Lysimeter – Whole Tree ET Response to Mild and Moderate Water Stress

Project No.: **14-HORT22-Shackel**

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Objective:

The long term objective of this research is to quantify the effect of water stress on almond physiology and ET, and to develop a physiologically-based model of this relation that can be used to predict the water savings associated with practices such as RDI. The goal for 2014 was to prepare the existing lysimeter and land at KAC for an almond planting over the winter/spring of 2014/15.

Interpretive Summary:

The weighing lysimeter at the Kearney Agricultural Research and Extension center (KARE), was serviced and upgraded, and the field was planted to a Nonpareil/Wood Colony/Monterey orchard. Trees are currently being established, and the initial ET results are consistent with expectations for young trees. Detailed experiments will be performed throughout the summer of 2015.

Figure 1. Lysimeter tree near solar noon on July 9, 2015, when the surface of the lysimeter was covered.

Materials and Methods:

A 3.5 acre lysimeter site (N36.5981 W119.5132) at the Kearney Agricultural Research and Extension center (KARE), previously used for grapevines (Johnson et al, 2005) was prepared and planted to almonds on 2/3/15. The orchard is planted at 4 x 6.5 m triangular spacing, with ½ Nonpareil, ¼ Wood Colony, and ¼ Monterey. The irrigation system for the first year is a single line drip system, and this will be expanded to a double line system as the trees develop. The weighing lysimeter was

serviced, upgraded to directly measure drainage, and calibrated, and a cell modem installed in the datalogger.

Results and Discussion:

The tree in the lysimeter as well as those in the orchard is growing vigorously (**Figure 1**). Leafout was approximately March 10, but even before this date, the lysimeter exhibited some variation in crop coefficient (Kc) (**Figure 2**), presumably due to evaporation from a wet soil surface. Relatively high Kc values were also observed following rain events in April and May (**Figure 2**), also reflecting a significant soil evaporation component. A covering test was performed between July 9 and July 21, and this had a relatively minor influence on Kc (**Figure 2**), probably indicating that the drip irrigation system did not create a wetted area with a significant contribution to ET.

Research Effort Recent Publications:

(None at this time)

References Cited:

Johnson SJ, Williams LE, Ayars JE, Trout TJ. 2005. Weighing lysimeters

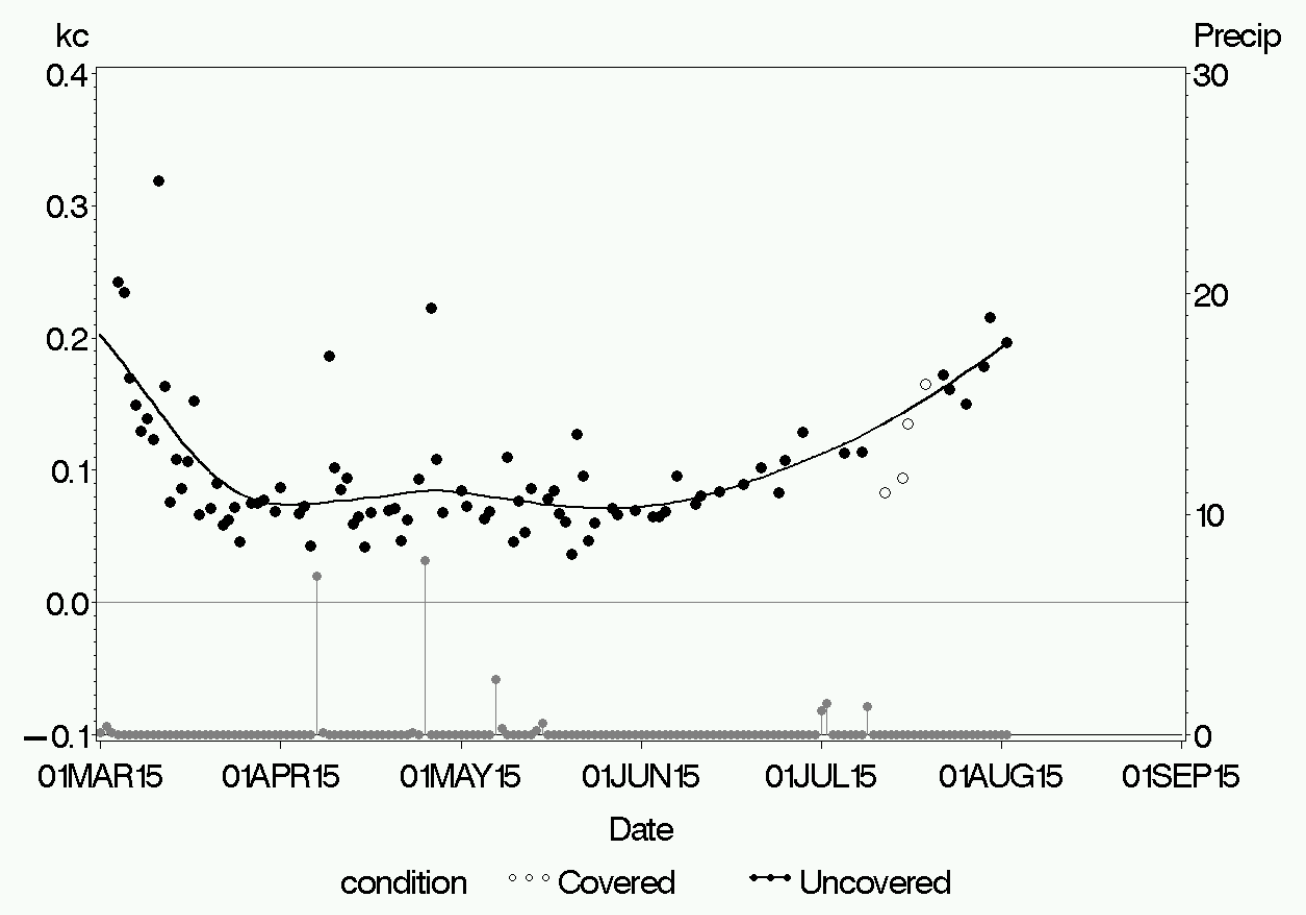

Figure 2. Seasonal pattern to date of daily Kc values (black points and smoothed fit line - left axis, with a reference line at Kc = 0), and precipitation events (grey points, right axis in millimeters) for the lysimeter tree.