CIHEAM
BARI

Regione Puglia

Consiglio Nazionale delle Ricerche
ISPA
ISTITUTO DI SCIENZE DELLE PRODUZIONI ALIMENTARI

IRRIMED 2015

International Conference on

"Modern technologies, strategies and tools for sustainable irrigation management and governance in Mediterranean agriculture"

(IrriMed 2015)

Valenzano (Bari, Italy), 23-25 September 2015

Proceedings - Book of Abstracts

Editors:
F. F. Montesano, A. Parente, N. Lamaddalena, M. Todorovic, L. Trotta

European Territorial Cooperation Programme
Greece - Italy
2007-2013
INVESTING IN OUR FUTURE

European Territorial Cooperation Programmes (ETCP)
GREECE-ITALY 2007-2013

Co-funded by the European Union (ERDF)
and by National Funds of Greece & Italy

Efficient Irrigation Management Tools for Agricultural Cultivations and Urban Landscape

SEASONAL MOISTURE VARIATION AT DEEP AND SHALLOW SOIL LAYERS IN A MEDITERRANEAN KIWIFRUIT ORCHARD

Domenico Laterza(*), Giuseppe Montanaro, Bartolomeo Dichio, Ruggero Ermini, Cristos Xiloyannis

Università degli Studi della Basilicata /DiCEM, Via S. Rocco, 3 Matera, Italy
** Corresponding author E-mail: domenico.laterza@unibas.it*

Abstract

Kiwifruit (Actinidia spp.) is a highly water demanding crop which originate from habitats characterised by high humidity and only a moderate intensity of sunlight, however because of its good profitability it is roughly well distributed also in semi-arid Mediterranean areas with dry growing season (~ 500 mm rainfall per year occurring mostly during autumn-winter). Irrigation is therefore mandatory for optimal fruit growth and yield (~ 50 t ha^{-1}).
For saving water purpose, drip irrigation is widely adopted in Mediterranean area in fruit tree crops including kiwifruit which may require up to 12,000 m3 irrigation water a year. Despite that relatively high seasonal irrigation volume, vines often suffer drought events. Considering that drip irrigation is neither design not managed to irrigate deep soil layer (> 50 cm depth) and that drip irrigation method keep soil moisture close to field capacity (FC) only in the early 30-40 cm of soil, it could be hypothesised that the moisture of deeper soil layer progressively decline during the season being not affected by drip irrigation causing water deficit.
To test this hypothesis, soil moisture was continuously monitored using FDR probes (EnviroSCAN Sentek, Stepney, SA, Australia) at 10, 30, 50, 70 and 90 cm depth throughout the growing season at a mature kiwifruit orchard (Hayward, 625 p ha-1). Vines were drip irrigated (2 drippers a plant, 10 l h-1 discharge rate each dripper) based on ETC values according to ET0 data released by a local weather station and Kc previously used in the area.
Results clearly show the soil moisture oscillations due to water consumption (vine absorption and soil evaporation) and replenishment (irrigation) at the early 10-30 cm depth. At that shallow layer, soil moisture oscillations remained close to FC (~ 38%vol) during spring and early summer, while minimum values approached 20%vol during mid-summer which were promptly recovered through the daily irrigation.
Soil moisture at deep soil layer (> 50 cm depth) progressively declined during the season toward the minimum value of 20-25%vol (70 cm depth) and ~ 30%vol (90 cm depth) reached at the end of July were sited during the reaming growing season. At these depths the consumption/replenishment oscillations were not detected, and soil moisture recovered only upon rainfall occurred in autumn.
Hence it could be inferred that these deeper layer supplied water to the above layers. It could be concluded that drip irrigation (schedule) was not adequately managed causing a withdrawal of water from deeper soil layer. Implication of these soil moisture dynamics in term of various components of water footprint are discussed.

Keywords: *drip irrigation, deep soil layer, drought, actinidia.*