

Assessment of AquaCrop Model on Potato Crop in Uruguay

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Abstract

The potato crop (*Solanum tuberosum* L.) is a high important crop in Uruguay. The Southern region is the most important production area of potato there. It is considered that in this region, irrigation should be supplementary since summer rainfall rarely reach crop requirements. Irrigation management is a very important tool in order to produce high quantity and quality products, efficiently. The decision support system, such as AquaCrop, helps technicians to decide when and how much irrigation to apply. Nevertheless, this model needs to be calibrated and validated with local data. The objective of the present work was to evaluate AquaCrop model through two potato irrigation trials. The experiments were conducted in Southern Uruguay. Two irrigation treatments were evaluated for potato crop (cv. Chieftain) in 2010-11 and four treatments in 2011-12 growing seasons (three irrigation treatments plus rainfed - without irrigation application). The maximum crop evapotranspiration was estimated by the Penman-Monteith equation (FAO-56) using meteorological data from an automatic weather station (Campbell Scientific). The soil site was a loam soil (Albolls soil). A completely randomized block design was used with four replications. Measurements of soil water content were taken once a week using TDR probes and the soil water potential was measured using tensiometers (0.15, 0.30, 0.45 and 0.60 soil depth). To evaluate AquaCrop model, actual yield crops vs simulated yields were used. Data from other experiments were used to parameterize AquaCrop, whose stress coefficient (for excess of water) was changed to reach successful simulations. Normalized root mean square error and index of agreement between simulated and observed yield was 11.8% and 0.96, respectively. Results of this study suggest that the use of AquaCrop model is possible in vegetable crops of Uruguay allowing to characterize required supplemental irrigation in this production systems.

Keywords: water productivity, yield, cultivar, supplemental irrigation, decision support system