Climatic Aptitude for Irrigated Wine Grapes in the Brazilian Northeast under Different Pruning Dates and Time Scenarios. Part B: Future Projections

A.H. de Castro Teixeira[1], J. Tonietto[2], G.E. Pereira[2], F.B.T. Tangerino[3], F. Angelotti[1]

[1]Embrapa Semi-Árido, P.O. Box 23, 56302-970, Petrolina, PE, Brazil.

[2]Embrapa Uva e Vinho, P.O. Box 130, 95700-000, Bento Gonçalves, RS, Brazil.

[3]São Paulo University State, P.O. Box 34, 15385-000, Ilha Solteira, SP, Brazil.

Email: heribert@cpatsa.embrapa.br

Abstract

According to the report from the IPCC (2007), the semi-arid regions are going to be the most affected areas by increasing water consumption, as a consequence of rising air temperatures. Long-term weather data were used together with future projections throughout simple regression models which relate the reference evapotranspiration (ET_0), crop coefficient (K_c) and the accumulated degree-days (DD_{ac}), to quantify the wine grape water requirements for a growing season - GS (VWR_{GS}) of the cv. *Syrah*, in the Brazilian Northeast, considering the baseline conditions and the scenarios for 2020, 2050 and 2080. VWR_{GS}, together with the growing season precipitation (P_{GS}), allowed the development of a vineyard water index (VWI_{GS}), which together with the mean air temperature (T_{GS}) was used for characterization of areas with different agro-climatic aptitude in producing grapes for wine elaboration according to time scenarios, varying the pruning dates. The highest increases in VWR_{GS}, comparing the baseline conditions and the projected years, happened during periods of the lowest averaged water requirements, in Ceará (CE), Rio Grande do Norte (RN) and Piauí (PI) States, while during the highest water requirement conditions, the highlighted states were Piauí (PI) and Maranhão (MA). It was observed that the region may present thermal limitations for the wine quality along the years as a consequence of increasing air temperatures during the growing seasons, depending on the pruning date, being expected higher alcohol and sugar contents as well as lower acidity, in the areas and pruning dates with larger T_{GS} values. Less problems in wine quality caused by the climate changes were verified for the Bahia, Pernambuco, Paraíba, Alagoas, Sergipe States and the west side of Maranhão State, for pruning dates occurring in May.

Keywords: tropical wine, climate suitability, water requirements, temperature, thermal limitations