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Influence of soil properties and climate characteristics on transpirable soil water for two varieties with differences in their crop cycle timing

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This paper presents an analysis of soil water content in two vineyards planted with Chardonnay and Cabernet Sauvignon in the Penedès Designation of Origin (DO). Climate is Mediterranean with maritime influence. The main soil types are Typic Xerorthent and Fluventic Haploxerept and soil is bare most of the time to avoid the competition of weeds for water. The plantation pattern was uniform in both cultivars, 1.3*3m. Soil moisture was analysed at each area from 10 to 90 cm every 20 cm, using TDF probes during two crop growing cycles (2010-2012). Soil water balance for years with different rainfall amount and distribution throughout the year was simulated using the Soil and Water Assessment Tool (SWAT). Differences in phenology of about one month existed among both varieties. In addition, the soil hydrological properties variability, resulted from land levelling operations before vineyard establishment, affects crop's soil water availability. These two facts made that, under the same rainfall amount and distribution, water available during the crop cycle were different for both varieties. The transpirable soil water fraction reached very low values, close to 0.1, particularly in the variety with early phenology timing. This pattern was repeated in different years depending on rainfall distribution, which affected grape production with significant yield reductions (up to 38% in relation to the average were found in some years).