Drought Resistance and Frost Tolerance of Redwood Clones

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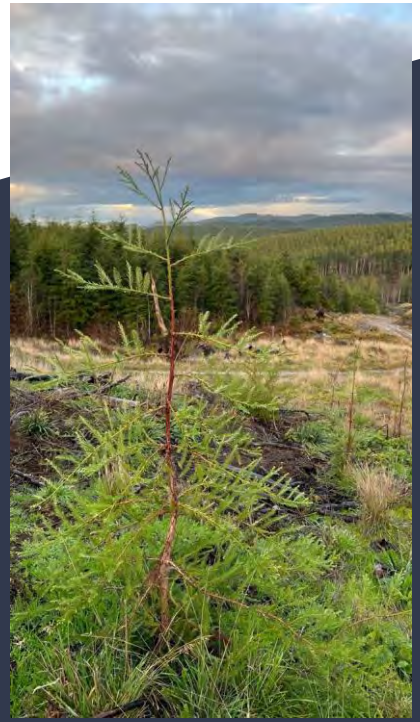
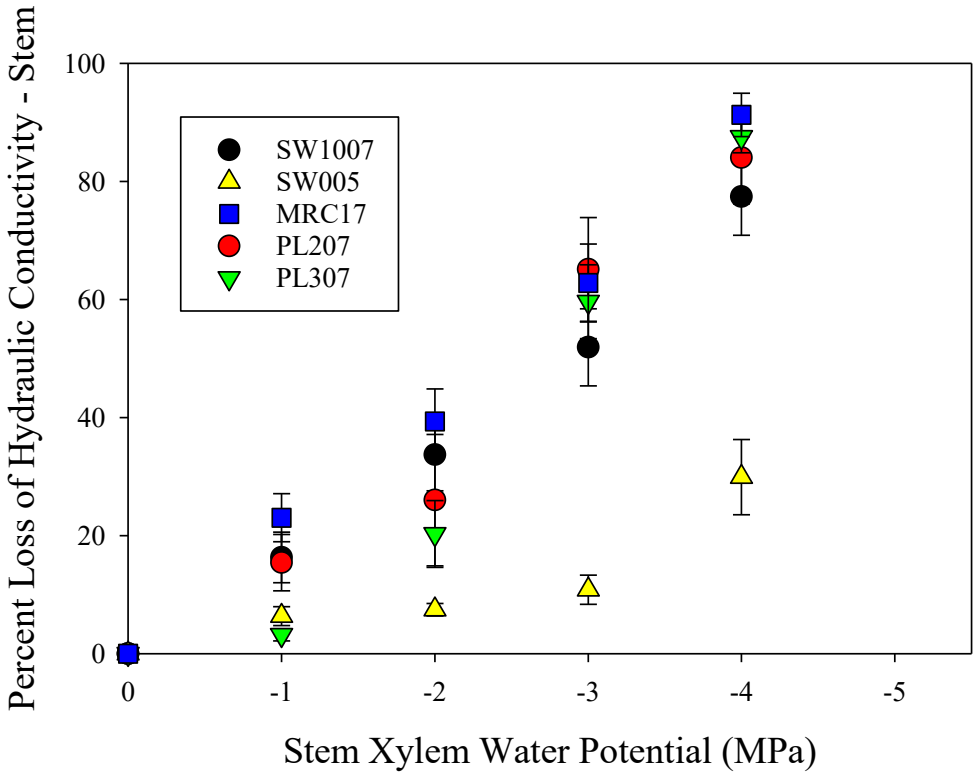


Background

- Increased interest in Redwoods
  - Fast growing, disease resistant/ tolerant, climate change
- Redwood Tree Improvement Cooperative (RWTIC) was established in 2019
- 47 clones in 5 sites in CA and OR
- First research done at planting
- 5 total clones tested at OSU-VMRC
  - Continued my research with 3
  - Located in Coquille & Bandon Oregon, South of Coos Bay



At Planting

Objectives

- Confirm if the drought resistant results at planting hold true 1-2 years after planting
- Determine if drought resistant clones are also frost tolerant
- Determine the amount of chilling hours necessary for peak cold hardiness of *Sequoia sempervirens*

Methods

Drought Resistance

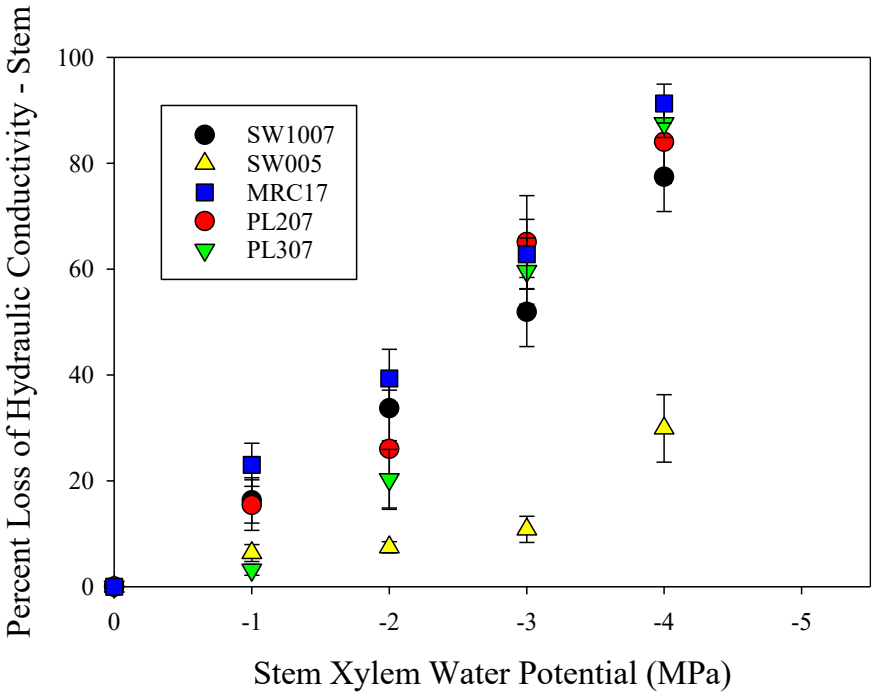
- Measure pre-dawn and midday samples
- Measure hydraulic conductivity
- Measure vulnerability to cavitation

Frost Tolerance

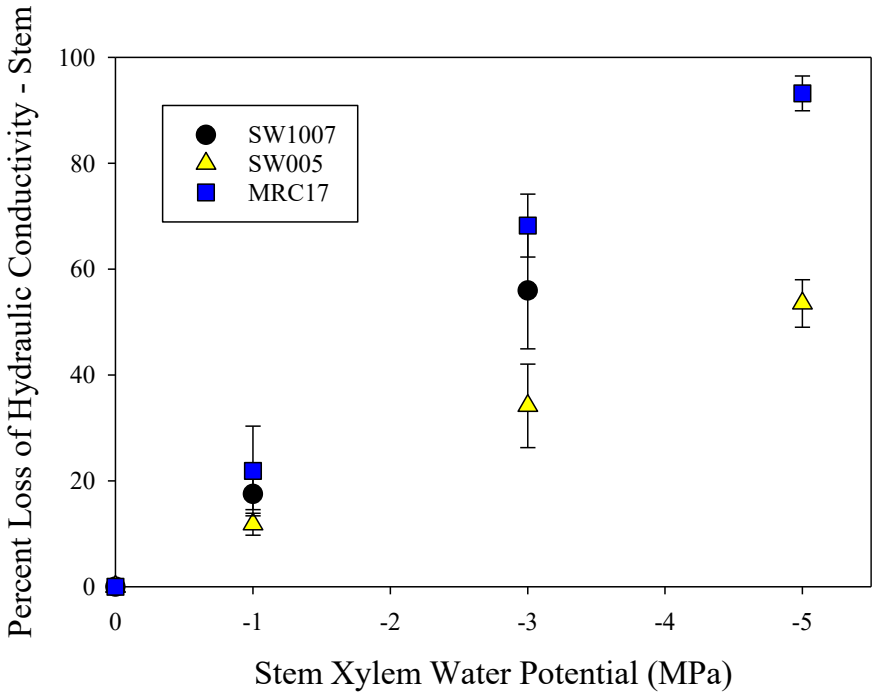
- Collect small branch samples in the field
- Preform electric conductivity procedure

September Measurements - Drought Resistance

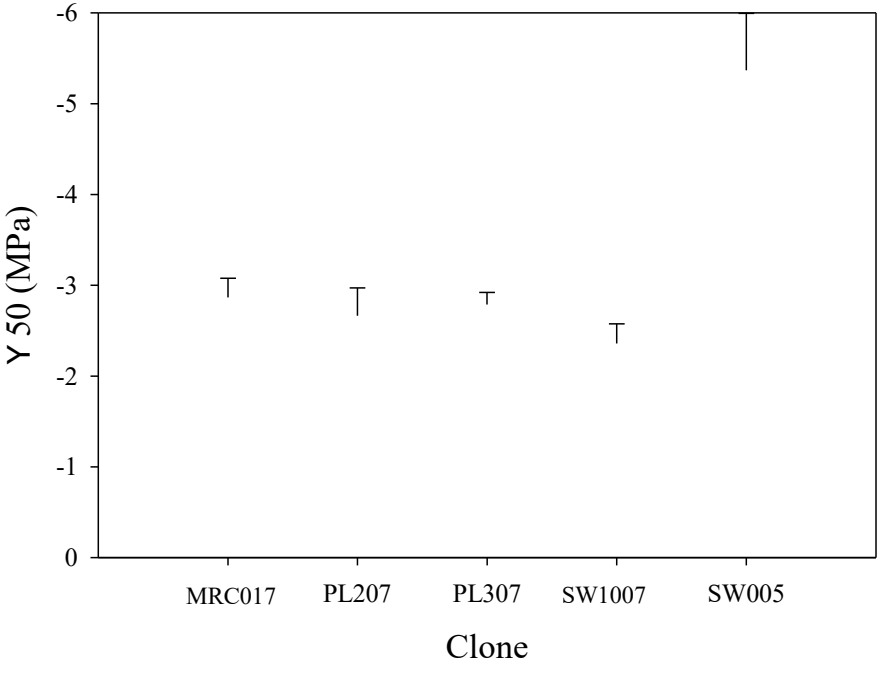
- Pre-dawn/ Midday measurements
- Frost tolerance samples collected
- Weather station data collected



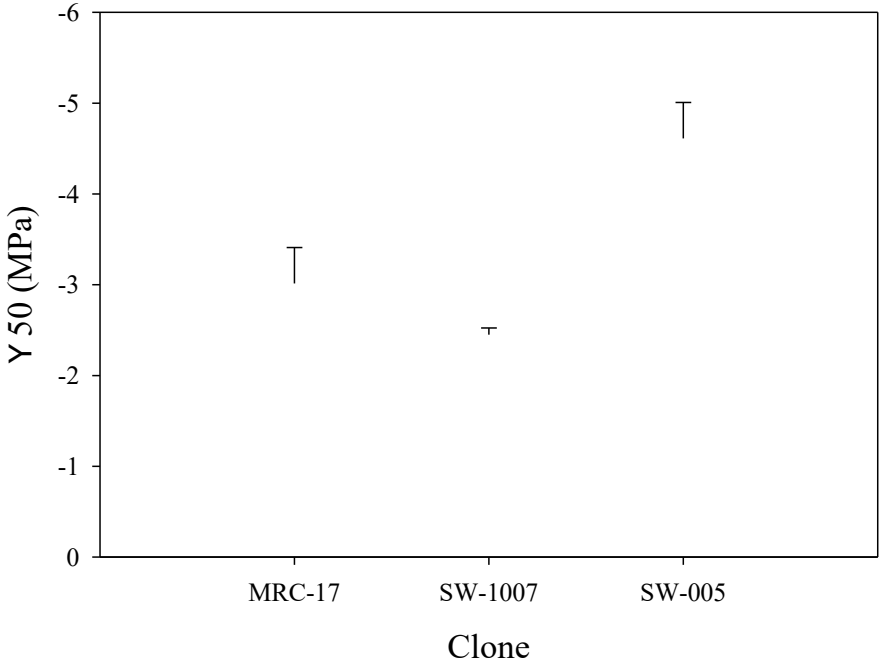
At planting



1-2 years after planting



At planting

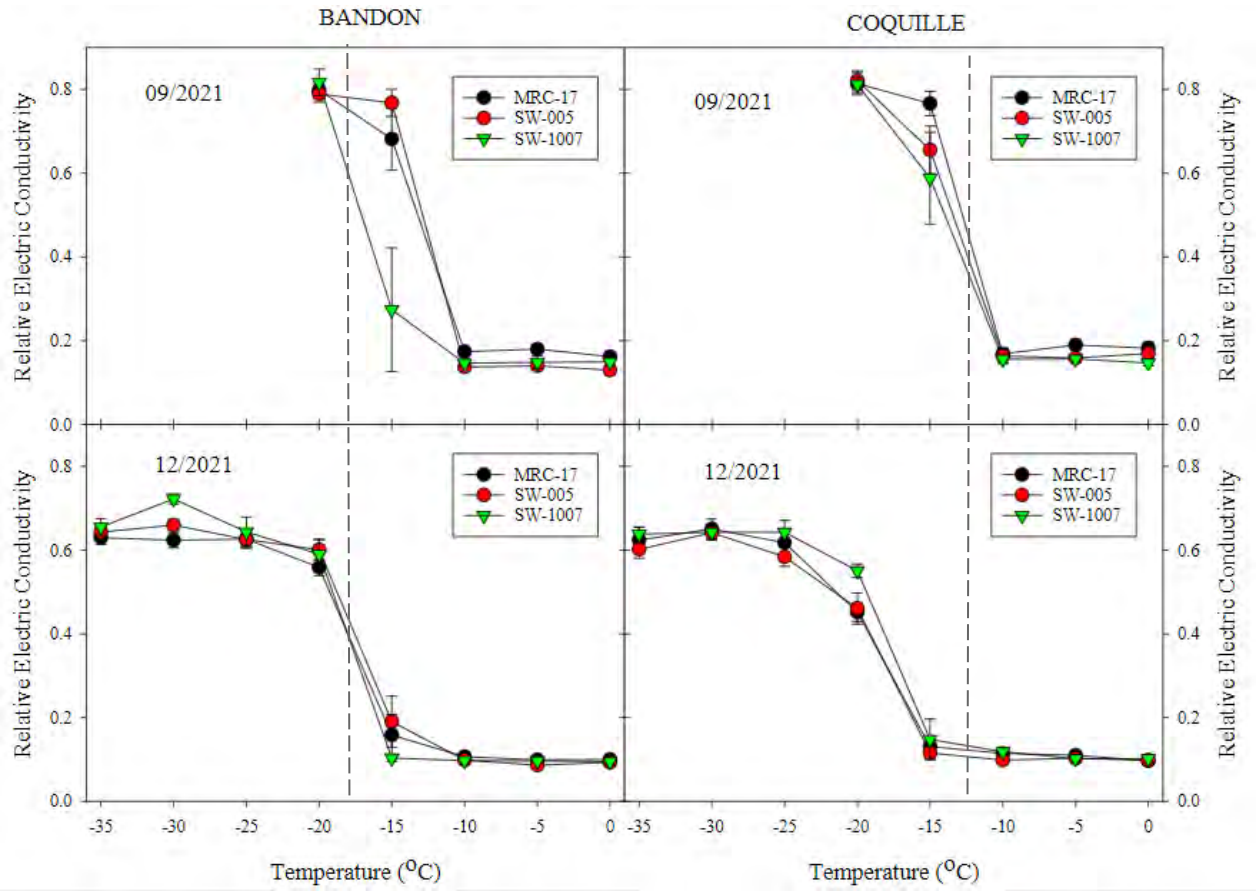


1-2 years after planting

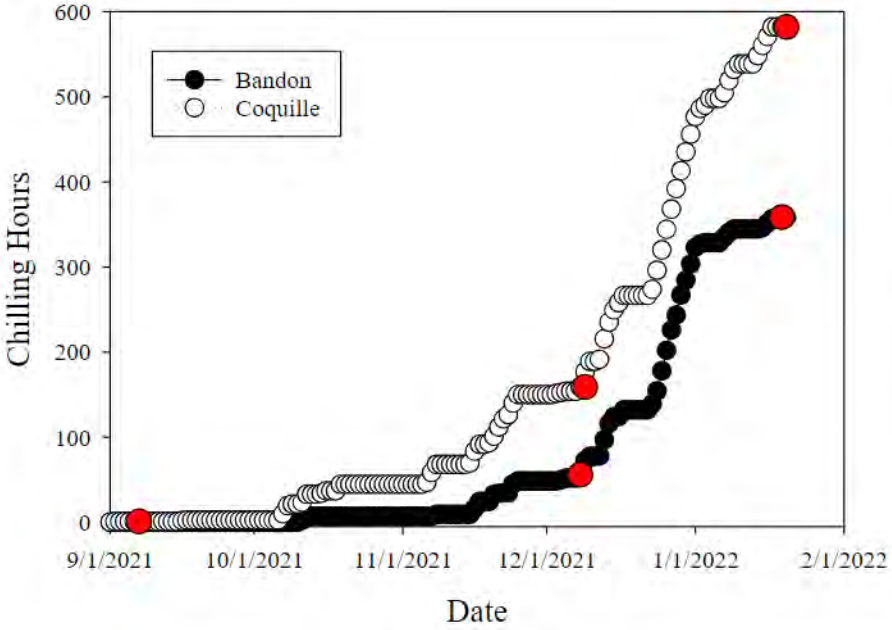
September, December, & January Measurements - Frost Tolerance

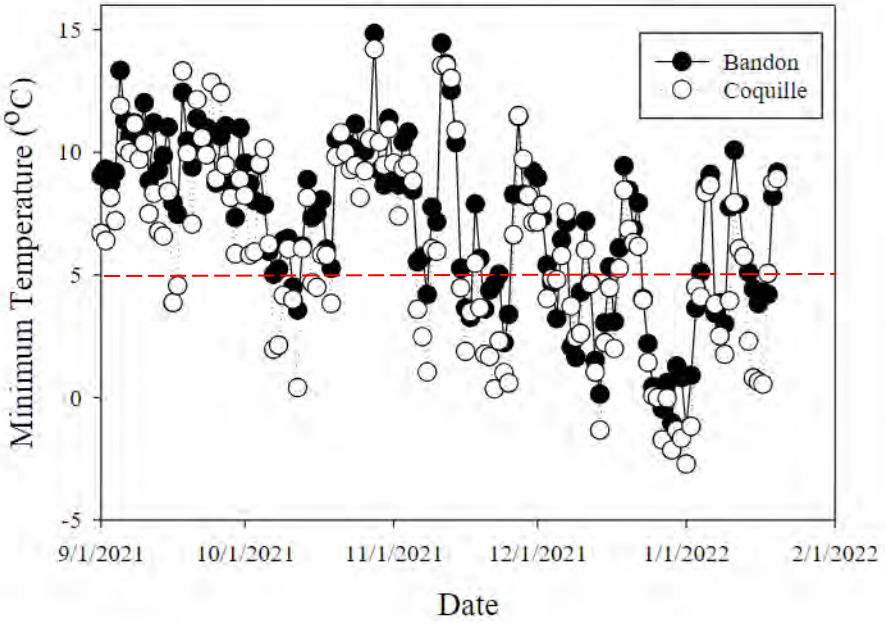
- Frost tolerance samples
- Chilling hours data collected

Frost Tolerance Lab Procedures



September and December Frost Tolerance Comparison

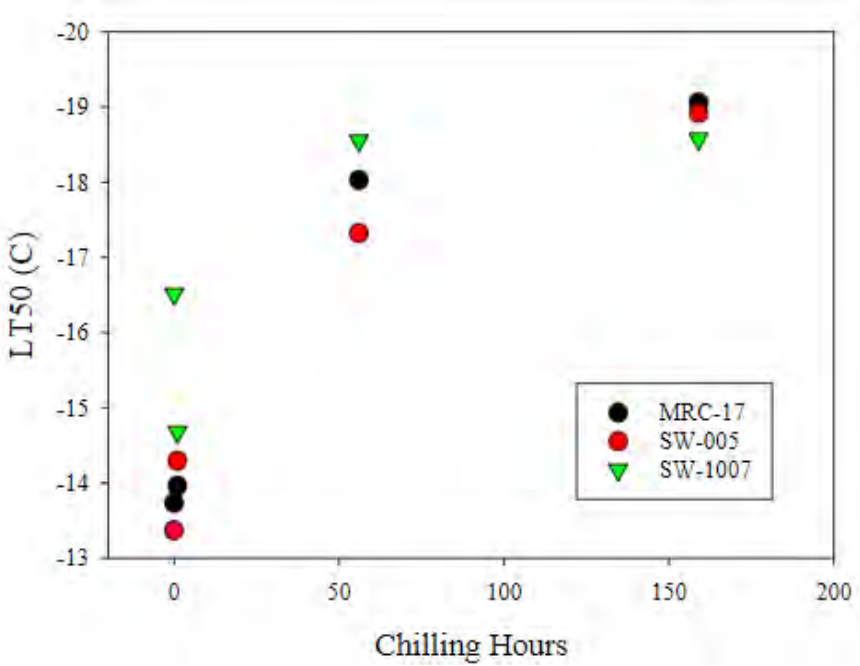




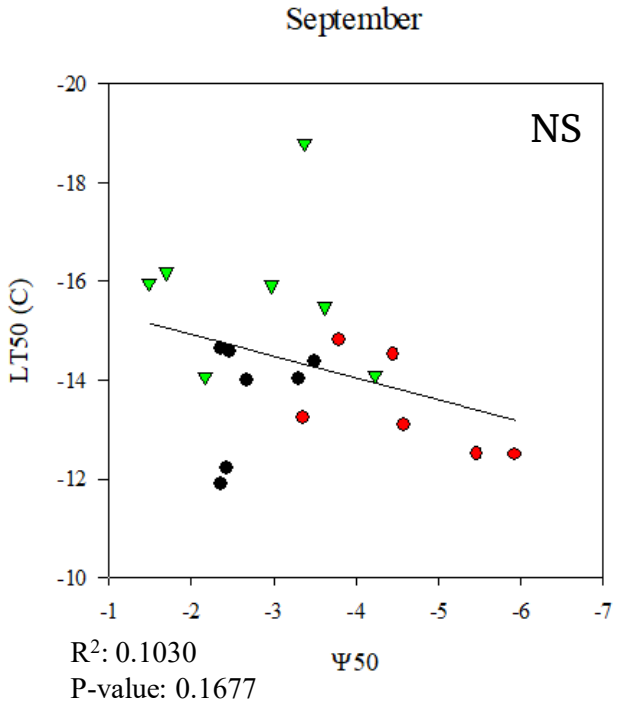
Chilling Hours

Lethal Temperature 50 compared to Chilling Hours

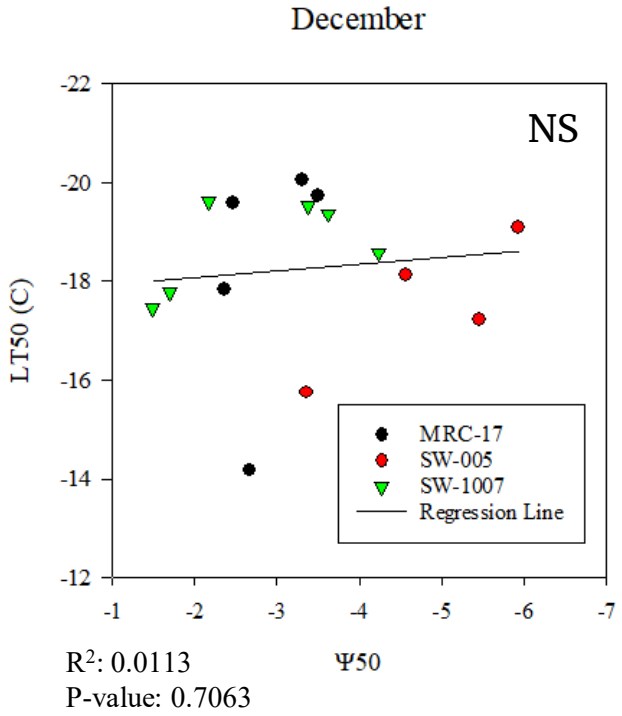
- Approximate Average LT50
  - -13 C° & -19 C°
- Cold Hardiness Peaks in December
- Bandon's Chilling Hours
  - 0, 56, 358
- Coquille's Chilling Hours
  - 1, 159, 582



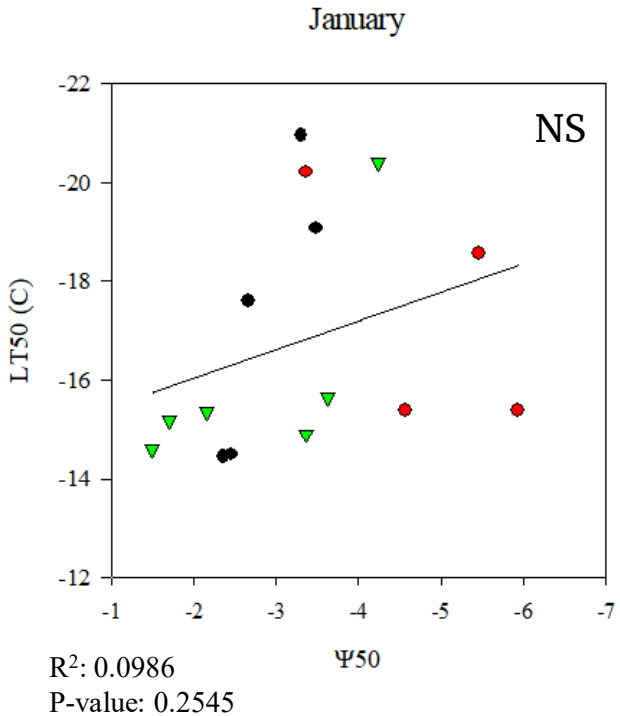
Lethal Temperature 50 Compared to Ψ50



R^2: 0.1030
P-value: 0.1677



R^2: 0.0113
P-value: 0.7063



R^2: 0.0986
P-value: 0.2545

Conclusions

- Drought resistance results at planting hold true 1-2 years after
- Frost tolerance in September varied across genotypes
- After December, most genotypes were equally frost tolerant at the same temperature
- No relation between LT50 and Ψ50 results

- Questions?
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