Geophysical Research Abstracts
Vol. 17, EGU2015-11239, 2015
EGU General Assembly 2015


# What is the Optimal Water Productivity Index for Irrigated Grapevines? Case of 'Godello' and 'Albariño' cultivars

María Fandiño, Emma M Martínez, Benjamín J Rey, and Javier J Cancela

GI-1716. Dpto. Ingeniería Agroforestal. Universidad de Santiago de Compostela. Escuela Politécnica Superior, Campus Universitario s/n, 27002, Lugo, Spain (javierjose.cancela@usc.es)

Different studies have tackled the conceptual and terminological study of crop water use indicators, mainly water use efficiency (WUE) and water productivity (WP) (Pereira et al., 2012; Scheierling et al., 2014). The high number of stakeholders, working about agricultural water use (hydrology and hydrogeology, civil and irrigation engineering, agronomy and crop physiology, economics), has hindered the real improvement thereof, from a multidisciplinary perspective. For example, Flexas et al. (2010) reviewed the future improvements in water use efficiency in grapevines, from a physiological approach. In this study, two grapevine cultivars, priority in Galicia (Spain): 'Godello' (DO Valdeorras) and 'Albariño' (DO Rías Baixas, two locations), was assessed in relation to four water productivity index, focus on irrigation systems, agronomy and crop physiology aspects, during a wet year (2012). All WP index was referred to farm yield level (kg ha$^{-1}$); where the denominator applied to WP$_{TWU}$, include all components of soil water balance; to WP$_{TWUfarm}$, introduced rainfall and irrigation depth; to WP$_{Irrig}$, only irrigation depth applied; and to WP$_T$, crop transpiration was used. In the last index, SIMDualKc model was used to partitioning crop evapotranspiration and cover crop transpiration. Different ranges of values was obtained for both cultivars, WP$_{TWUfarm}$ was higher in cv 'Godello' than in cv 'Albariño', 3.8 and 0.9 kg m$^{-3}$ respectively. Average value to WP$_{Irrig}$ has showed: 17.6 kg m$^{-3}$ for cv 'Albariño' and 15.5 kg m$^{-3}$ for cv 'Godello', due to a reduction of 60% of irrigation depth in DO Rías Baixas. However, for both locations, higher WP$_{Irrig}$ was obtained to drip irrigation system versus subsurface drip irrigation. WP$_T$ showed a different tendency, rain-fed 'Godello' and surface drip irrigation 'Albariño' treatments obtained higher values (6.8 and 3.6 kg m$^{-3}$), with higher WP$_T$ to cv 'Godello' for all treatments versus 'Albariño'. Results had showed that water productivity indexes are cultivar depending, similar values was achieved in near locations (data not showed). Special care must be taken when analysing water productivity indexes at the farm level, considering identical irrigation depth, density, canopy management system, age of the plantation, management practices, among other factors, which may affect of water consumed or supplied to the vineyard. Agronomical economic aspects should be studied, taken into account irrigation systems cost and benefit crop yield, at basin scale. Temperate viticulture should pursue greater WUE and WP, identifying the most productive cultivars adapted to near-future climate conditions.

References:

Flexas J, Galmés J, Gallé A, Gulías J, Pou A, Ribas-Carbo M, Tomàs M, Medrano H (2010). Improving water use efficiency in grapevines: potential physiological targets for biotechnological improvement. Australian Journal of Grape and Wine Research, 16(s1):106-121

Pereira LS, Cordery I, Iacovides I (2012). Improved indicators of water use performance and productivity for sustainable water conservation and saving. Agricultural Water Management, 108:39-51

Scheierling SM, Treguer DO, Booker JF, Decker E (2014). How to assess agricultural water productivity? looking for water in the agricultural productivity and efficiency literature. Looking for Water in the Agricultural Productivity and Efficiency Literature (July 1, 2014). World Bank Policy Research Working Paper, (6982)