Postharvest Deficit Irrigation in Okanagan Cherry Orchards

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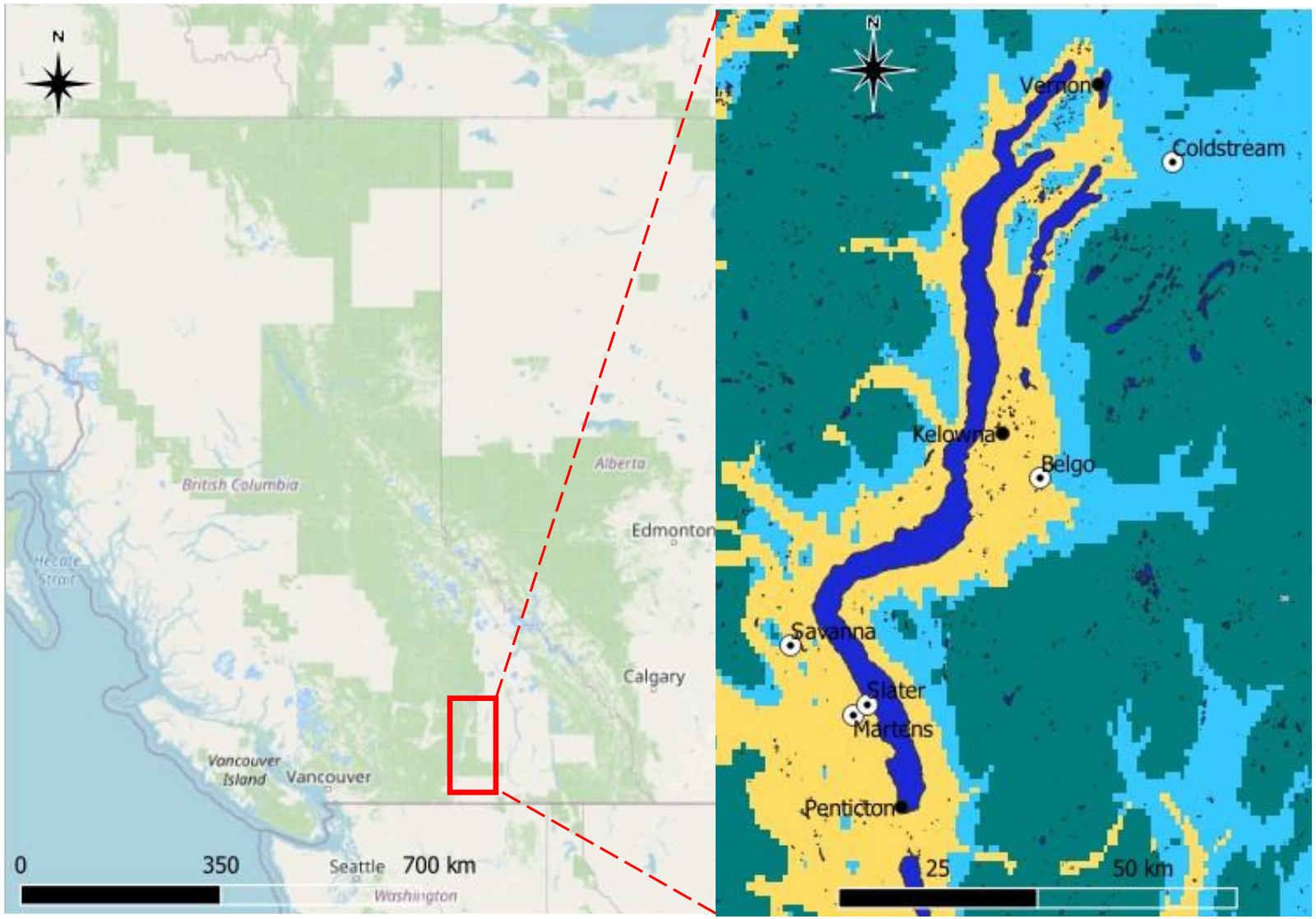
Agriculture and
Agri-Food Canada

Overview

- Background
- Importance and Research Questions
- Experiment and Methods
- Results
- Implications

Background



Köppen-Geiger Climate Classification

- BSk (Cold, semi-arid climate)
- Dfb (Warm summer, humid continental climate)
- Dfc (Subarctic climate)
- Lakes

Importance of this research?

Climate Change

Water Conservation

What is Post Harvest Deficit Irrigation?

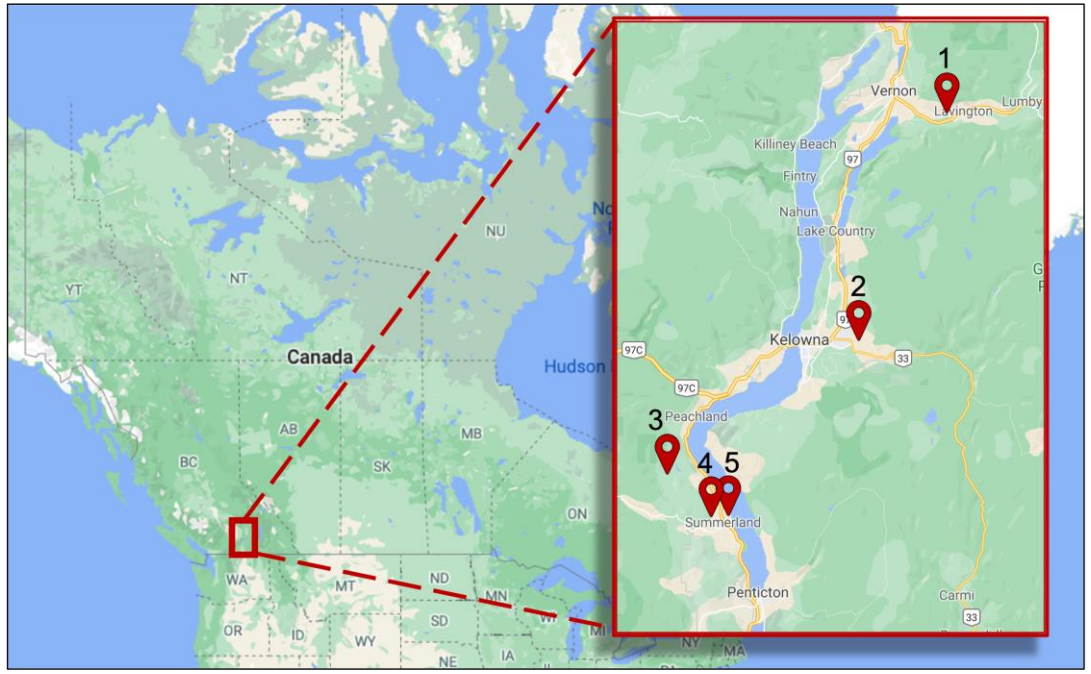
Full Irrigation | Harvest | Deficit Irrigation

Research Question?

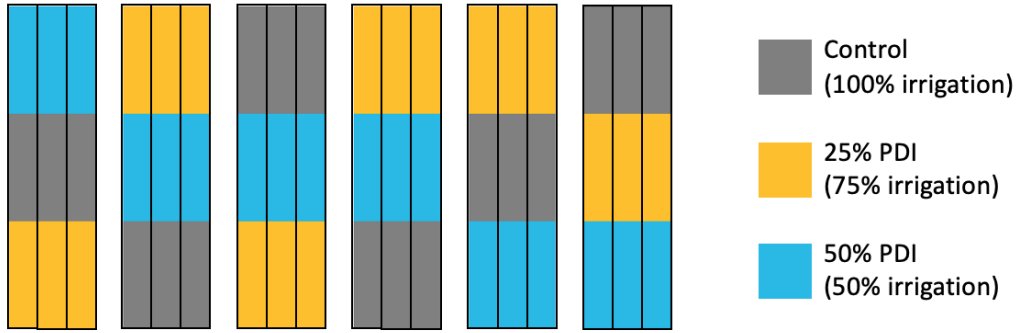
What are the effects of PDI on:

- Fruit Quality
- Yield
- Plant Water Status

Two PDI treatments have been applied to ‘Sweetheart’ sweet cherries in five Okanagan orchards



- Deficits imposed by reducing irrigation flow in relation to growers’ standard practice
- Site 1-4: 2019-2021, Site 5: 2020 and 2021



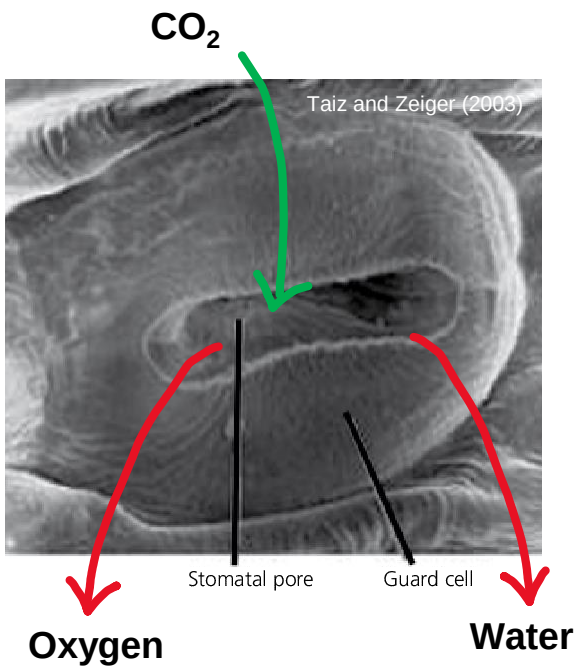
Tree stem water potential, respiration, and fruit quality and yield were measured

Stem Water Potential

- Indicator of water stress

Tree Respiration

- Transpiration, carbon fixation, and WUE



Fruit Quality/Yield

- Firmness, size, sugar/acid content, colour, stem pull force

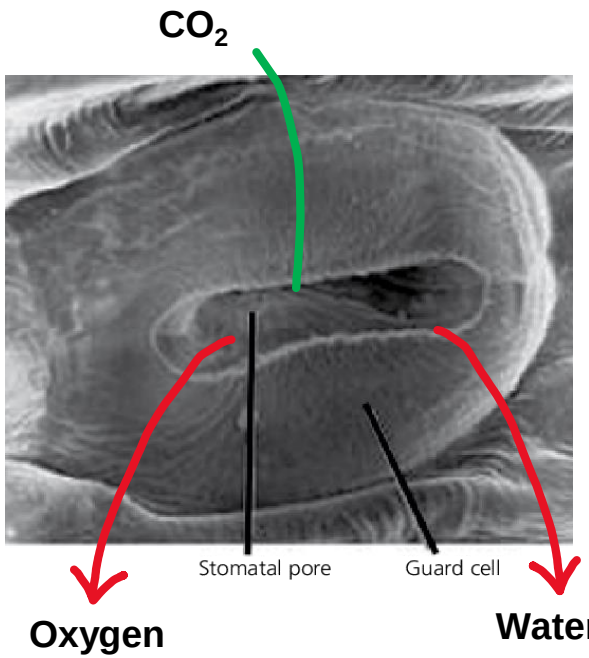
Tree stem water potential, respiration, fruit quality and yield results are in!

Stem Water Potential

- PDI did not increase water stress
- Thresholds suggested: -1.9 MPa (Short Term) or – 1. 32 MPa (Sustained)

Tree Respiration

- Leaf respiration decreases with water stress
- Water stressed trees use water more efficiently

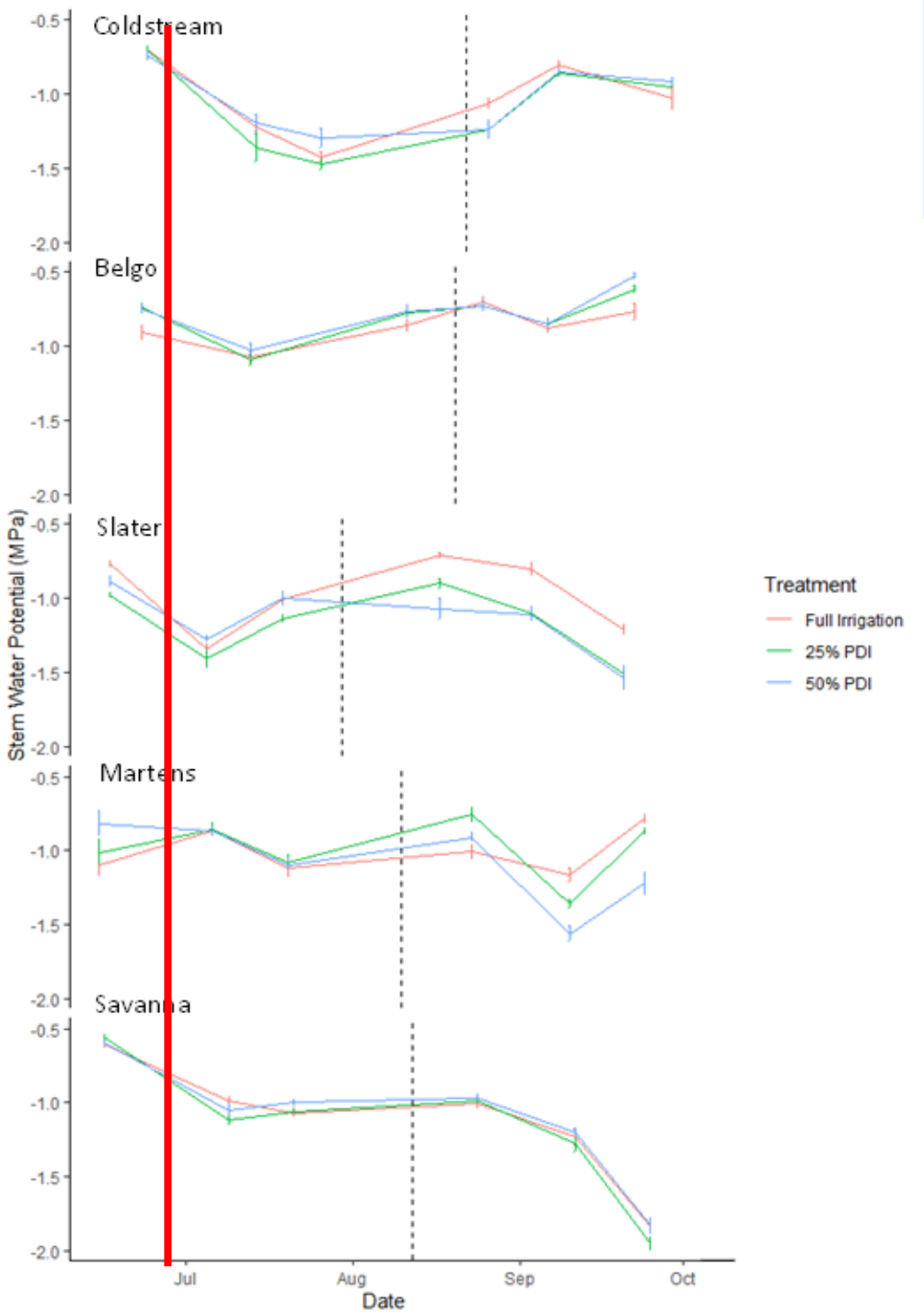


Fruit Quality/Yield

- Current reductions should not impact fruit quality or yield

Tree response to the heat dome

- Field measurements before and after ‘heat dome’
- No lasting effect on stem water potential or leaf gas exchange measurements
- ‘Sweetheart’ trees are well adapted to the dry Okanagan climate
- Trees were significantly more water stressed in 2021
- Fruit quality 2021:
  - TA → Higher
  - Color → Higher



Take home messages

- Can likely reduce irrigation after harvest in most orchards
- More user friendly thresholds need to be established
- Trees recover well from water stress

Thank You !

https://open.library.ubc.ca/cIRcle/collections/ubctheses

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