

# Non-toxic CLS Disease Control of Sugar Beet using Hot Water



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## • Introduction

- Cercospora leaf spot (CLS) caused by pathogen *Cercospora beticola* (Cb)
- Critically affecting sugarbeet growth and decreasing sucrose quantity & quality
- Fungicide leads to Cb developing resistance & causes environmental pollution
- Hot water is as deadly as toxic fungicides, killing pathogens in seconds

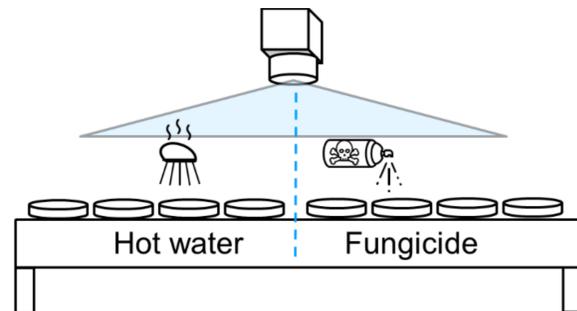
## • Objectives

- Develop an innovative approach of non-toxic eco-friendly way to eradicate Cb by using hot water for sustainable CLS disease management

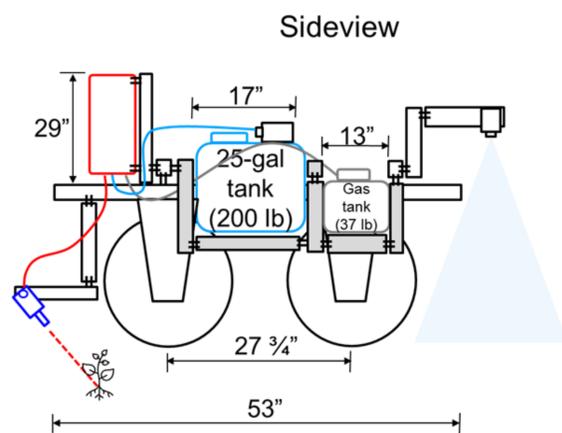
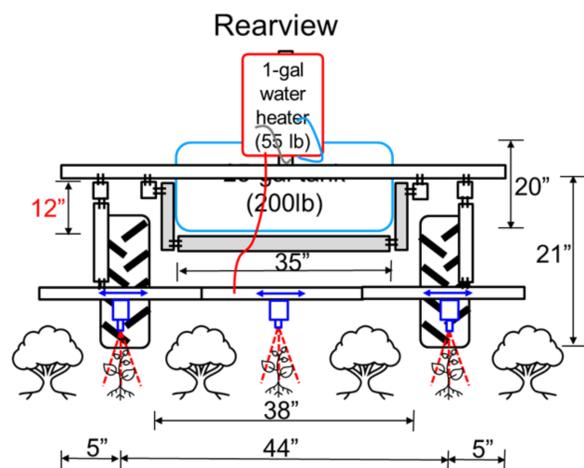
## • Methods

- Water infiltrates into residues and reaches pathogens fast and effectively
- Heat transfer via water to reduce Cb prevalence
- 1¢/gal water vs. \$600/gal fungicide

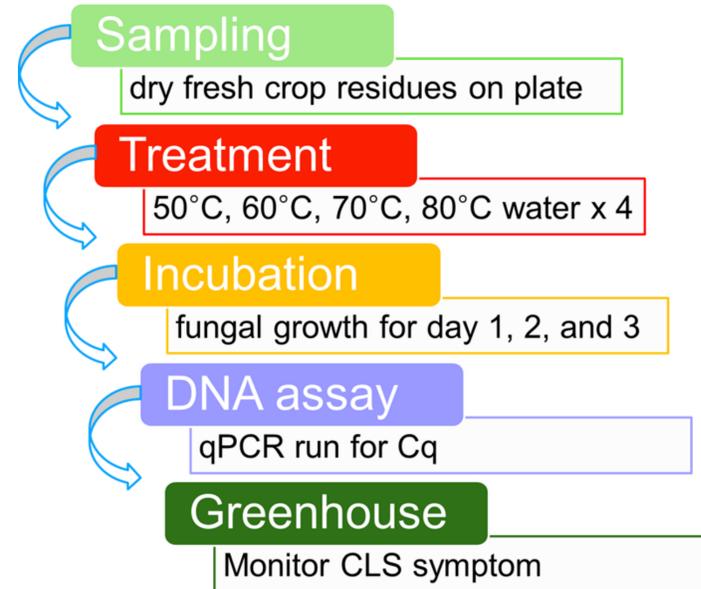
Variables	Range	Optimum	Note
Temperature	50-80°C		
Volume	10-100 ml		
Droplet	100-400 micron		



T	Volume	Drop	Volume
50°C	100 ml	100	30 ml
60°C		200	30 ml
70°C		300	30 ml
80°C		400	30 ml

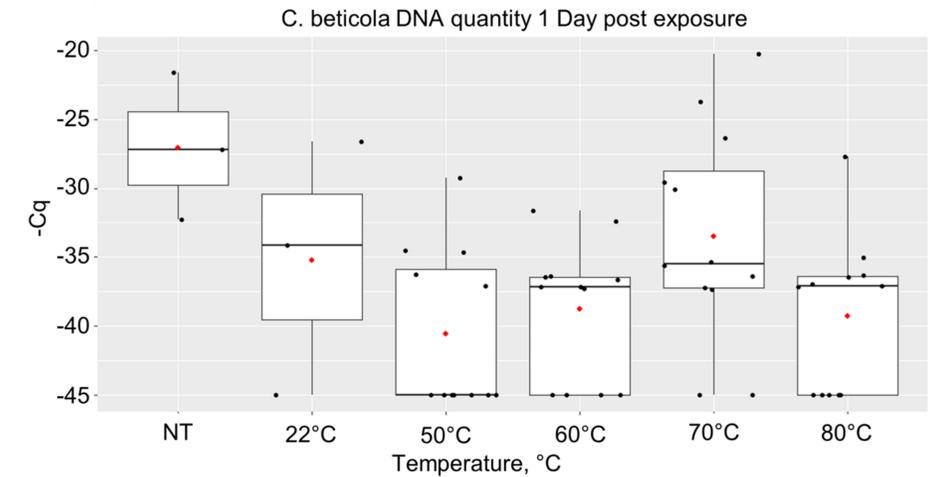


## • Experiment



## • Results

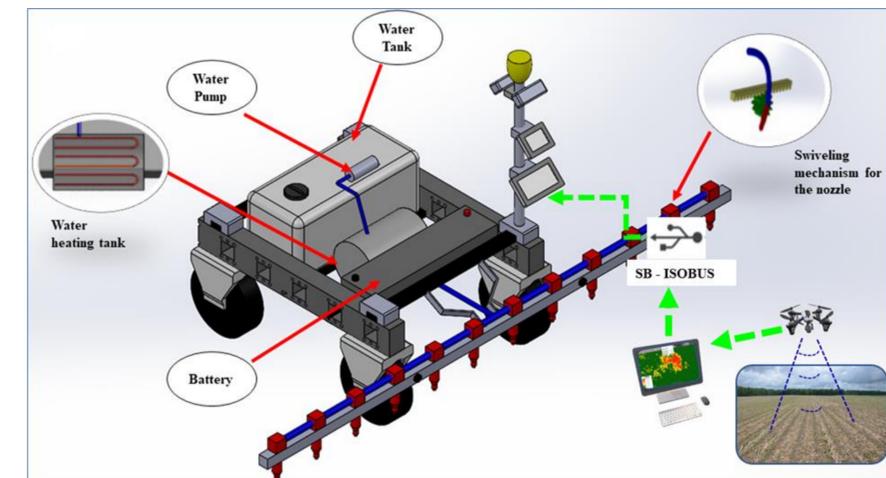
- Averages lower than NT samples for all temperatures
- 50°C resulted in a reduction in DNA detection
- Day 2 & 3 voided and caused by inhibitors in incubation



## • Conclusion

- Hot water can effectively kill Cb on crop residues and can facilitate sustainable management of Cb inoculum levels in sugarbeet fields.
- The benefit extends to applications on other biotic stresses (e.g., pest and weeds) for sustainable management of pesticides and herbicides.

## • Future work: AI-driven site-specific sprayer robot



## • Acknowledgments

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