

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

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# 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 while lowering irrigation in single rows in each orchard in postharvest period in both 2022 and 2023
- During 2023 harvest we sampled the fruit from fully irrigated and stressed trees to evaluate effects on the yield quality and quantity

# Goals for continuous research

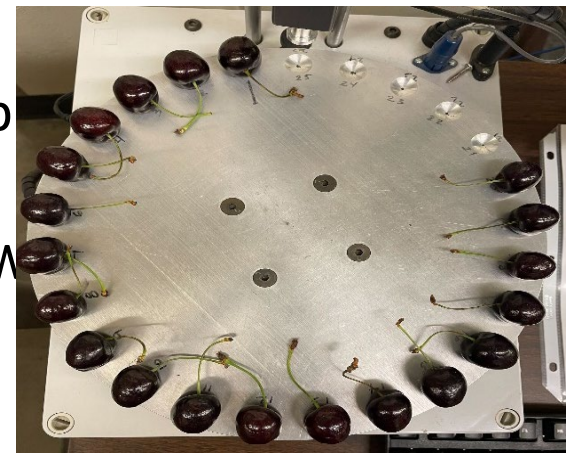


- After another limited irrigation in postharvest period of 2023, we need to assess harvest samples in spring of 2024
- Evaluate FloraPulse technology in sweet cherry as a possibility of SWP-measurement automation.
- Recommend SWP levels at which irrigation can be reduced without impacting the yield



# Experimental design

- FloraPulse installed the first week of May
- 4 per orchard; 2 branches per tree; total 12 in 3 orchards
- 2 trees in each orchard equipped (PDI and Control treatment)
- Deficit started August 26, 2022 and June 21, 2023.
- 2/rows under observation (PDI and Control treatment)
- 2 flowmeters and valves per row for each drip line
- Valves were closed for PDI in one of the rows for 50% irrigation application
- 1 (2022) and 5 (2023) trees from each deficit and control treatments were sampled weekly for SWP using pressure chamber
- One-way ANOVA was used for statistical analysis of the fruit quantity and quality and SWP





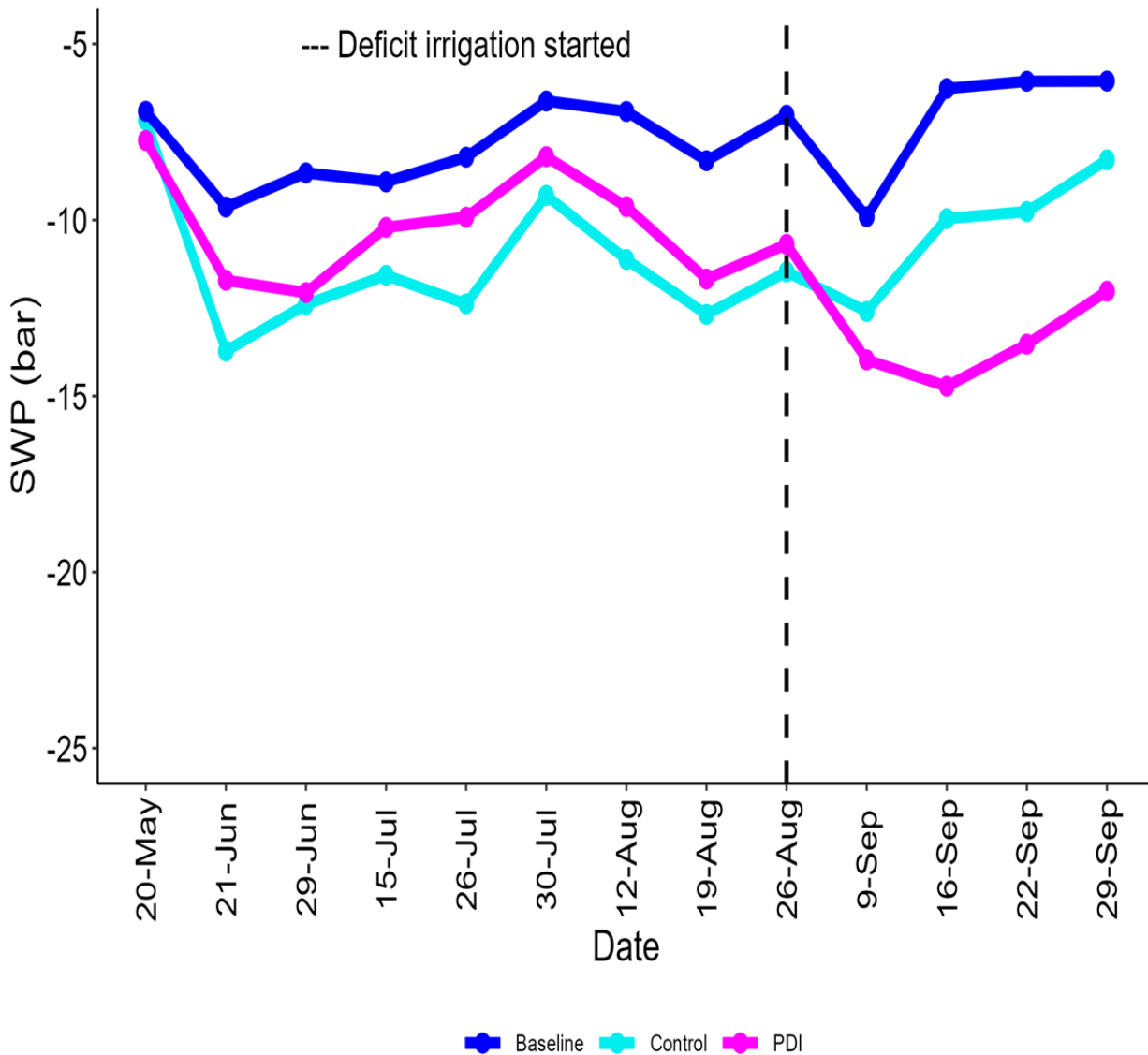
# Control and deficit rows in three orchards near Linden



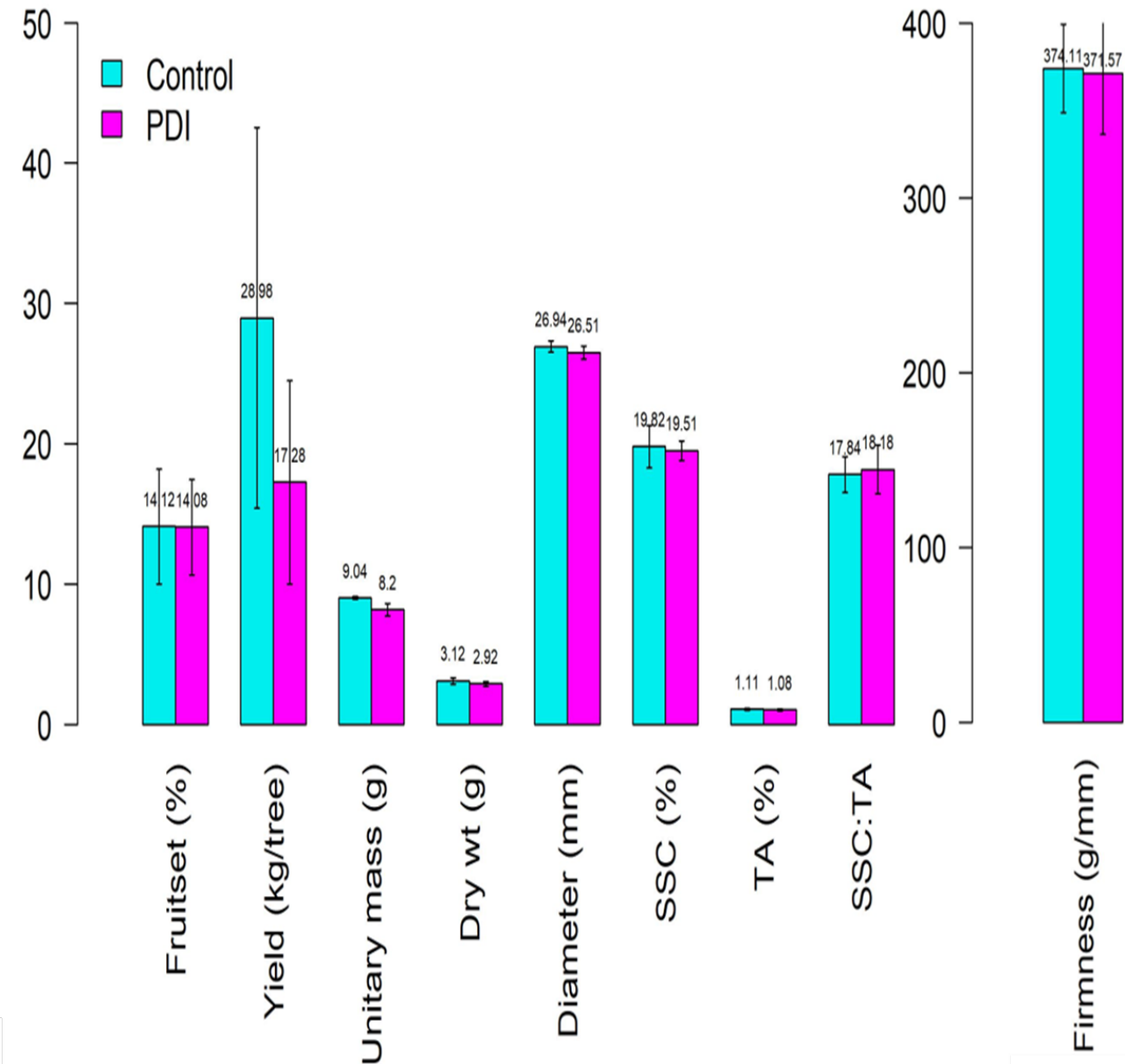
Site	Irrigation	Planting density	Control trees under observation	Deficit trees under observation
Go	Drip	20x22 ft	24	25
Kahn	Drip	16x16 ft	31	31
Dasso	Drip	20x20 ft	10	12

# SWP in post-harvest period of 2022 and yield quality control in 2023

Site 1: pressure chamber SWP, 2022

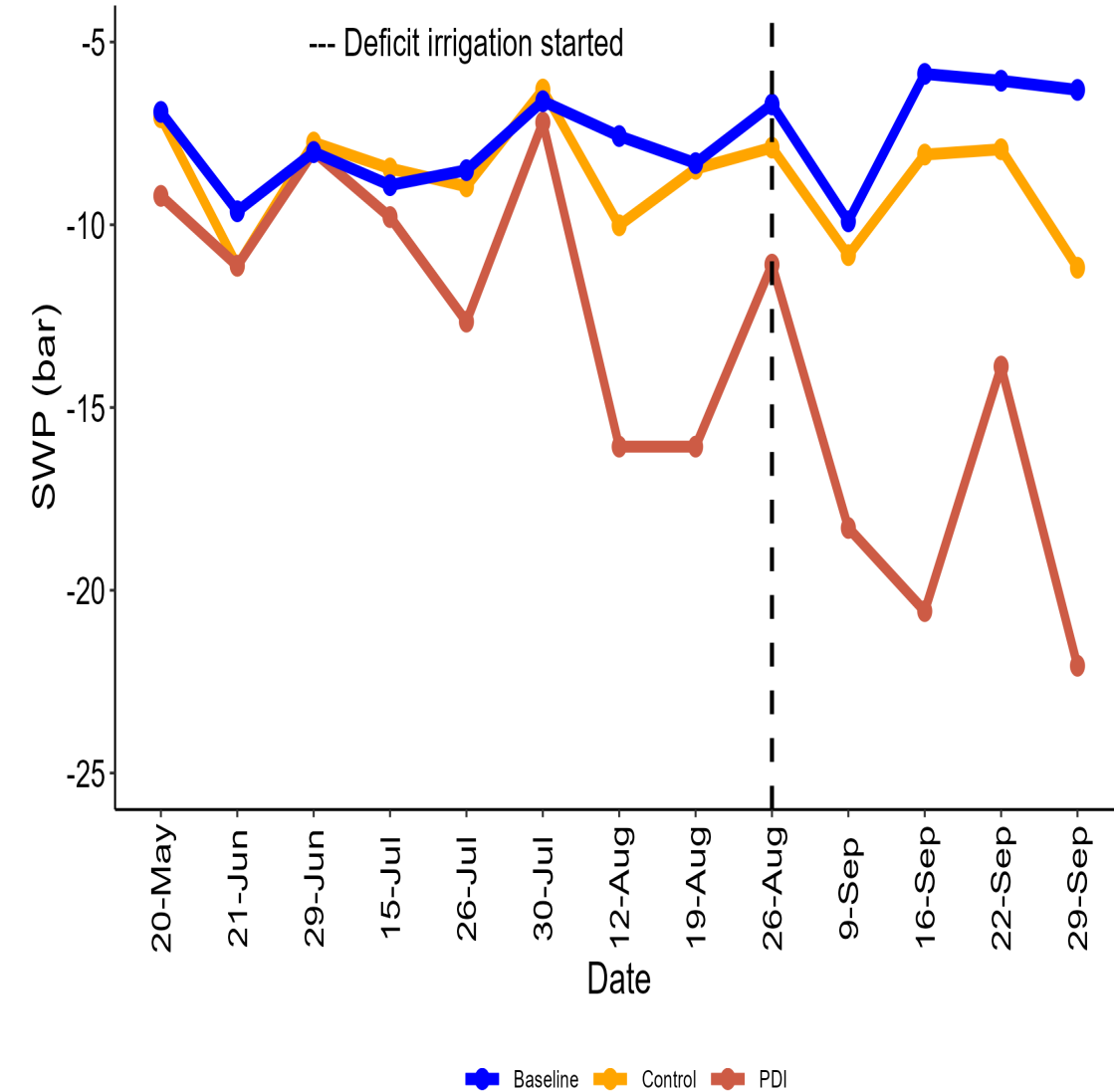


Site 1: yield and fruit quality (24 hours), 2023

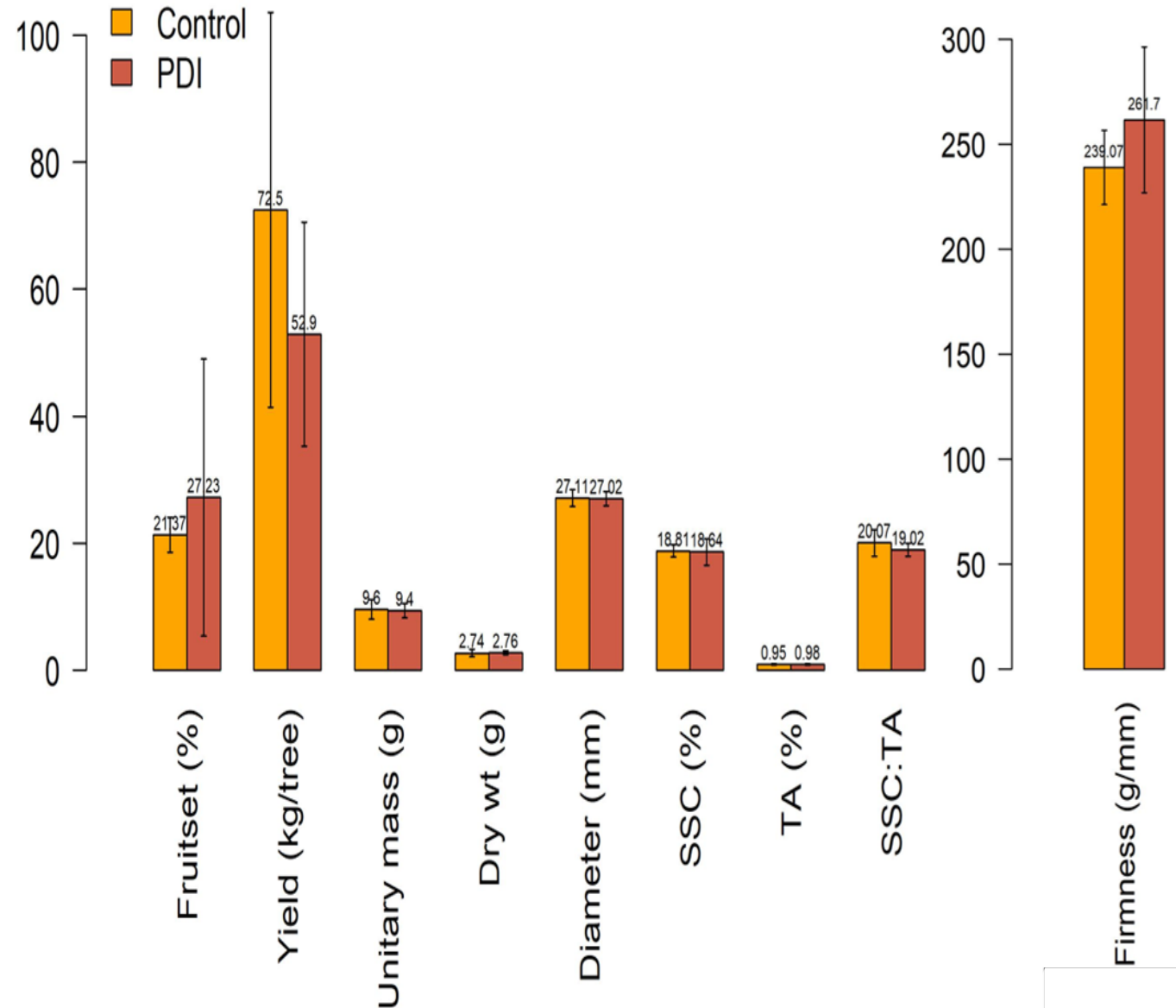


# SWP in post-harvest period of 2022 and yield quality control in 2023

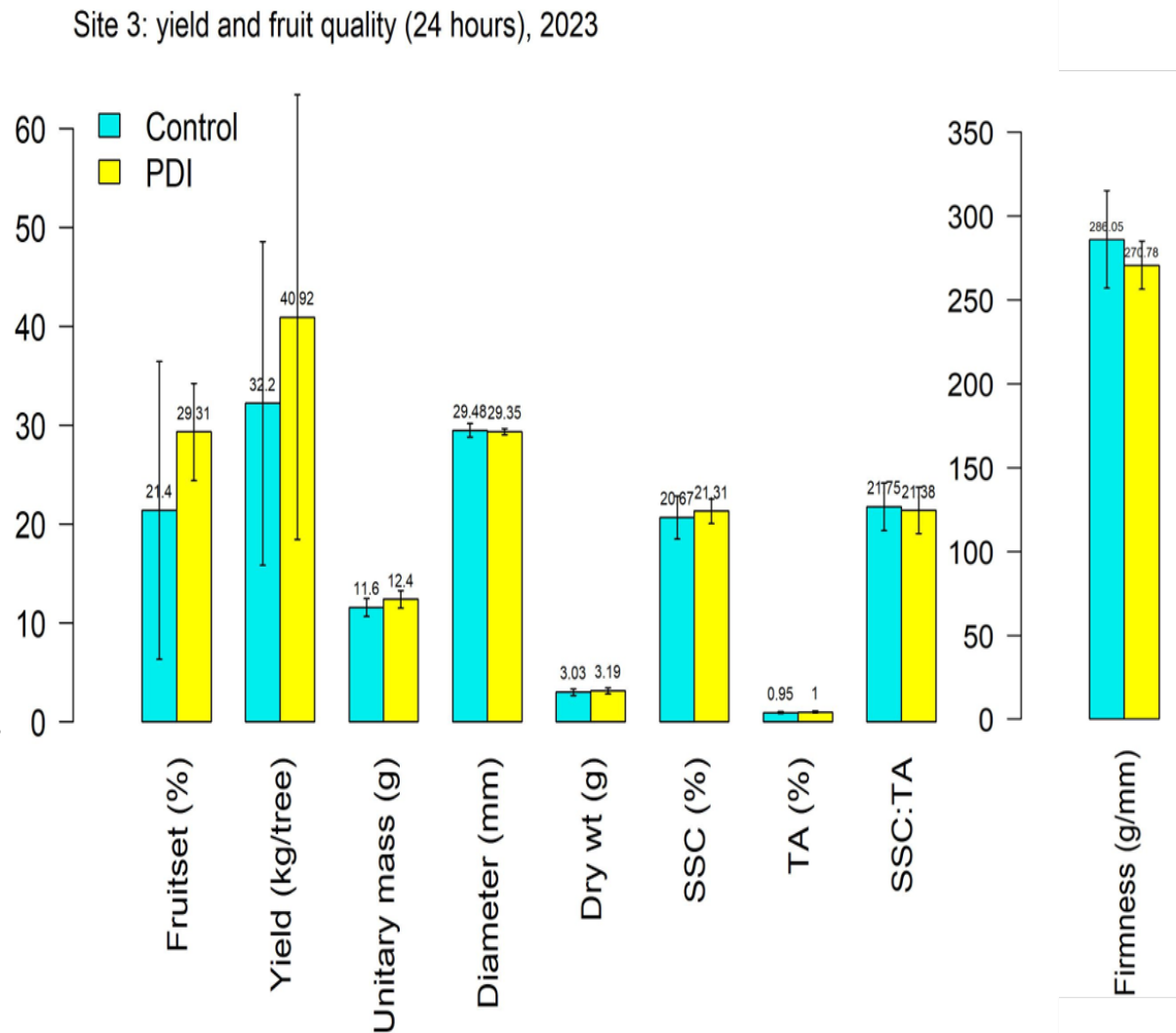
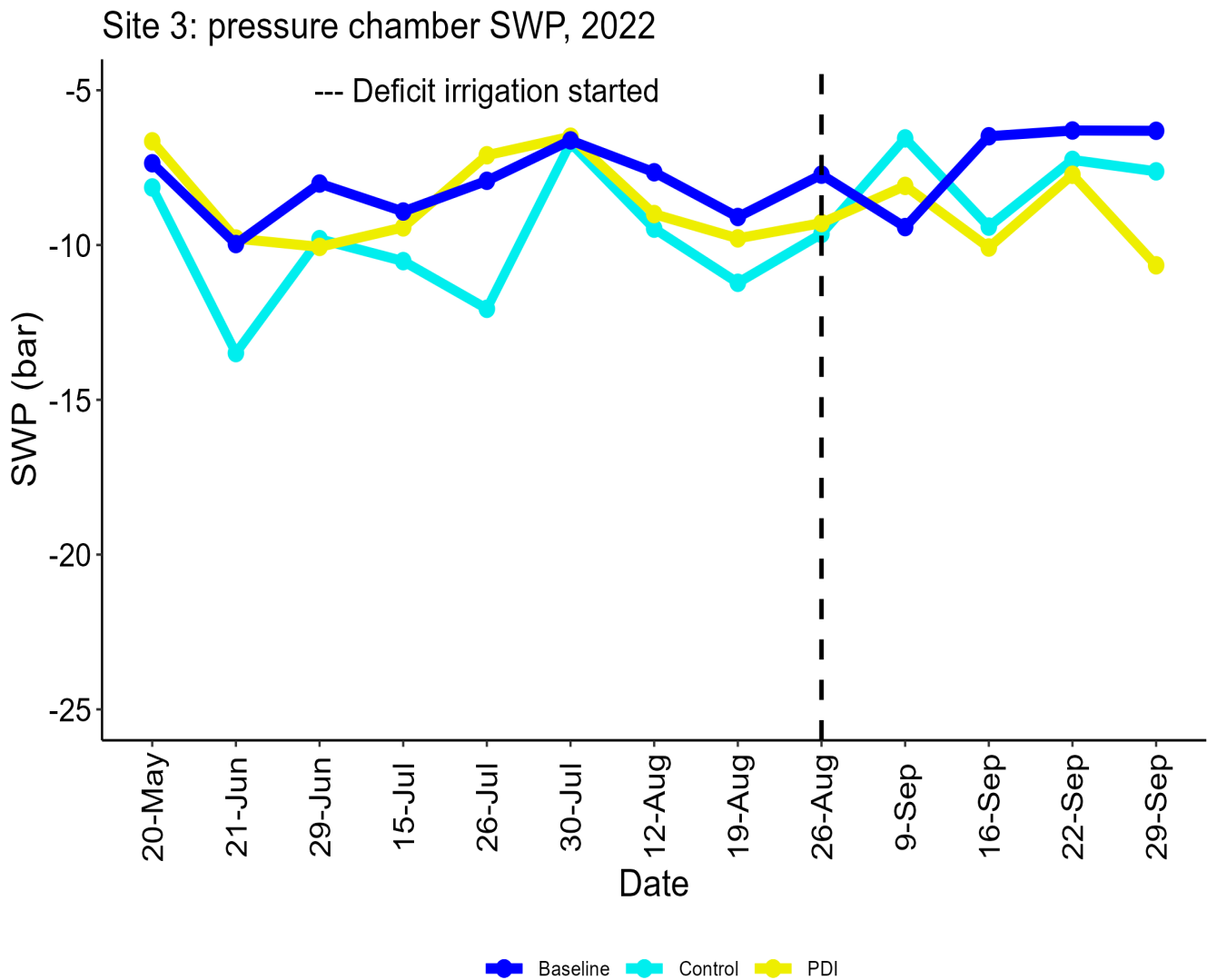
Site 2: pressure chamber SWP, 2022



Site 2: yield and fruit quality (24 hours), 2023

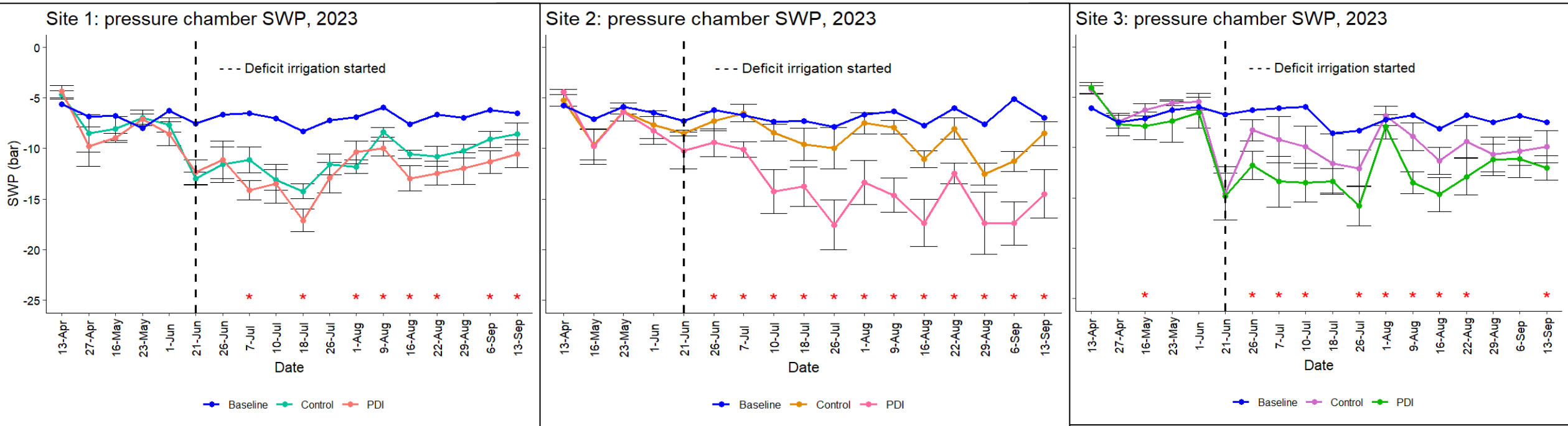


SWP in post-harvest period of 2022 and yield quality control in 2023





# 2023 Post-harvest season SWP



# 2022-2023 Applied Water Savings

<i>Year</i>	<i>Orchard</i>	<i>Study period considered</i>	<i>Cumulative applied water in the control row</i>	<i>Cumulative applied water in the deficit row</i>	<i>Water Saved during the study period</i>	<i>Deficit application period considered</i>	<i>Water saved after deficit application</i>
<b>2022</b>	Site 1	4 Aug-14 Oct	7.27 inch	5.16 inch	2.11 inch (29%)	26 Aug-14 Oct	2 inch (41%)
	Site 2	4 Aug-14 Oct	10.40 inch	10.38 inch	None	26 Aug-14 Oct	1.26 inch (22%)
	Site 3	4 Aug-14 Oct	12.89 inch	9.79 inch	3.10 inch (24%)	12 Aug-14 Oct	3.33 inch (31%)
<b>2023</b>	Site 1	13 Apr-12 Oct	25.04 inch	16.98 inch	8.06 inch (32%)	21 Jun-12 Oct	7.87 inch (42%)
	Site 2	5 Apr-12 Oct	46.88 inch	30.37 inch	16.51 inch (35%)	21 Jun-12 Oct	16.52 inch (50%)
	Site 3	5 Apr-12 Oct	29.66 inch	26.65 inch	2.21 inch (10%)	21 Jun-12 Oct	5.81 inch (26%)

## 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!

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