



PRECIPITATION VARIABILITY IN A TEMPERATE COASTAL REGION AND HOW IT AFFECTS TANNAT AND ALBARIÑO CULTIVARS

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Abstract:

Context and purpose of the study - Climate is one of the main components that defines the development and behavior of the plant, conditioning the health status and the final quality of the grapes. In temperate coastal climates such as in Uruguay (latitude 35° S, longitude 55° O), precipitations during the growing season present high interannual variability, with an average of 100 mm per month. This variability means that plants must adapt to conditions from one year to the next. The objective of this work was to evaluate the performance of two cultivars; Tannat, adapted cultivar of Uruguay and Albariño, a cultivar recently introduced in the country, in relation with precipitations during three growing seasons.

Material and methods – We analyzed precipitation data from two agro-meteorological stations in southern Uruguay over 31 years (1992-2022). We calculated descriptive indexes of precipitation (PP) during the growing season (September to March) and dry periods (moving average of 15 days with PP less than 6 mm). We established trends of precipitations using means of first-order linear regressions. We measured water potential at different phenological stages (25, 33, 34 and 37 of Eichhorn-Lorenz scale) of Tannat and Albariño, over three contrasting growing seasons in terms of precipitation (2019: preveraison precipitation; 2020: dry and 2021: postveraison precipitation) in order to assess plant water status, as well as plant physiological parameters (leaf area, yield, cluster weight, pruning weight, ravaz index and leaf/yield balance index), grapes final composition and health status at harvest.

Results – In the last 31 years, precipitations during the growing season ranged from 405 to 1154 mm and 64 to 599 mm during the grape ripening period. In 197 days of the growing cycle in Uruguay (1 Sep - 15 Mar), an average of 66 days had precipitation, which means one event every three days. However, when analyzing the dry periods, an average of 18 events per growing season were recorded with a variability from 0 to 50 periods, which shows the alternation between excess and deficit of water in the terroir. The 31-year trend showed an increase in these dry events ($r^2 = 0.32$; p -value = 0.07) and a decrease in days with precipitation ($r^2 = -0.31$, p -value = 0.07). When analyzing the cultivar response to the 2019, 2020 and 2021 cycles, both cultivars showed significant differences in soluble solids, pH and berry weight. Albariño showed differences in bunch weight, while Tannat showed differences in total acidity, anthocyanins, leaf area, yield with incidence of *Botrytis cinerea* sp., pruning weight and bunch index. Therefore, the high inter-annual variability had an impact on Tannat performance. Still, Albariño was more stable between rainy and dry years, an interesting option for winegrowers searching for durable and sustainable products.

Keywords: Albariño, Tannat, climate variability, precipitation, Uruguay.