Geophysical Research Abstracts
Vol. 19, EGU2017-18740, 2017
EGU General Assembly 2017


# Aerial thermal images to assess irrigation efficiency in 'Vitis vinifera' cv. Albariño

Xesús Pablo Gonzalez, María Fandiño, Benjamín J. Rey, and Javier José Cancela

GI-1716. University of Santiago de Compostela, Escola Politécnica Superior, Agroforestry Engineering Department, Campus Universitario s/n (Lugo - 27002), Spain (xesuspablo.gonzalez@usc.es)

Canopy temperature was defined as key data to irrigation management and to detect crop water stress (Jackson, 1982). Recently, temperature camera was installed on board in a Unmanned Aerial Vehicle (UAV), thus heterogeneity within field could be determined. Pereira et al. (2012) have defined the conceptual and terminological study of crop water use indicators, mainly water use efficiency (WUE) and water productivity (WP). Actually, it is crucial achieve higher WP and WUE, where crop yield variability between years must be reduced with the smallest irrigation water, but with a correct management of crop water stress during the season. In this study, Albariño cultivar grapevine, priority in Galicia (Spain) in Designation of Origen 'Rías Baixas', was assessed in relation to water productivity index, focus on irrigation treatments aspects, during 2016. Albariño vineyard was planted in 1996 on 110-Richter at a spacing of 3 $\times$ 2 m (1667 vines ha$^{-1}$) (41º57 6 N, 8º49 26 W, elevation 101 m). Vines were trained to a vertical trellis system on a Guyot oriented in the East–West direction. Three irrigation treatments were applied: irrigation from budburst to maturation (T1), from flowering to maturation (T2), and from veraison to maturation (T3), moreover a rain-fed treatment was implemented. All WP index was referred to farm yield level (kg ha-1); where the denominator applied to WP TWUfarm, introduced rainfall and irrigation depth; to WP Irrig, only irrigation depth applied; was used. Moreover, crop water stress index (CWSI) was used to determine homogenize areas within experimental plot, using an UAV with a thermal camera (ThermoMAP, senseFly, SW) to achieve a final map with 14 cm per pixel resolution. During August 11th, at the end of veraison, camera was installed in an 'eBee Ag' UAV (senseFly, SW) with a median flight altitude of 75 m over ground level. Yield per hectare were recorded and total irrigation depth per treatment during the growing season from March to harvest. Preliminary results have showed that CWSI is useful to determine heterogeneity areas within field, concretely areas with identic irrigation treatments were grouped in a similar range, a good correlation was achieved with steam water potential measured in verasion during the flight. This aspect permit establishes a tool to manage irrigation with efficiency, during the growing season, using thermal data and CWSI. Finally, WP were higher in rain-fed than irrigated treatments, where T3 treatment showed higher WP Irrig, than T1 and T2 treatments. A new step Economic aspects should be studied, taken into account benefit crop yield, and cost of pumping irrigation water.

References:

Jackson, RD (1982). Canopy temperature and crop water stress. Advances in irrigation, 1:43-85

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