



CSU Bakersfield

Wireless Solid Set Canopy Delivery System for Tree Cooling

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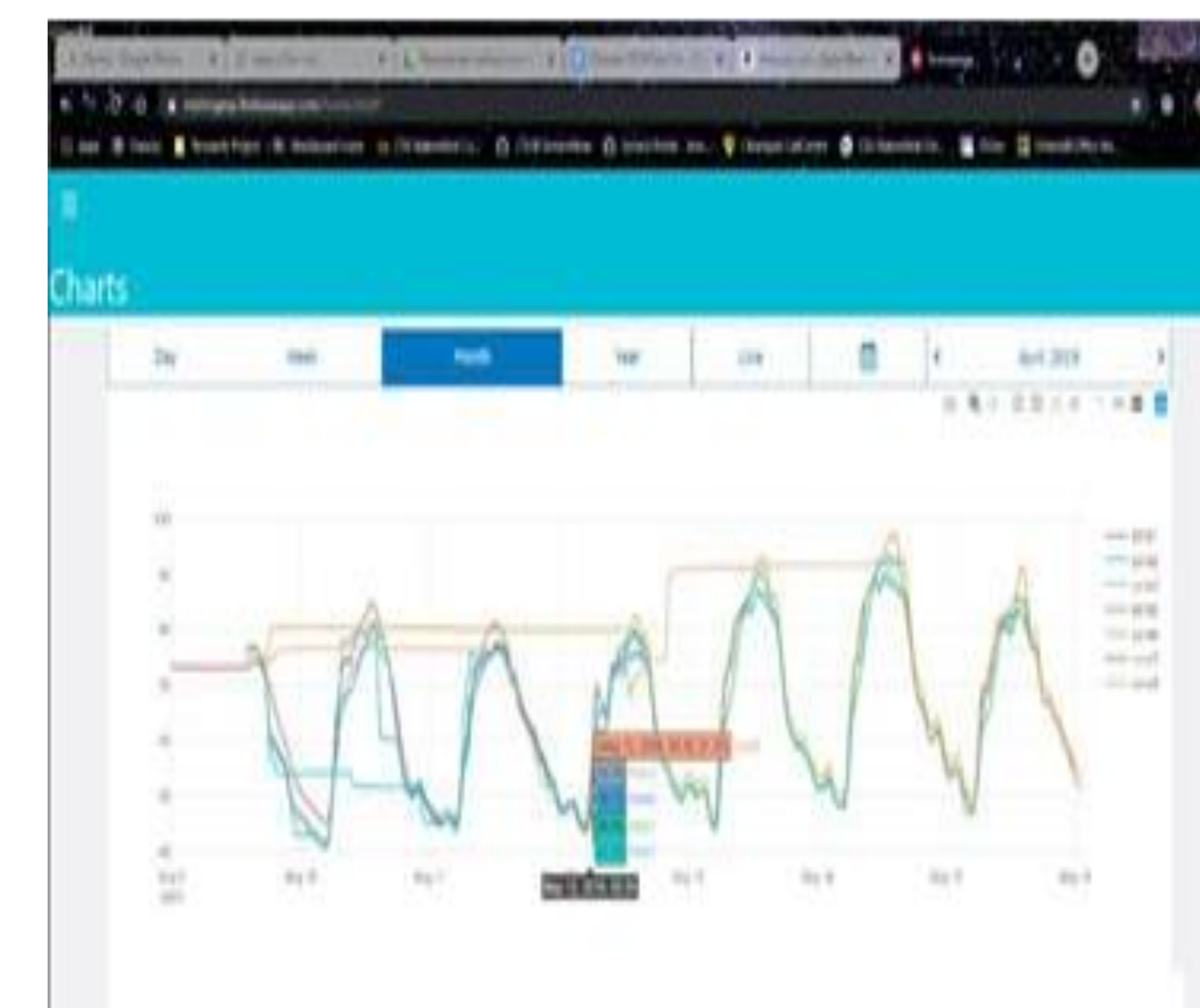
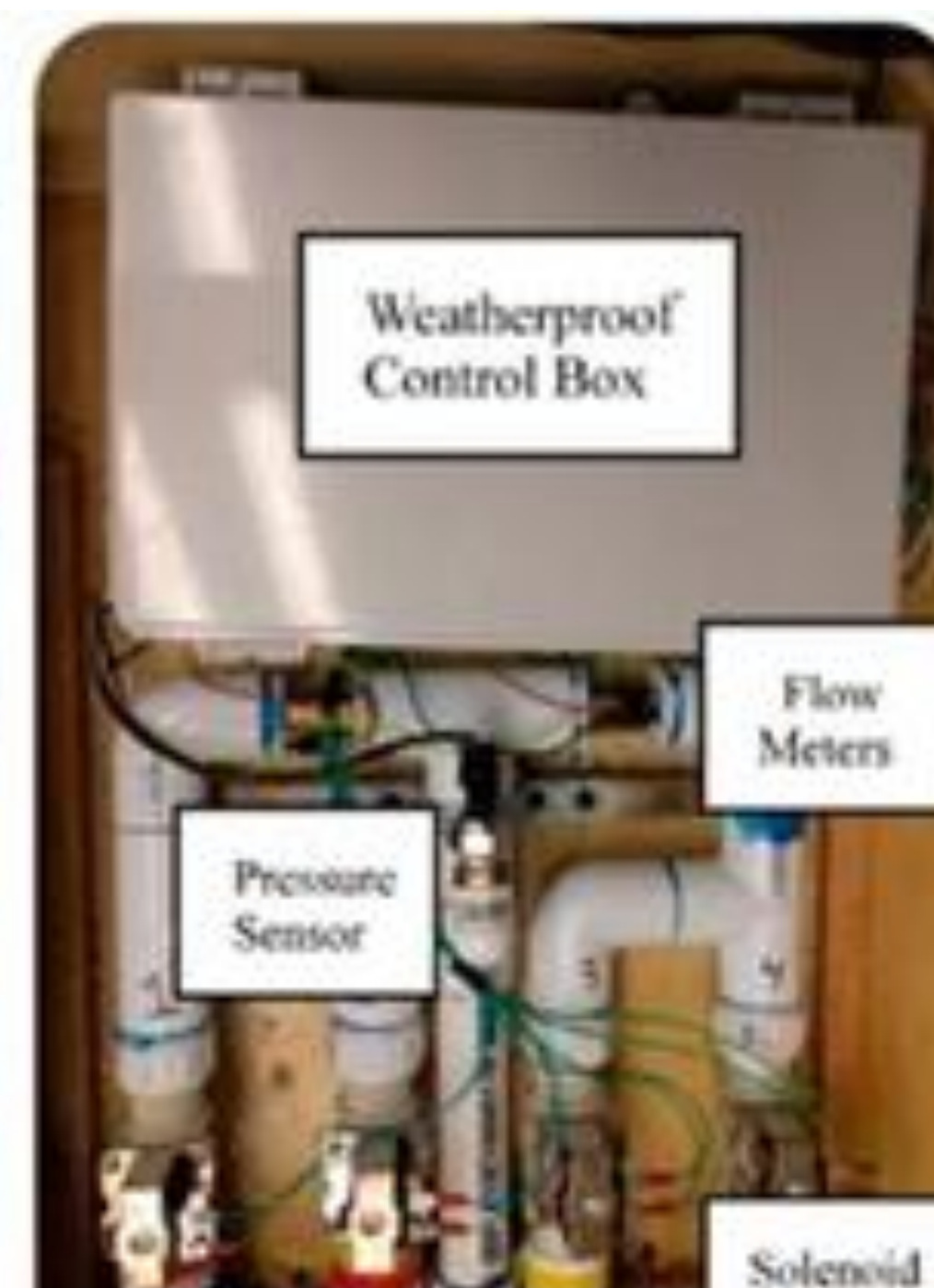
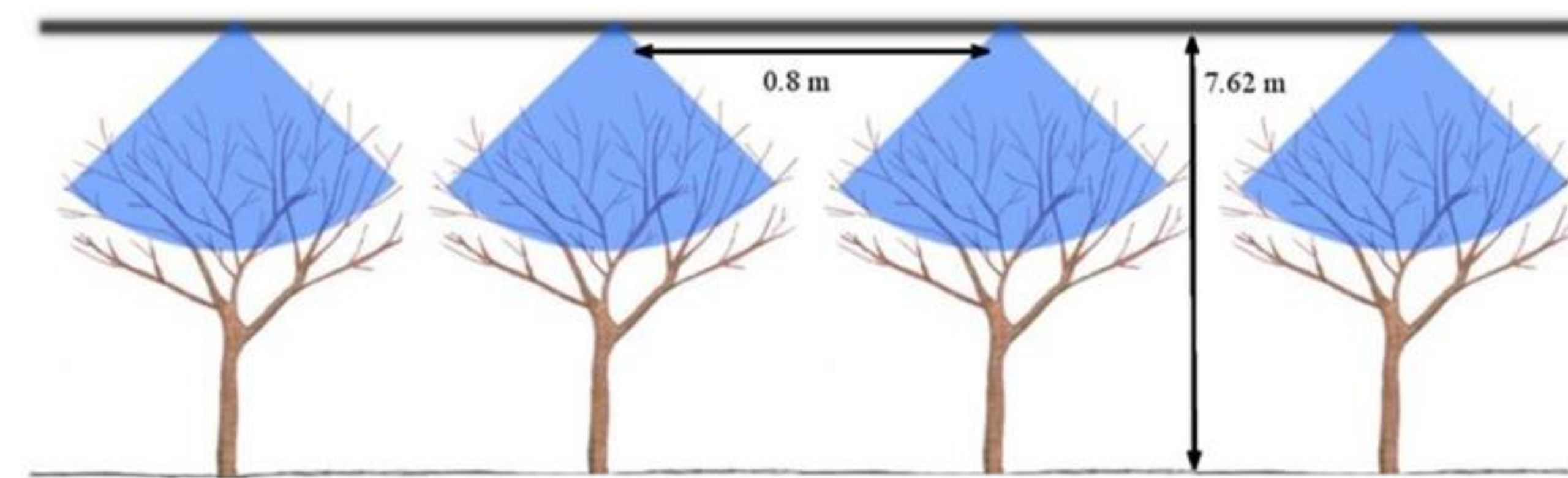
Abstract

Background:

Increasing winter temperatures are having an impact on California tree crops. Pistachio trees have a chilling requirement of approximately 65 hours per winter of temperatures below 45 degrees Fahrenheit. These chill hours are crucial for an adequate bloom and yield response. The predicted increase in winter temperatures can create unsuitable conditions to produce many tree crops in California.

Methodology/Principal Findings:

We conduct research with a canopy delivery misting system on a two-acre pistachio orchard located in the West region of Bakersfield, CA. The system consists of a smart control unit, a local weather station, eight zone sensors, water control valves with flow sensors, and a total of 32 various misting and sprinkler devices installed approximately seven and a half meters in the air above the trees. The system is fully automated and designed to monitor current temperature conditions, triggering the overhead misters if the readings approach a specific threshold. Preliminary tests have shown the system capable of reducing ambient temperatures by up to 15 degrees Fahrenheit.



Conclusions/Significance:

Early tests have shown the system to be effective at reducing ambient temperatures around the pistachio trees. Weather models indicate that the temperatures will continue to rise in the future, reducing the number of chill hours each winter. California alone is home to 1.2 million hectares of orchards cropped with trees that have chilling requirements. These orchards represent an estimated \$8.7 billion industry. This entire industry is vulnerable to the future projected increases in temperature, making further research on methods to reduce these effects paramount.

