



# RIPENING EVOLUTION IN DOUBLE PRUNING MANAGEMENT OF FRENCH GRAPEVINES 'MERLOT' AND 'TANNAT' UNDER SUBTROPICAL CONDITIONS IN BRAZIL

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## INTRODUCTION

Brazil boasts continental dimensions and a vast diversity of viticulture within its territory, with a planted area exceeding 75 million ha. Wine production surged by 60% in 2020, accompanied by a 1.2% expansion in vineyard acreage, marking a record since the 2000s. With the pursuit of new viticultural frontiers and the increased production of wines, particularly from French grape varieties such as 'Merlot' and 'Tannat', new cultivation techniques have been developed to enhance grape ripening and consequently the production of quality wines, especially in regions with no tradition in viticulture. The dual pruning technique, still relatively novel in Brazil, originated in the Brazilian Southeast and is employed for producing wines of superior quality in subtropical high-altitude conditions.

This technique involves two viticultural seasons and a single harvest, achieved by performing two prunings on the vines, thereby altering the timing of grape ripening and harvest, resulting in well-ripened grapes and high-quality, characteristic wines. Wine quality is directly linked to the optimal point of grape ripening, which encompasses physiological, technological, and phenolic ripening events. Analyzing these parameters throughout berry development enables the establishment of indicators for technological and phenolic ripeness, translating into different qualitative potentials for fine wine production. This study aimed to characterize the ripening behavior for the production of French-origin grapevines 'Merlot' and 'Tannat', under dual pruning management, for red wine elaboration.

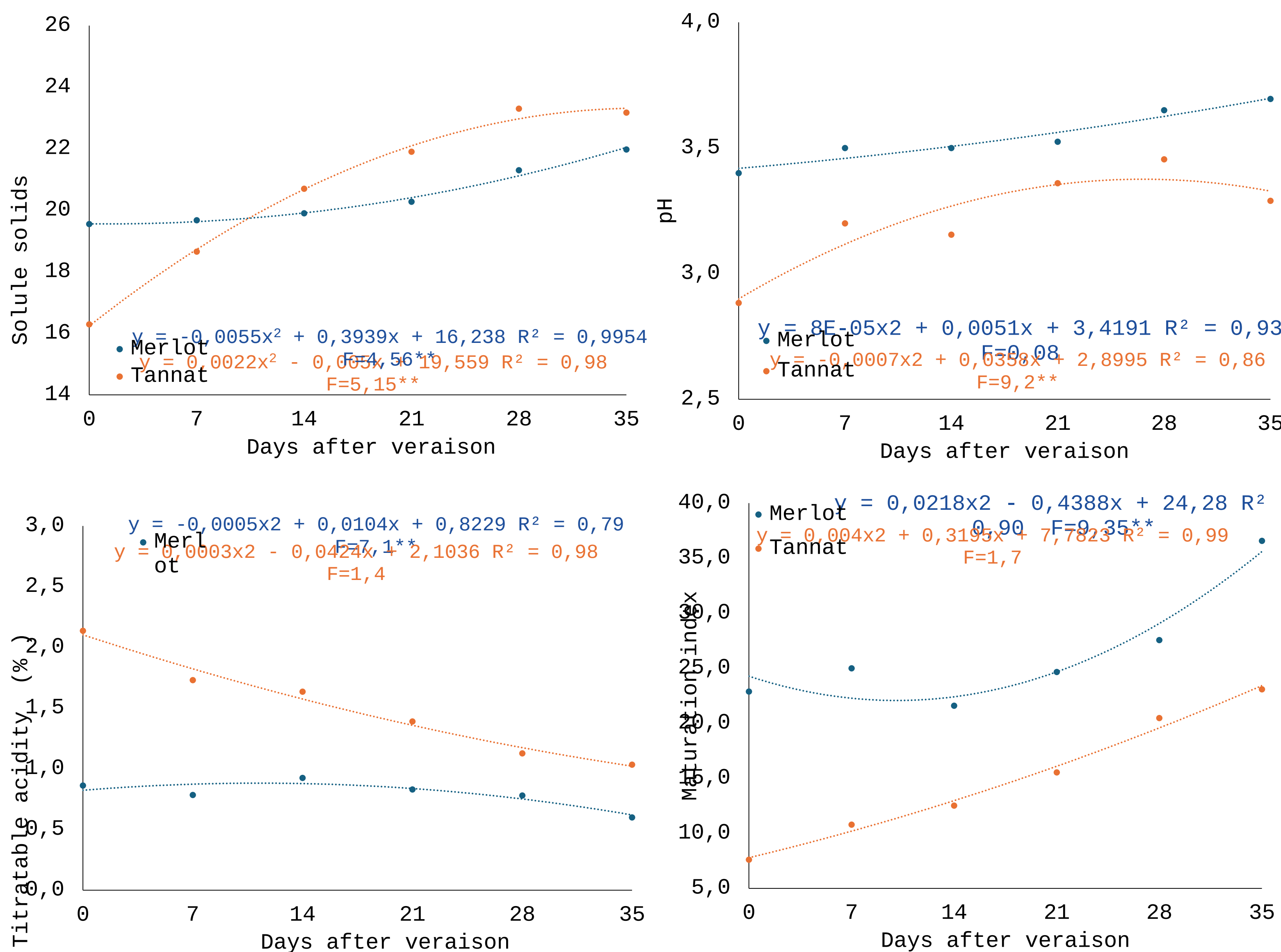
## METHODOLOGY

The experiment was conducted in the vineyard established at Fazenda Santa Lúcia do Tietê SN Bairro das Contendas, located in the municipality of Mineiros do Tietê - São Paulo, situated at 22°32'25" S, 48°24'13" W, and 580 meters above sea level. According to the Köppen-Geiger climate classification, the region is characterized as *Cfa*, a hot-summer humid subtropical climate, with the average temperature of the warmest month exceeding 22 °C and in the coldest month below 18°C (Cunha & Martins, 2009). The 'Merlot' and 'Tannat' grapevines were grafted onto Paulsen 1103 rootstock, trained using the trellis system with a spacing of 3.0 x 1.0 m. Training pruning was performed in August 2022, and production pruning was carried out in February 2023. The vines were arranged in planting rows with 40 plants, totaling 8 blocks with 5 plants per experimental plot, in a randomized block experimental design. The evolution of grape ripening will be determined based on soluble solids content (SS, expressed in °Brix), titratable acidity (TA, expressed as a

percentage of tartaric acid), maturation index (MI = SS/TA) and pH. Sampling will be conducted weekly from the onset of ripening (veraison or change in berry colour) until fruit harvest. Ten representative clusters will be selected from each experimental plot, from which 8 berries per cluster will be collected at each sampling time for analysis. These samples will be placed in plastic bags and stored in a refrigerator until chemical analyses are performed. The regression analysis was used to examine the chemical evolution of cultivars during ripening using the statistical program SISVAR®, version 5.7 (Lavras, MG, Brazil).



## RESULTS



## CONCLUSIONS

The onset of berry maturation for the Merlot and Tannat cultivars occurred at 94 and 96 days after pruning (DAP), respectively. For soluble solids content, values ranged from 19.55 to 21.98 °Brix for 'Merlot' and from 16.29 to 23.17 °Brix for 'Tannat'. The maximum pH values in the grape must of 'Merlot' and 'Tannat' were 3.55 and 3.22, respectively. There was a reduction in titratable acidity (TA) in the analyzed musts, from 0.86% to 0.60% for 'Merlot' and from 2.14% to 1.03% tartaric acid per 100 mL of must for 'Tannat'. The must maturation indices of both cultivars showed variation between 22.89 and 36.58 for 'Merlot' and between 7.61 and 23.09 for 'Tannat' (SS/TA), respectively.

Thus, it is recommended that the harvest of Merlot and Tannat cultivars occurs at 35 days after veraison, but this may vary depending on the climatic conditions of each harvest. According to the observed soluble solids values in this study, it is evident that the 'Tannat' grape exhibits greater enological potential when compared to the 'Merlot' grape. Based on the assessed season, harvest is predicted to occur 35 days after veraison.

## ACKNOWLEDGEMENTS

