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Are tensiometers the best tool for water management in subtropical Hass orchards?

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RADFORDS



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Introduction

- Avocado production worldwide:
8.8 million tonnes (FAO, 2022)
- Mexico is responsible for approximately 30% of this total
- Currently Brazil is ranked 7th in avocado production



Introduction

- Avocado production is growing fast in Brazil
- From 2019 to 2021: planted area increased by 18% and production by 24%
- Most of the area under rainfed conditions



Introduction

- Avocado-growing regions suffer water stress during critical stages of avocado development
- It is important to develop a sustainable water management for avocado orchards to improve yield and orchard establishment



Methods

- Hass orchard
- Bernardino de Campos, SP, BR
- 9 x 4.5 m (247 trees/Ha)
- One micro-sprinkler per plant (30 L/h)



Methods

- Three different irrigation regimes:



(1) Rainfed



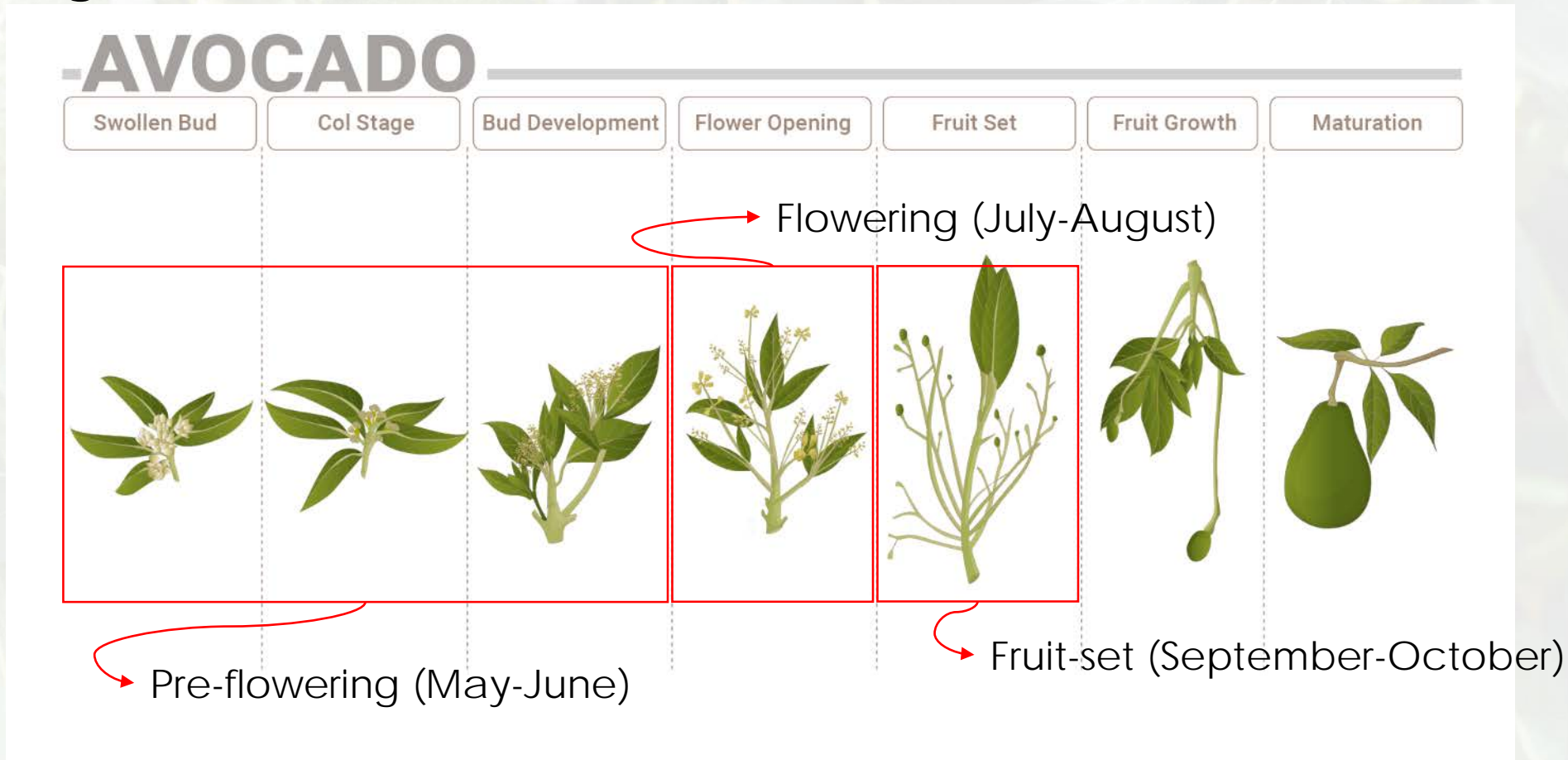
(2) irrigation run time defined by grower (5,091 m³/Ha)



(3) ½ irrigation run time defined by grower (2,545 m³/Ha)

Methods

- Critical stages



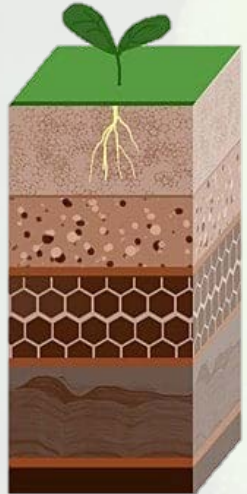
Methods

Assessments:

- Climatic water balance
- Crop and potential evapotranspiration (Penman-Monteith)
- Available Water Capacity (AWC) and Easily Available Water (EAW)
- Tensiometer readings



Results



Water holding capacity: 122 mm

$F = 0.7$

Clay soil
Lower frequencies of irrigation

Easily available water (EAW): 85.4 mm

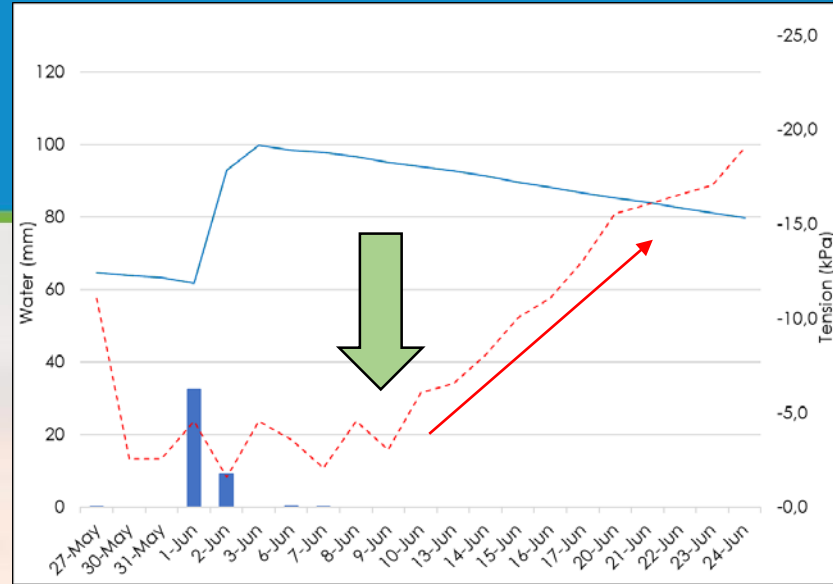
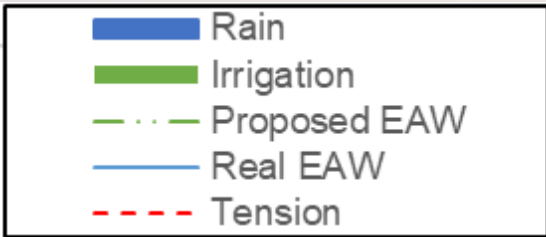
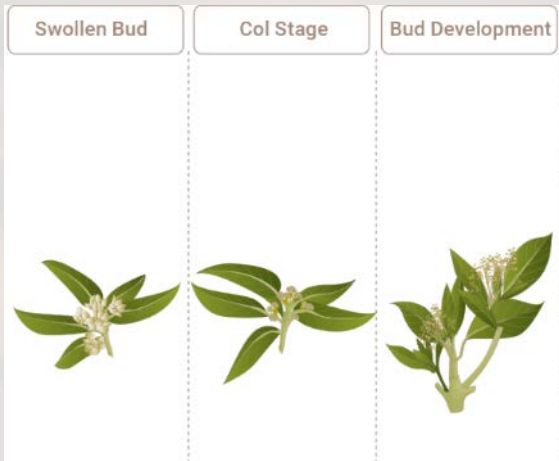
Soil available water capacity (AWC): 11.6 mm

Critical water content: 73.8 mm

Real EAW vs Proposed EAW
+
Real Water tension values

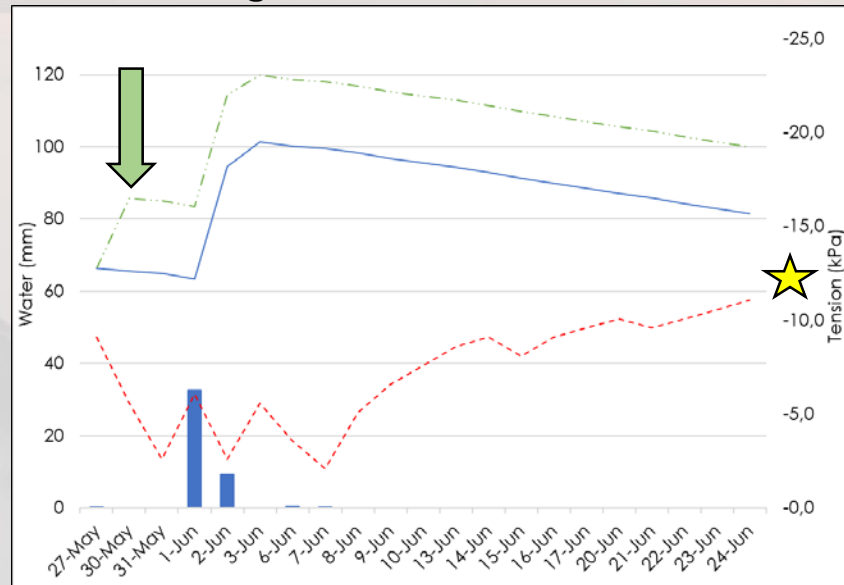
Results

- Pre-flowering

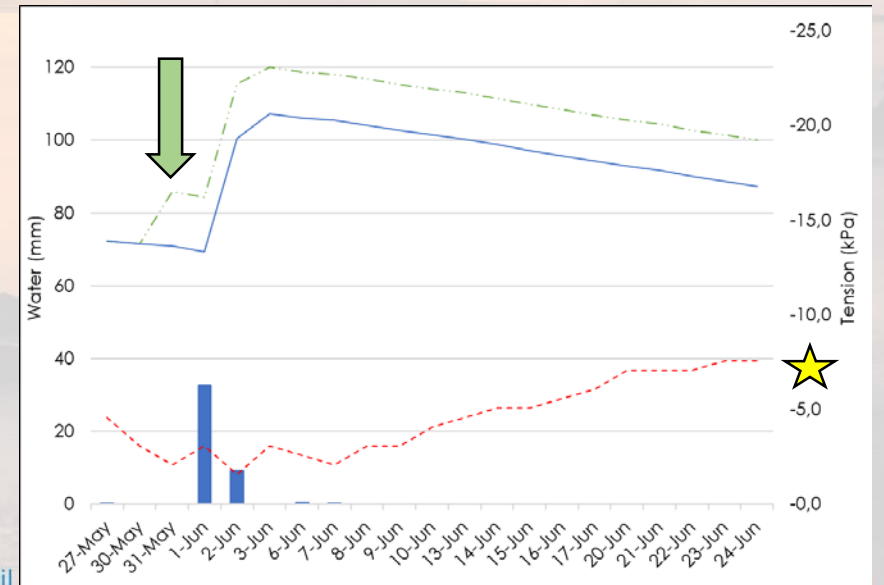


(1) Rainfed

(2) irrigation run time defined



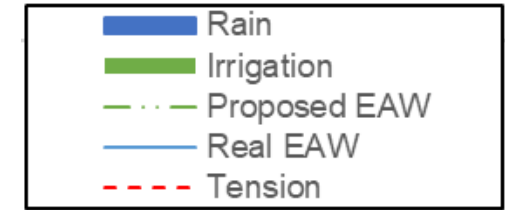
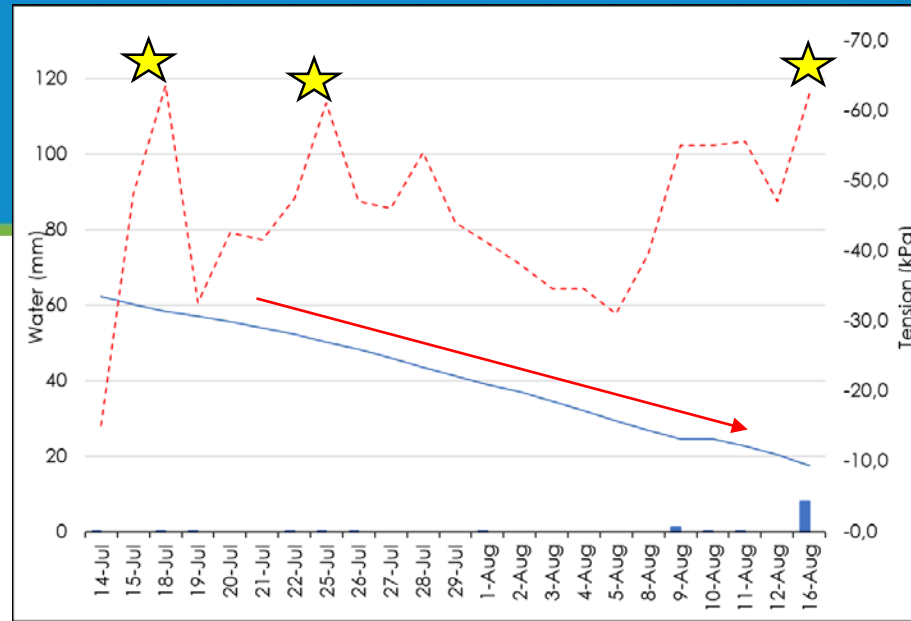
(3) ½ irrigation run time



Results

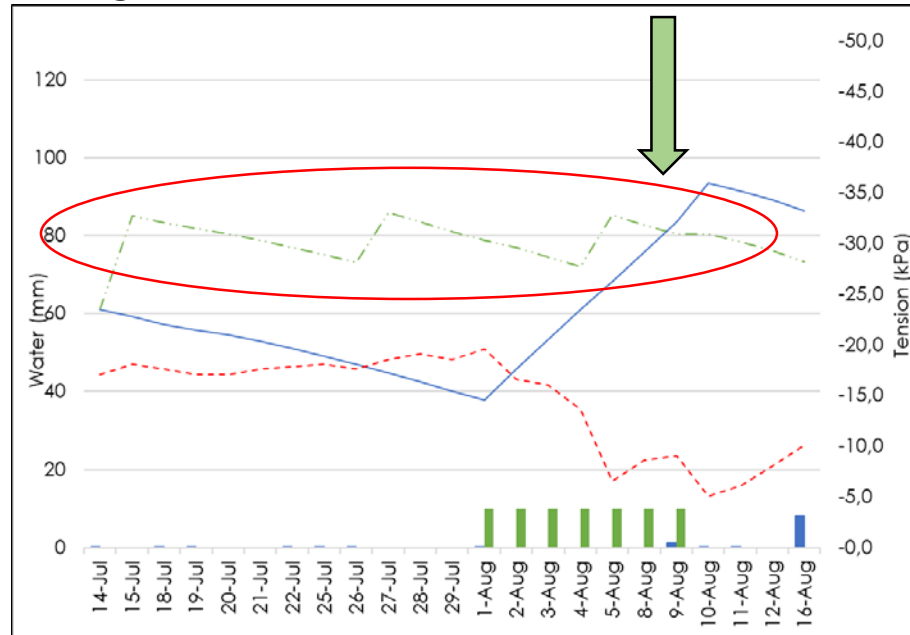
- Flowering

Flower Opening

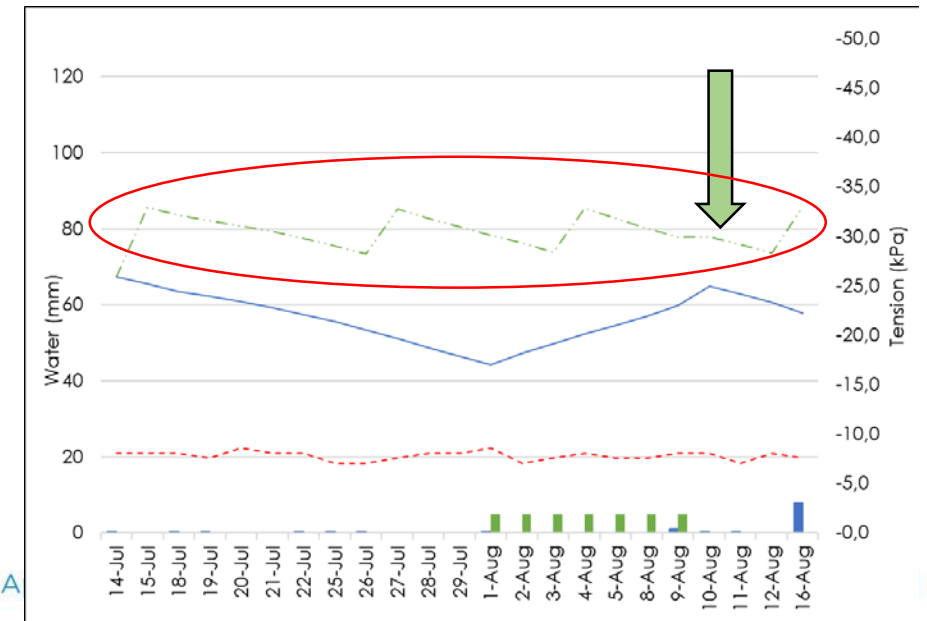


(1) Rainfed

(2) irrigation run time defined



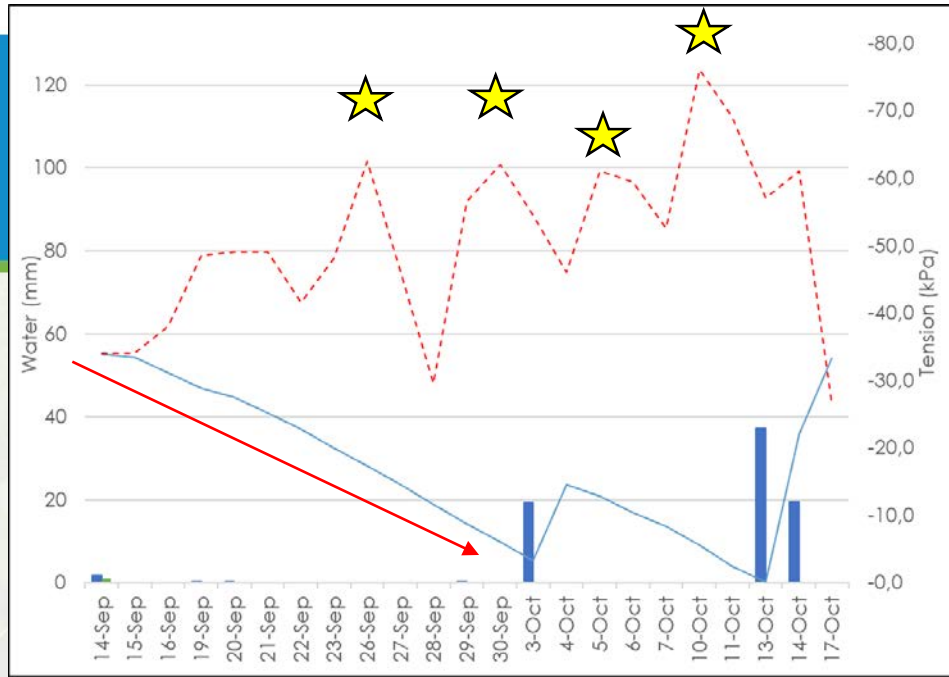
(3) 1/2 irrigation run time



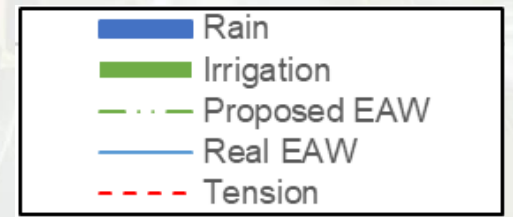
2-5 A

Results

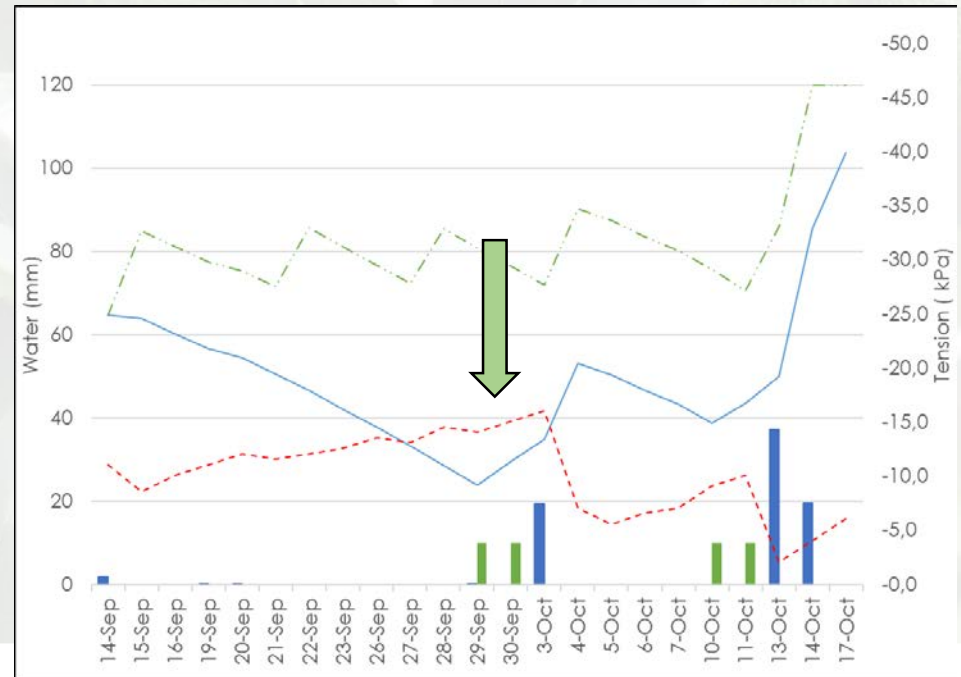
- Fruit-set



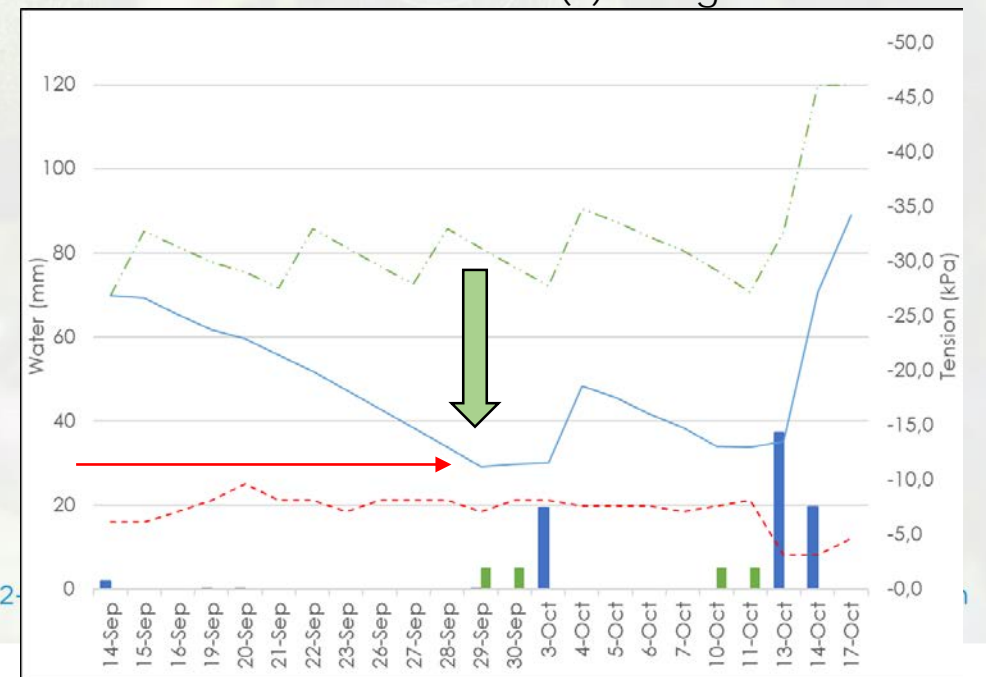
(1) Rainfed



(2) irrigation run time defined



(3) 1/2 irrigation run time



Conclusion

- Defining an irrigation schedule based only on soil tension values was not the best strategy for avocado water management
- To improve the quality of water management, the process should be complemented by monitoring soil EAW
- Combining information could help to avoid events of water stress and deficit during critical phenological stages



Questions

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