UC DAVIS
UNIVERSITY OF CALIFORNIA

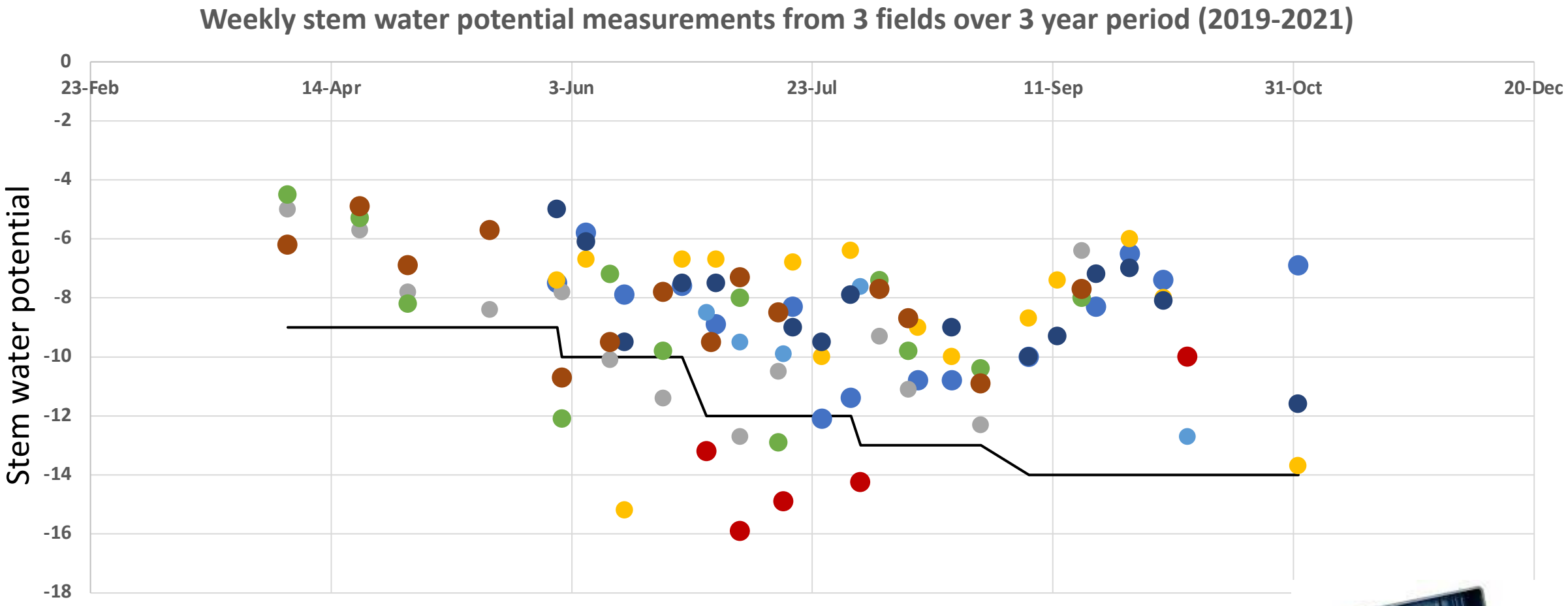
University of California
Agriculture and Natural Resources

Plant-based irrigation management in sweet cherry to reduce water needs while maintaining yield and quality

PIs: Ken Shackel, Kosana Suvočarev, Giulia Marino
Cooperating Personnel: Kari, Arnold, Mohamad Nouri, Kamyar Aram
Student: Jarin Tasnim Anika

Introduction

- For healthy crops, the amount of water loss from soil and plants needs to be restored through irrigation.
- We measured ET and SWP of 3 orchards over 4 growing seasons
- The outcome results show lower crop coefficient than recommended by FAO-56
- Simultaneous measurements of SWP with Sholander chamber show that plants were optimally irrigated for the most of the season


Weekly stem water potential measurements from 3 fields over 3 year period (2019-2021)
Stem water potential
0
-2
-4
-6
-8
-10
-12
-14
-16
-18
23-Feb
14-Apr
3-Jun
23-Jul
11-Sep
31-Oct
20-Dec

Goals for continuous research

- With continuous ET and weekly/bi-weekly SWP measurements we continue our study, while introducing RDI of 50 % in limited areas

- Evaluate further technology, FloraPulse, for continuous SWP monitoring in order to fine-tune both pre- and post-harvest plant-based irrigation management

- And evaluate this technology in sweet cherry as a possibility of SWP-measurement automation.

Experimental design

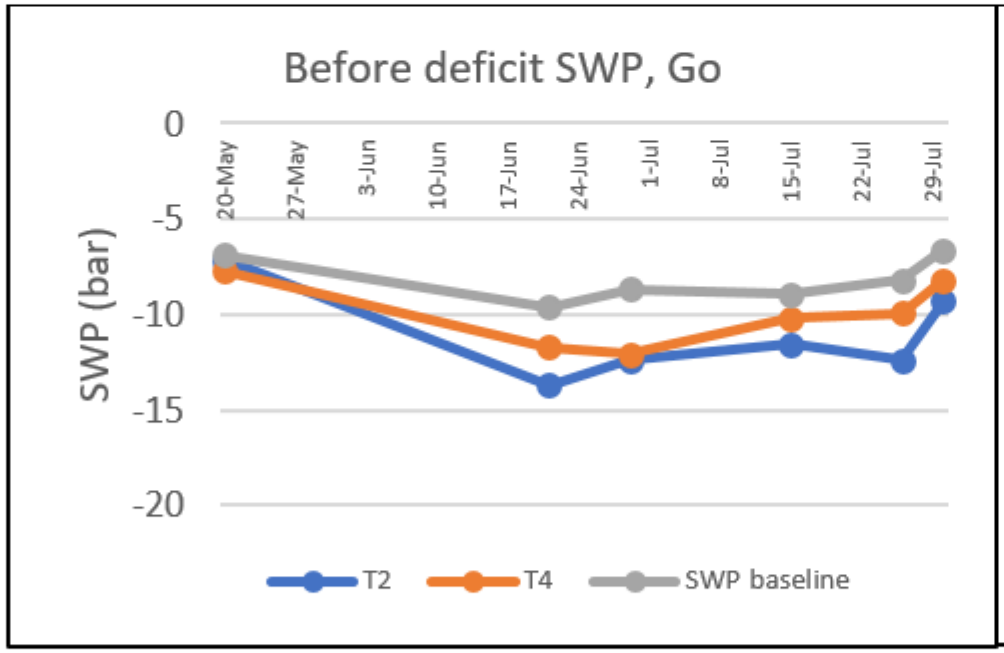
- FloraPulse installed the end of July
- 4 per orchard; 2 branches per tree; total 12 in 3 orchards
- 2 trees in each orchard equipped (RDI and Control treatment)

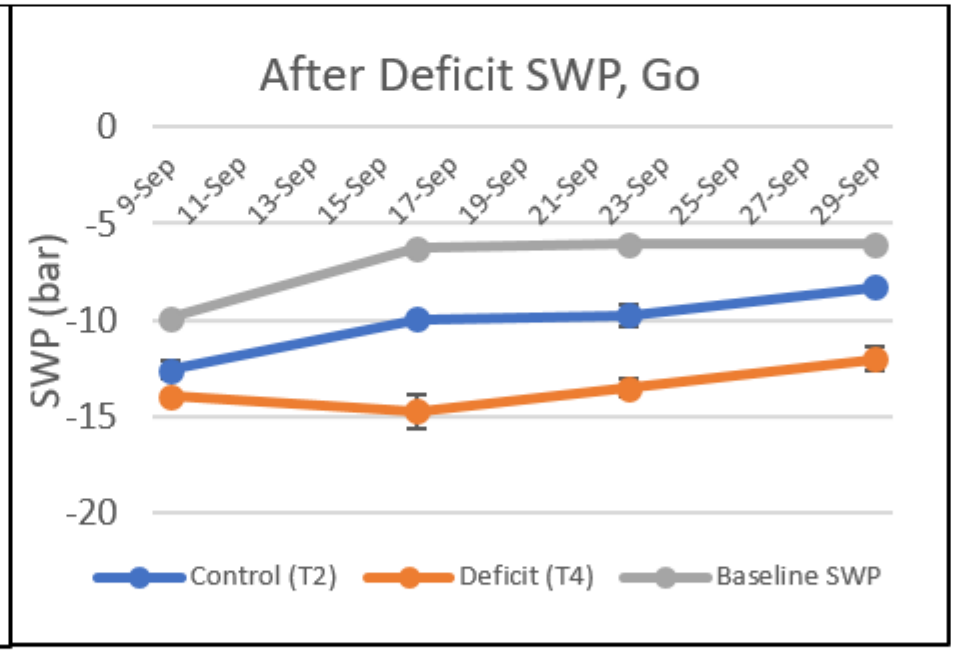
- Deficit started in the beginning of August.
- 2/rows under observation (RDI and Control treatment)
- 2 flowmeters and valves per row for each drip line
- Valves were closed for RDI in one of the rows for 50% irrigation application

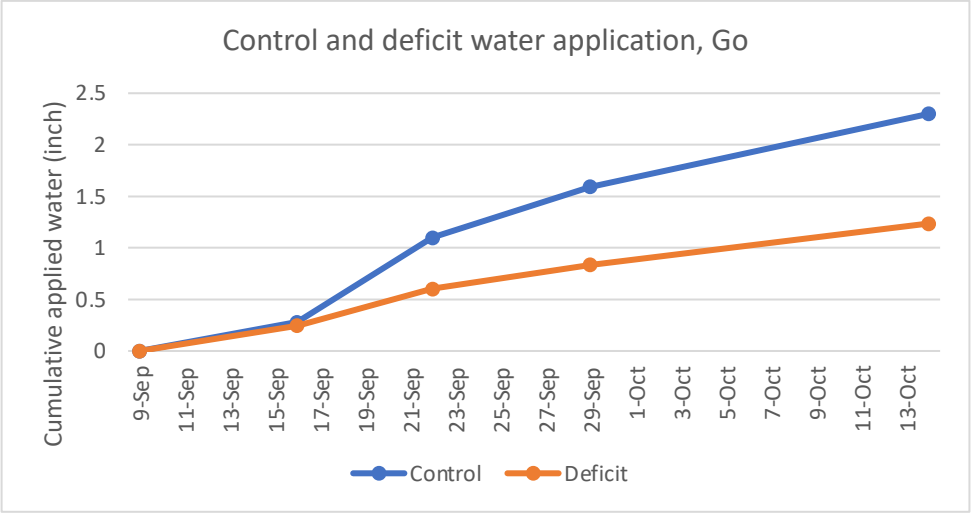
Control and deficit rows in three orchards near Linden

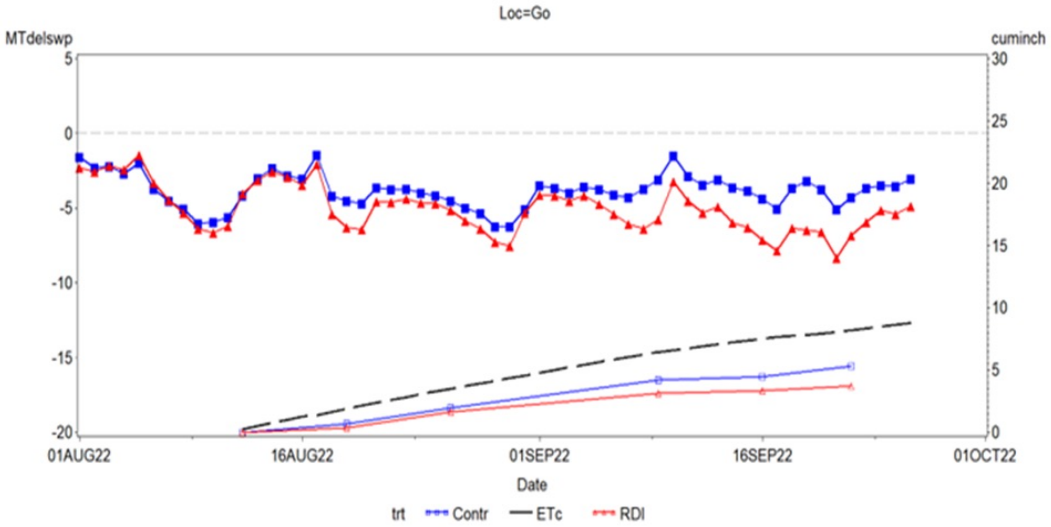
Site	Irrigation	Planting density	Control trees under observation	Deficit trees under observation
Go	Drip	20x22 ft	24	25
Kahn	Drip	16x16 ft	31	31
Dasso	Drip	20x20 ft	10	12

Deficit Water application and change in SWP, Go



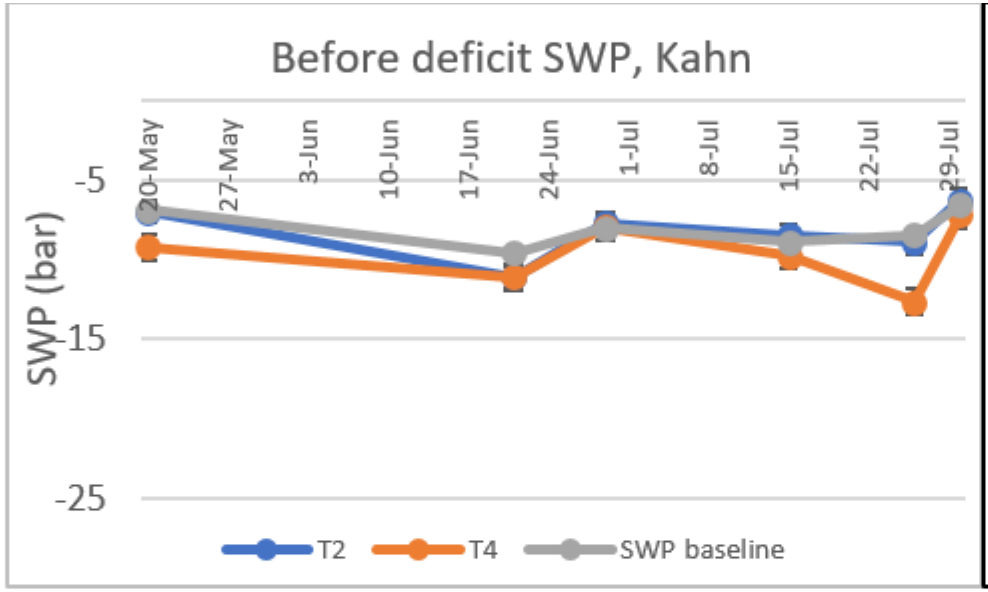


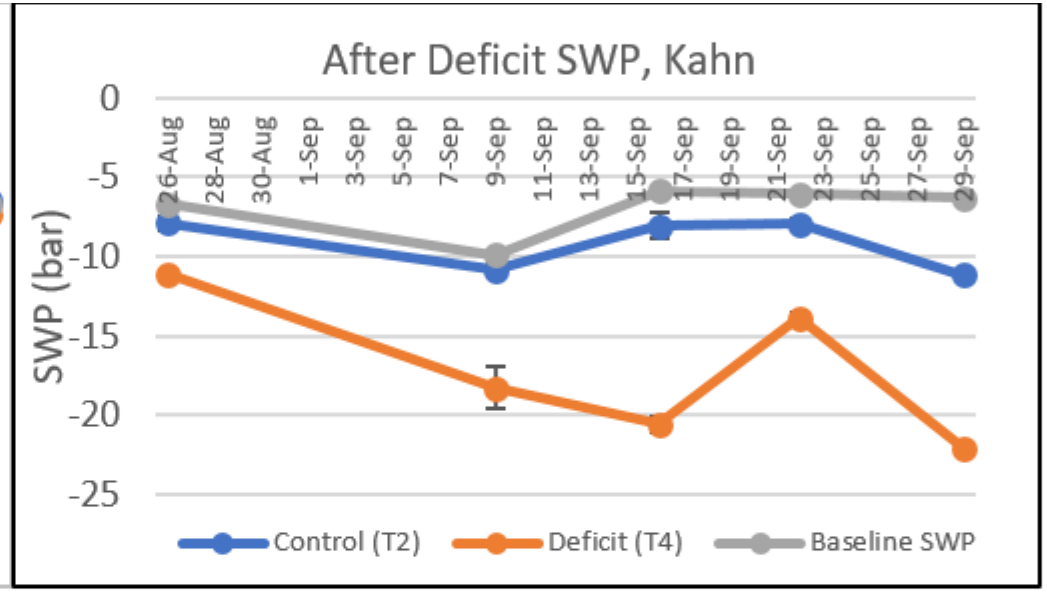


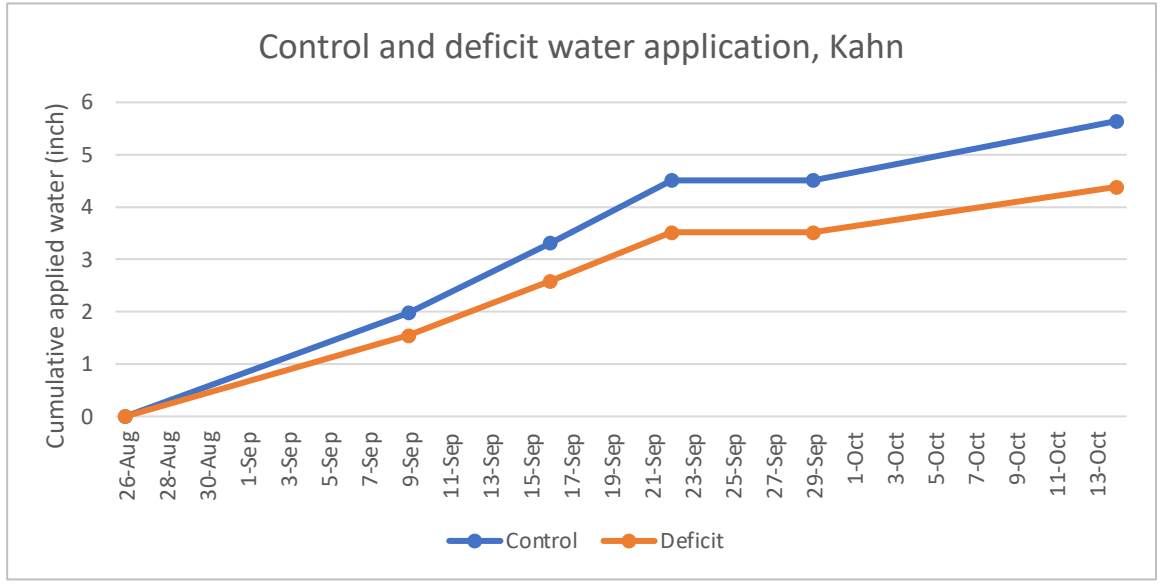


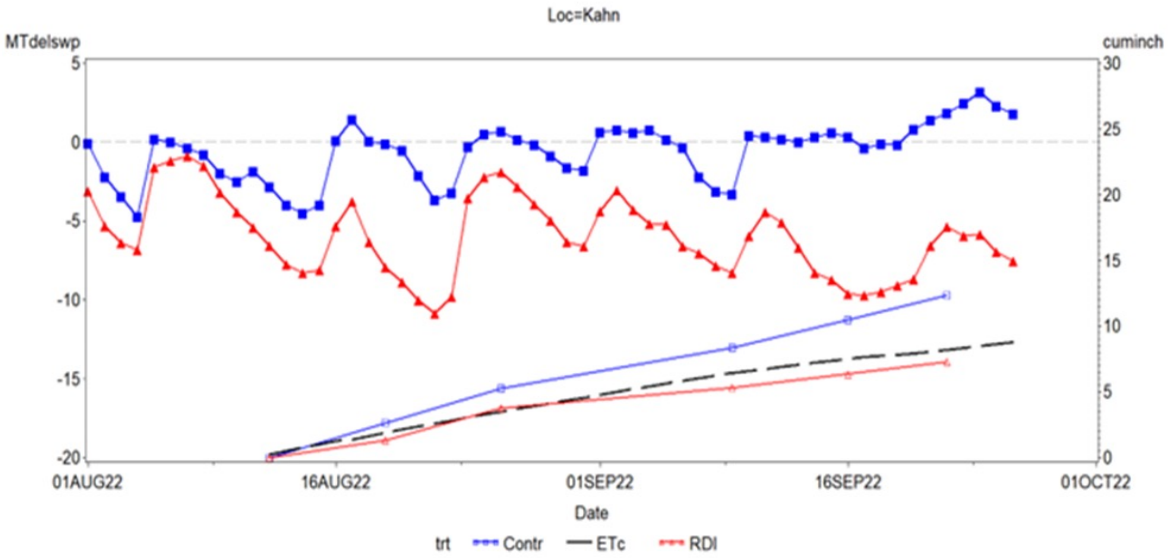
Go valve was turned on several times by someone. that's why deficit data is from 9 sept

Deficit Water application and change in SWP, Kahn



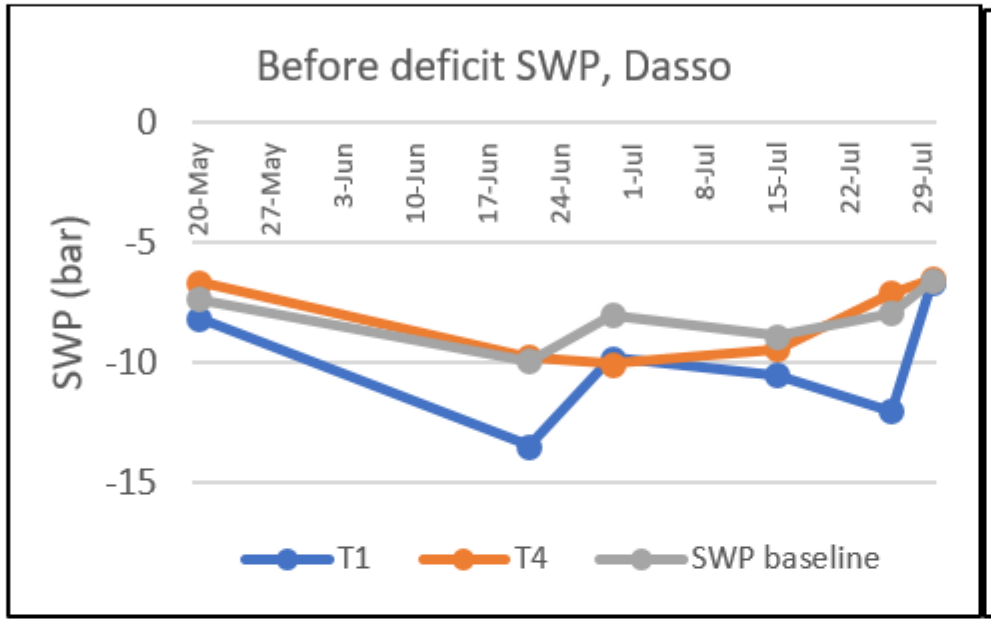


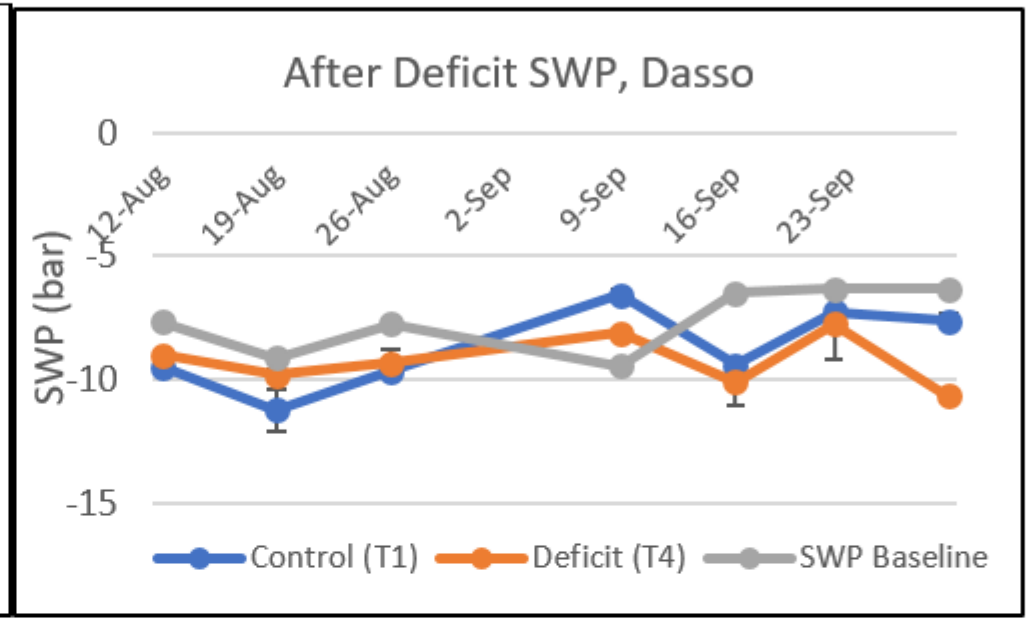


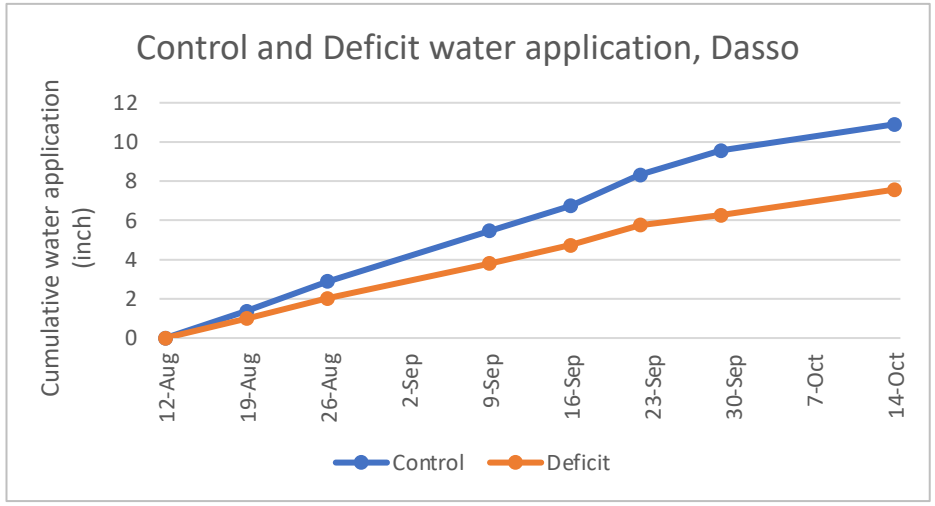


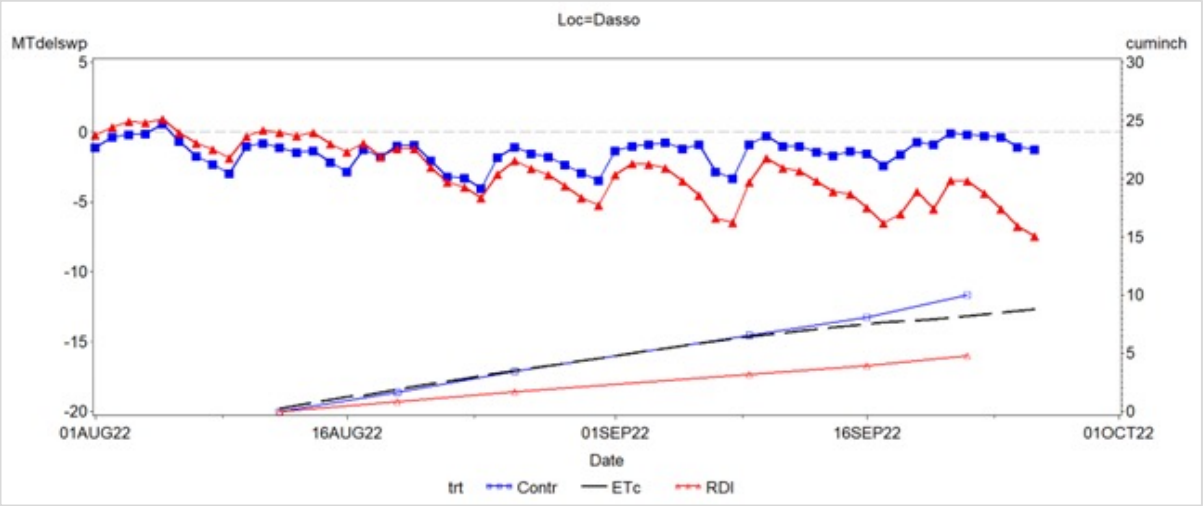
Deficit started on 26 august

Deficit Water application and change in SWP, Dasso









Deficit started on 12 august

Next year’s experimental design and goals

1. Sample cherries during the harvest for quantity/quality evaluation
2. Select at least 5 plants per row under observation for collecting flowering, fruit-set, harvest data.
3. Select more rows under deficit irrigation if possible
4. Evaluate changes in SWP before and after harvest.
5. Continue observing ET/SWP/VWC feedbacks.

Expected outcomes:

- The development and dissemination of relationship between SWP, ET, soil moisture and applied water for mature, micro-irrigated cherry orchards

- Evaluate practicality of on-farm use of commercial solutions for automated water potential measurements to maintain high quality and quantity of cherry harvest

Thanks!