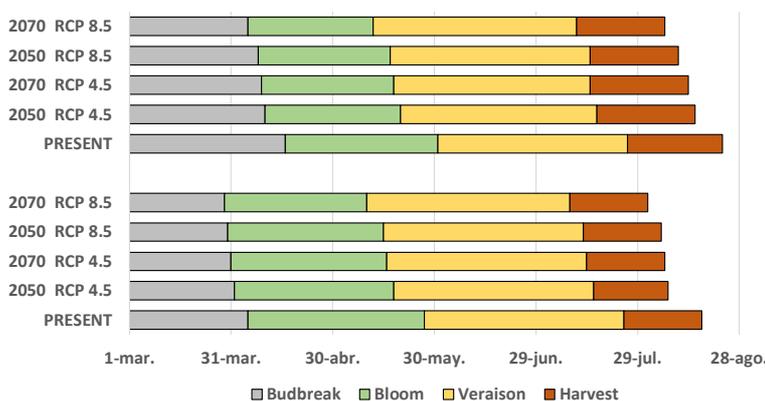
Phenological dates referred to budbreak, bloom, veraison and harvest were analyzed for the period 2000-2019. The weather conditions at daily time scale, recorded during the same period, were also evaluated. The thermal requirements to reach each of these phenological stages were calculated and expressed as the GDD accumulated from DOY=60. Changes in phenology were projected by 2050 and 2070 taking into account those values and the projected temperatures and precipitation, simulated under two Representative Concentration Pathway (RCP) scenarios –RCP4.5 and RCP8.5– using an ensemble of models.



## Results and conclusions

The average phenological dates during the period under study were April 16<sup>th</sup> ± 6.6 days and April 5<sup>th</sup> ± 6.0 days for budbreak, May 31<sup>st</sup> ± 6.0 days and May 27<sup>th</sup> ± 5.3 days for flowering, July 26<sup>th</sup> ± 5.6 days and July 25<sup>th</sup> ± 5.8 days for veraison, and Ago 23<sup>rd</sup> ± 10.8 days and Ago 17<sup>th</sup> ± 9.0 days for maturity, respectively for Tempranillo and Chardonnay. The projected changes in temperature imply an average change in the maximum growing season (April-August) temperatures of 1.2 and 1.9 °C by 2050, and 1.6 and 2.6°C by 2070, under the RCP4.5 and RCP8.5 scenarios, respectively. A reduction in precipitation is predicted, which vary between 15% for 2050 under RCP4.5 scenario and up to 30% by 2070 under RCP8.5.

The advance of the phenological dates for 2050, could be of 6, 7, 7, and 8 days for Tempranillo and 4, 6, 6 and 9 days for Chardonnay, respectively for budbreak, bloom, veraison and harvest under the RCP4.5 scenario. Under the RCP8.5 emission scenario, the advance could be up to 30% higher.



Bloom in Tempranillo cultivar.

Projected changes in phenology for Tempranillo (top series) and Chardonnay (bottom series) in La Mancha Designation of Origin.

