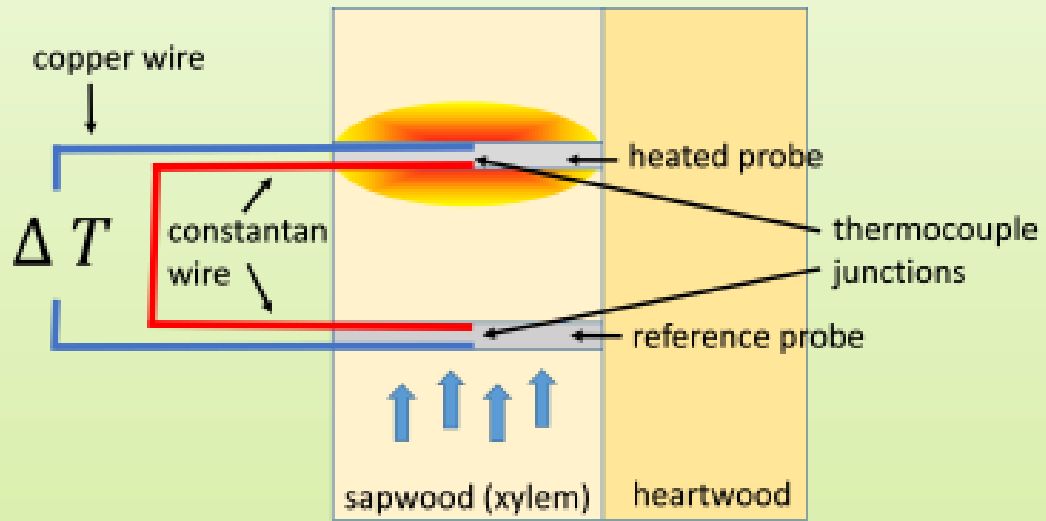


SPRUCE Sap Flux Findings with Implications to Photosynthesis and Transpiration

Jaden Lau – Cornell University,
ORNL Environmental Sciences Division



Temperature Dissipation Probe to Measure Sap Flux



Thermal Dissipation Probe (TDP)

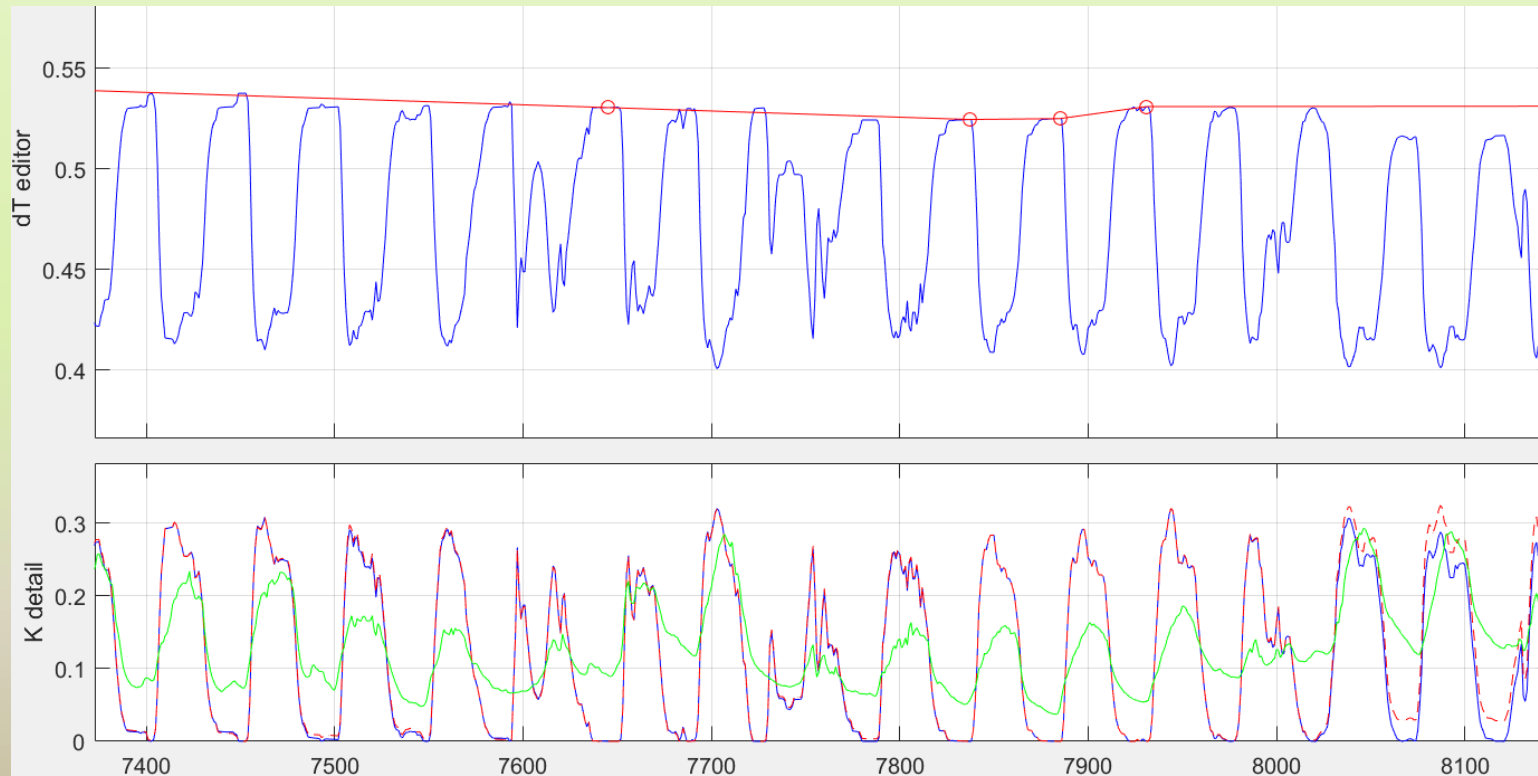


TDP in SPRUCE chamber

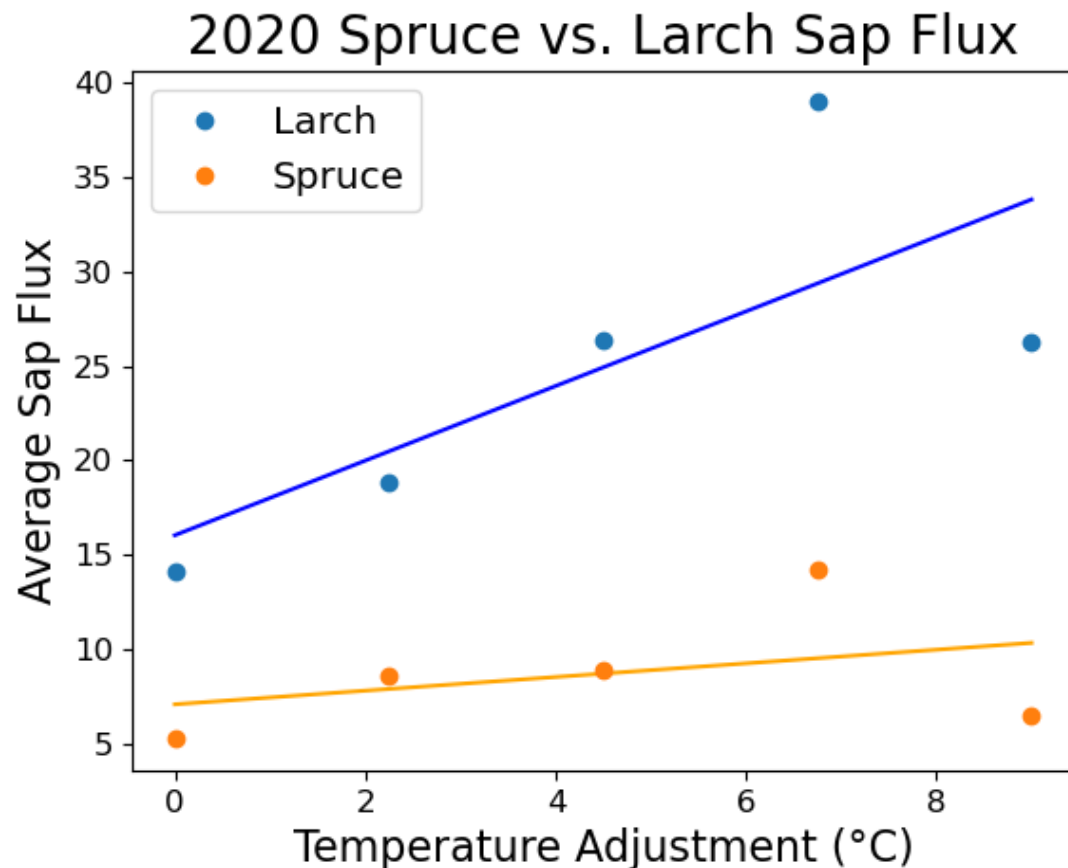
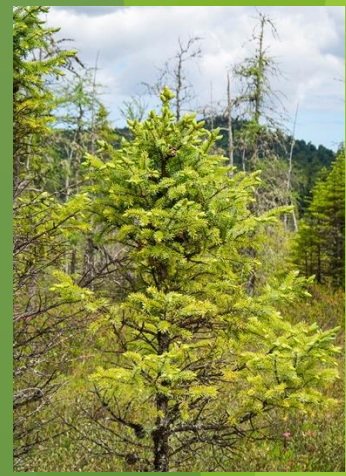
Baseliner Software (Oishi 2016)

Sap Flux Analysis

Goal: Determine the temperature difference between probes when sap flux is at a minimum



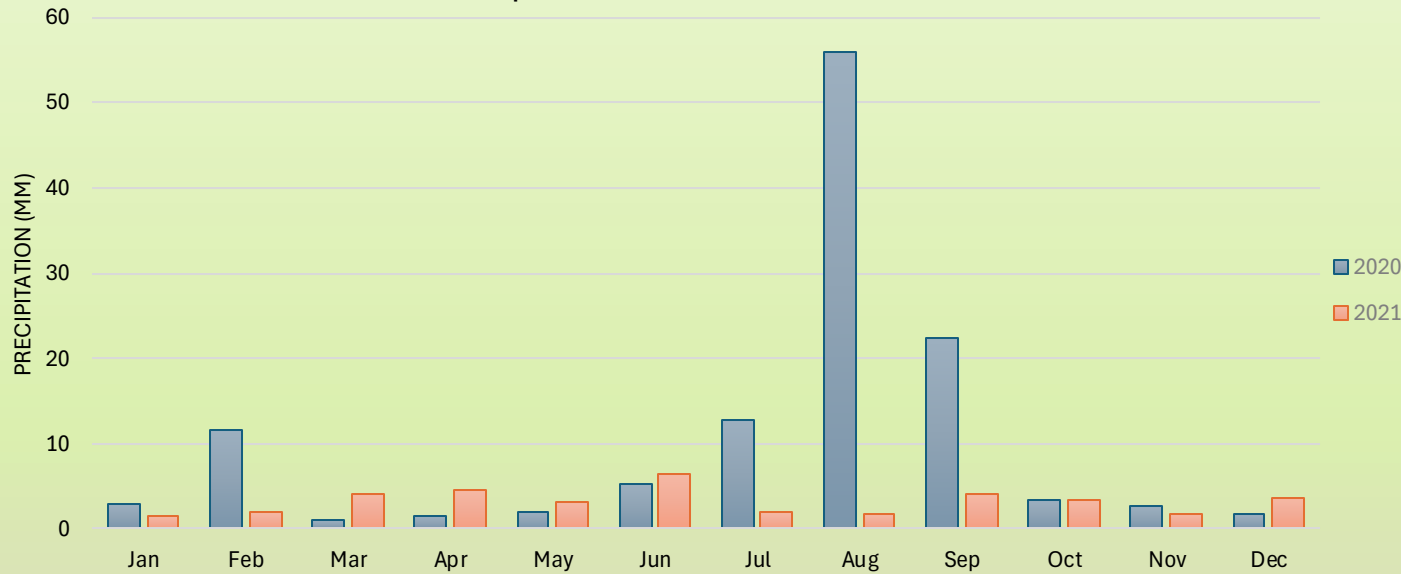
Sap flux Comparison between Species



- Sap Flux Doubled in Larch vs. SPRUCE
- Sap Flux Greatest 6 degrees Celsius increase?

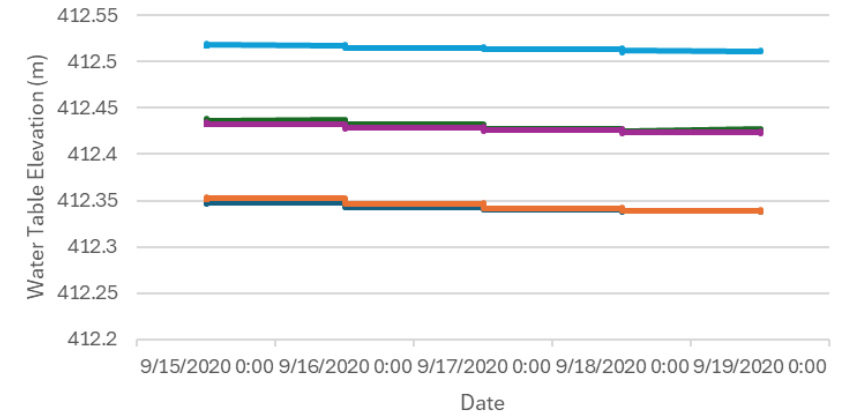
Precipitation Analysis

Precipitation Amounts 2020 vs. 2021



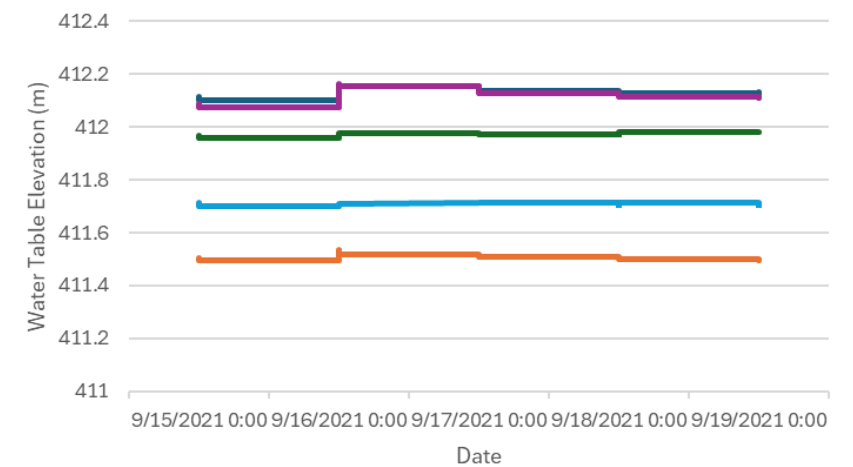
Very low Precipitation in summer 2021

2020 Water Table Levels



2020: Water Table $\approx$ 412.4 m

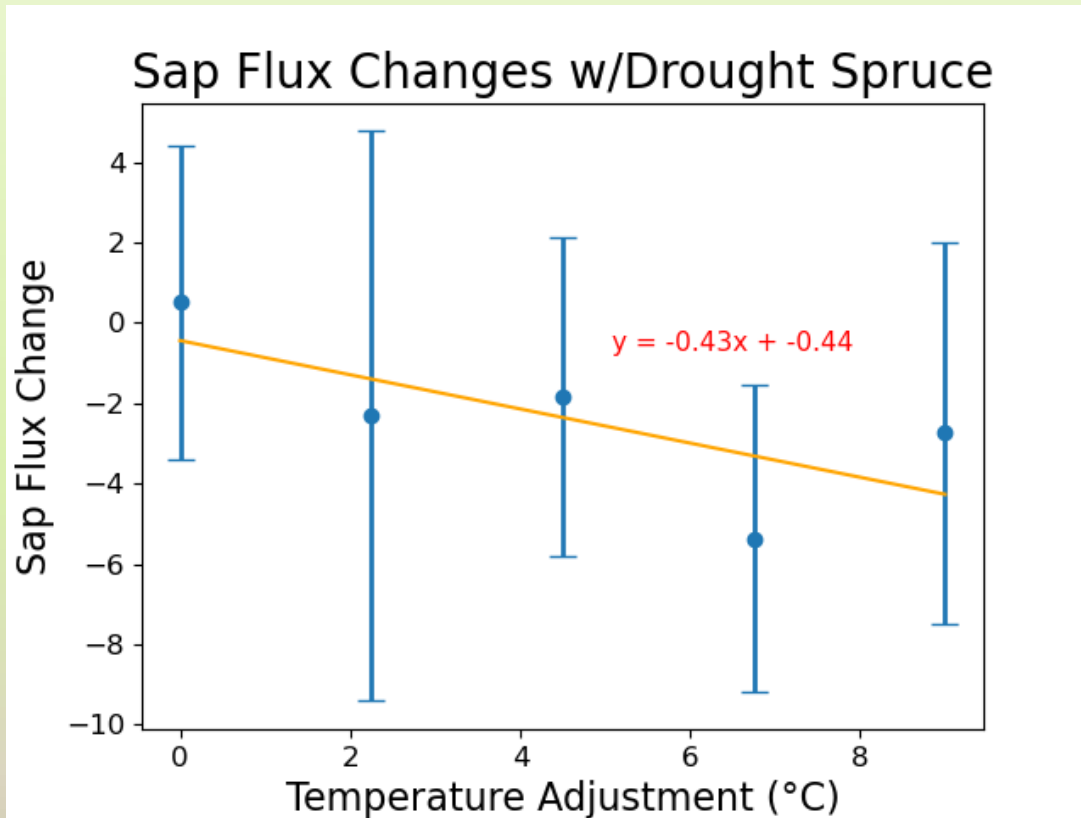
2021 Water Table Levels



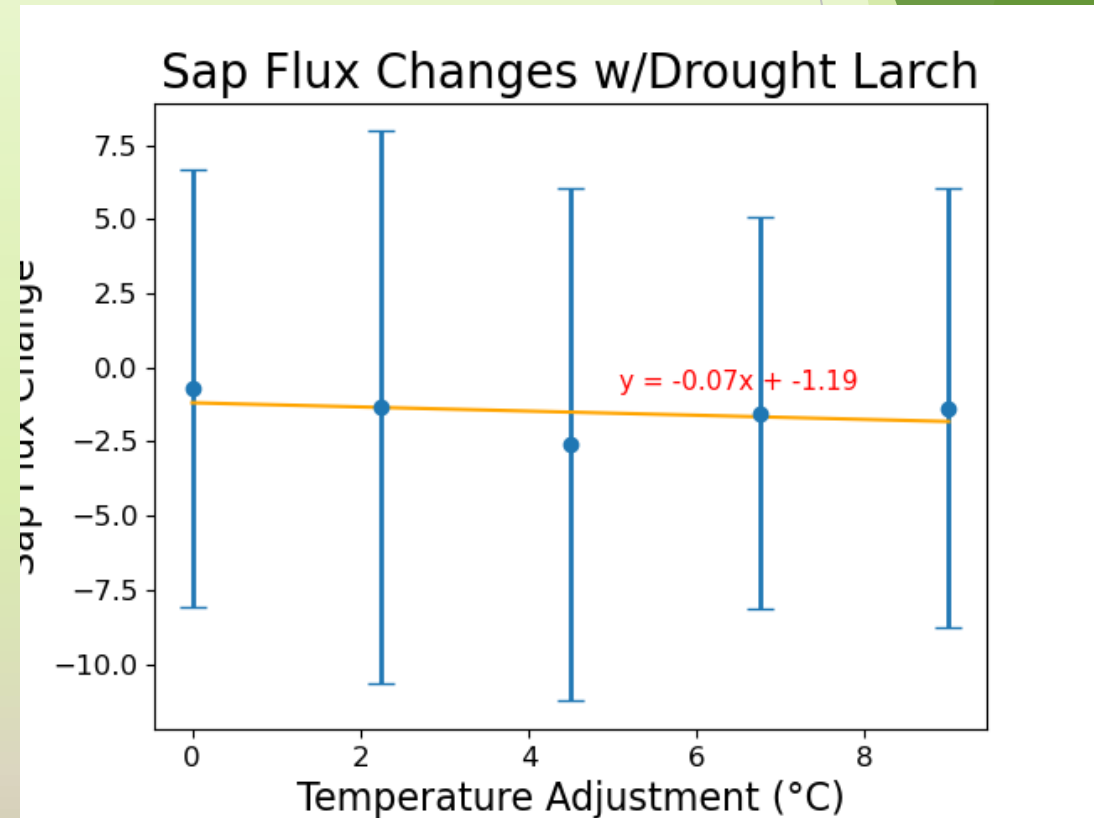
2021: Water Table $\approx$ 411.9 m

Sap Flux Changes in Drought Year

Spruce

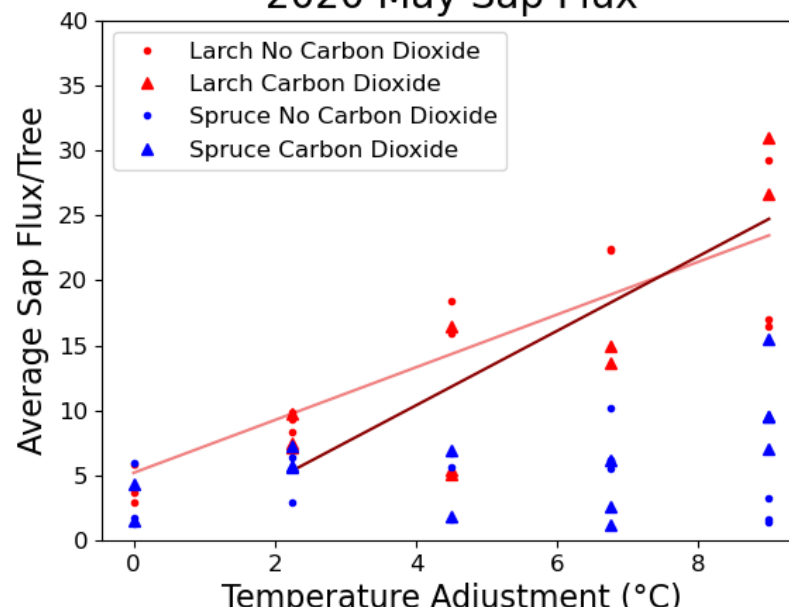


Larch

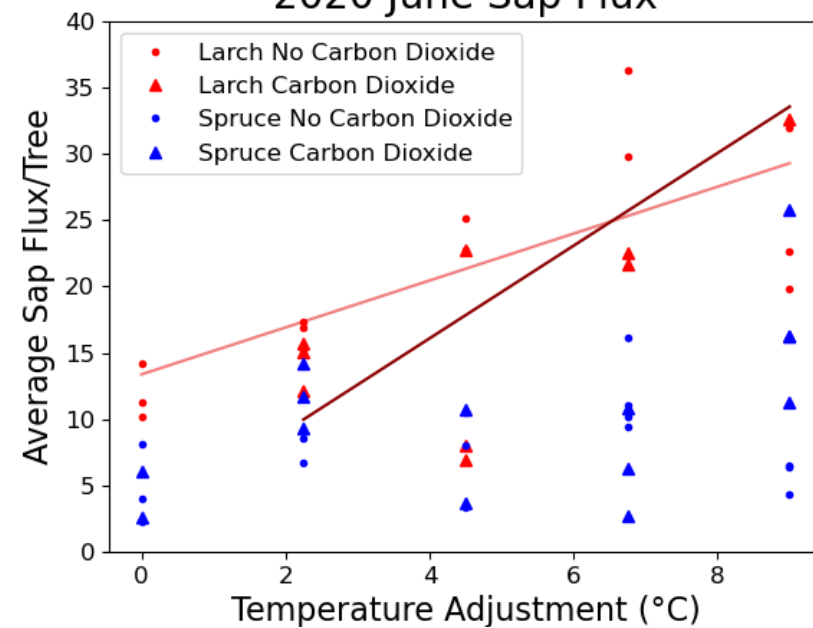


Most notable change with higher temperature Spruce

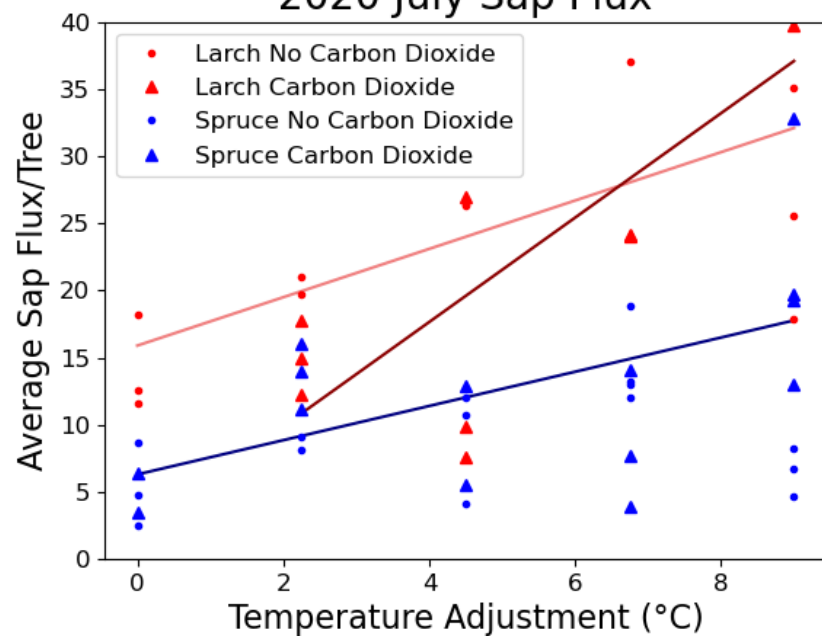
2020 May Sap Flux



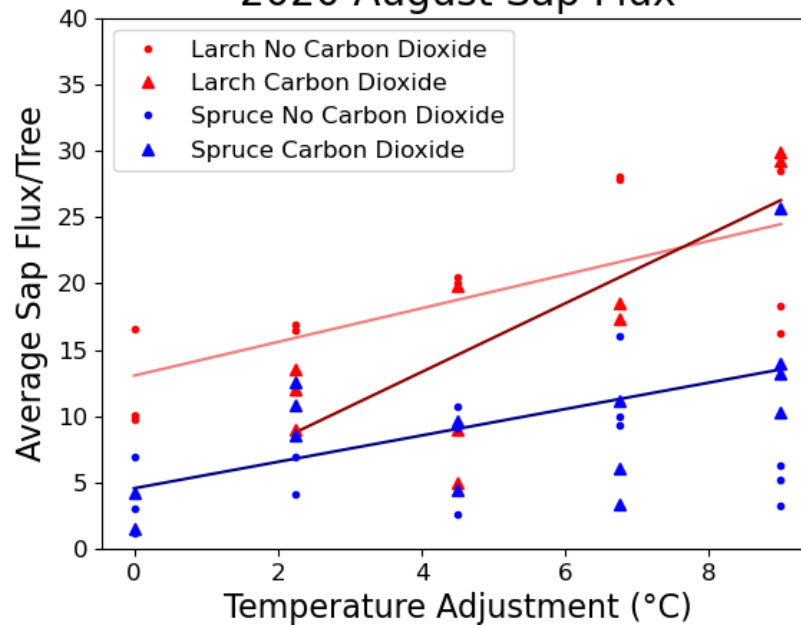
2020 June Sap Flux



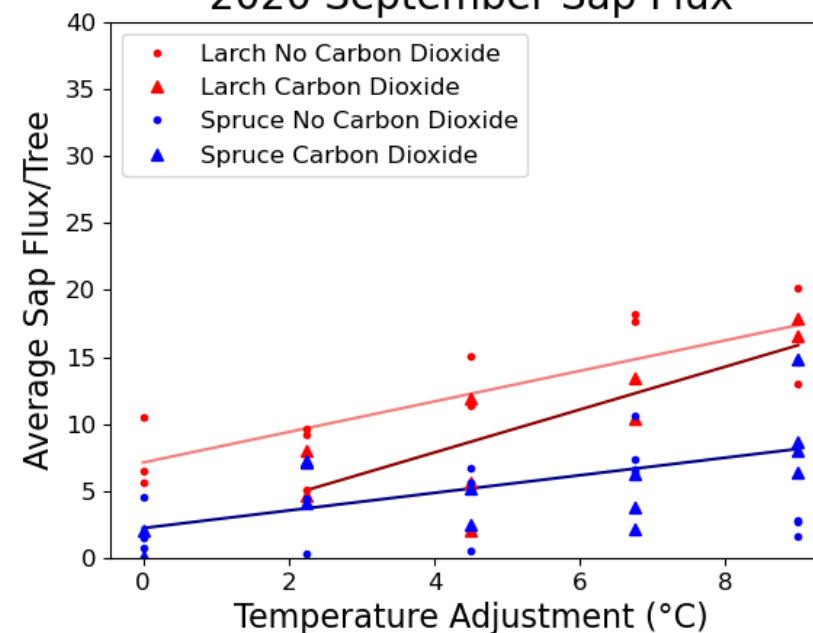
2020 July Sap Flux



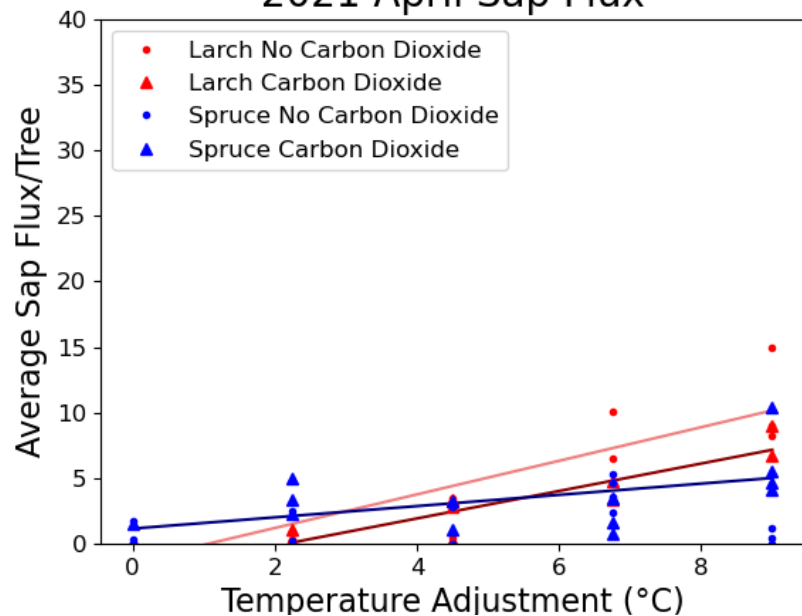
2020 August Sap Flux



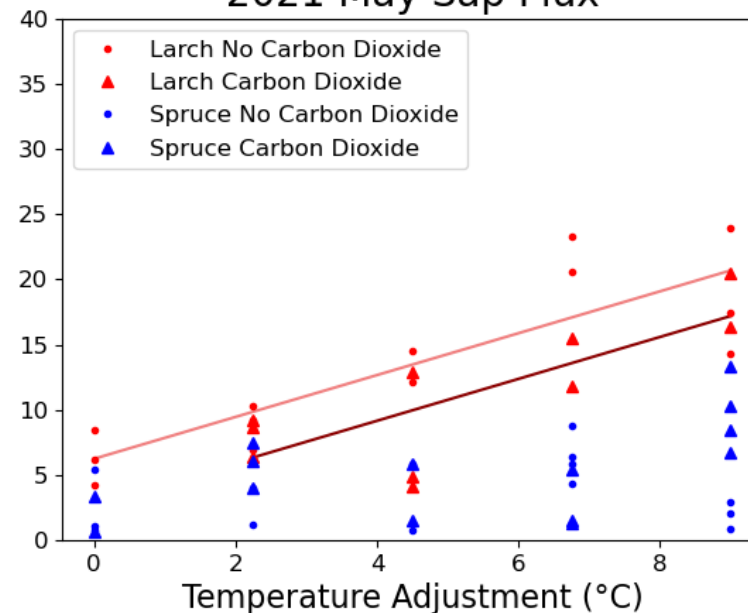
2020 September Sap Flux



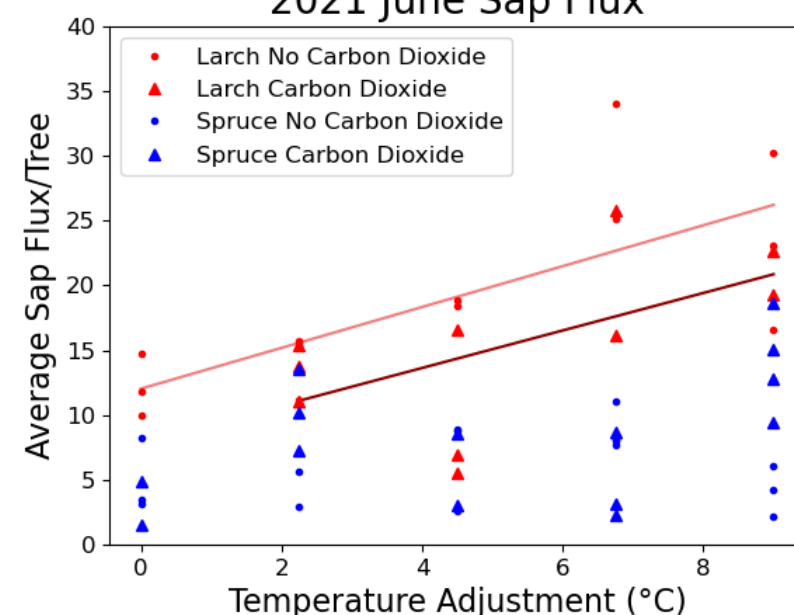
2021 April Sap Flux



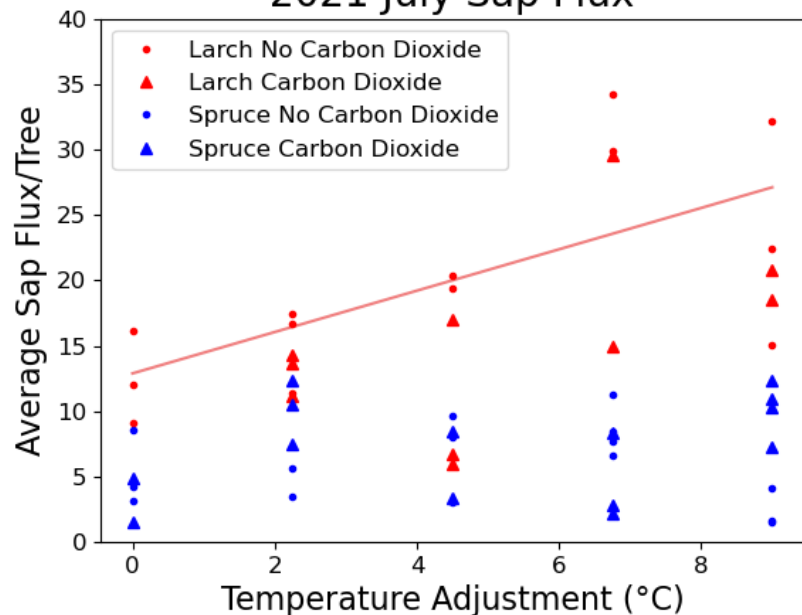
2021 May Sap Flux



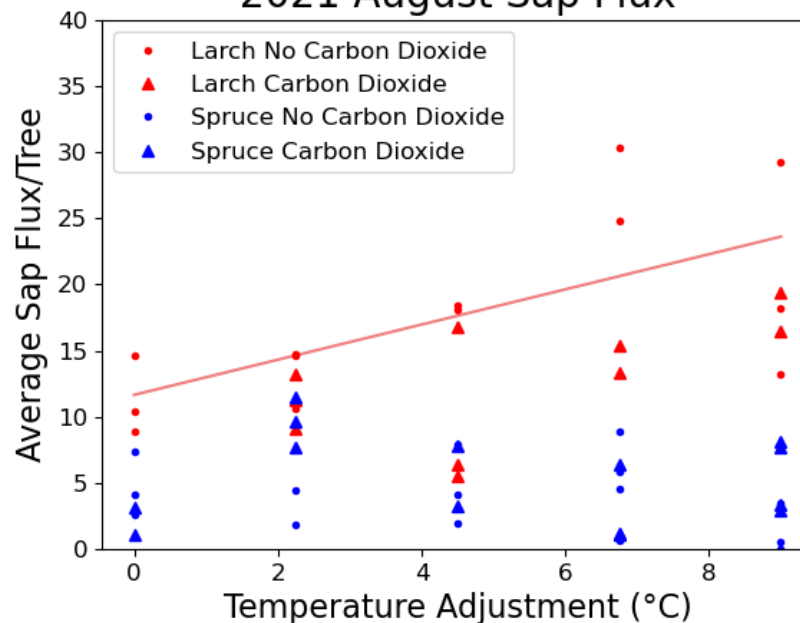
2021 June Sap Flux



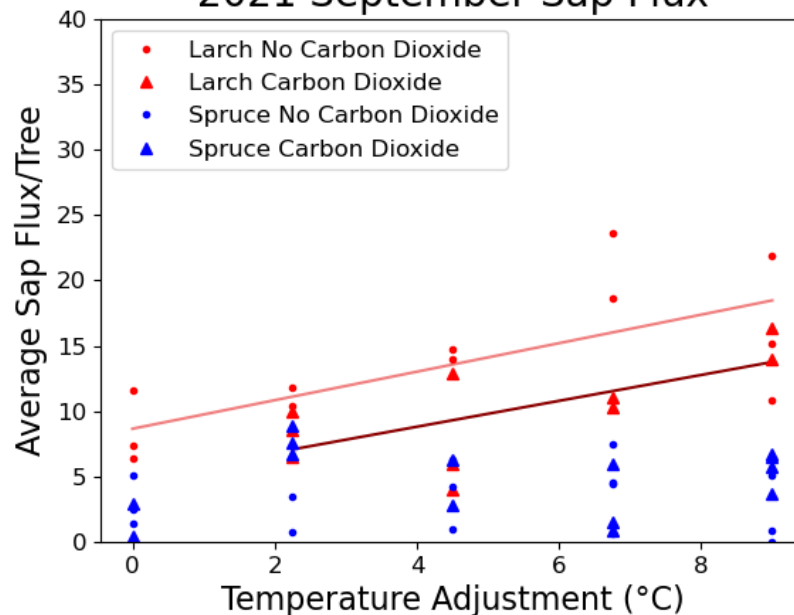
2021 July Sap Flux



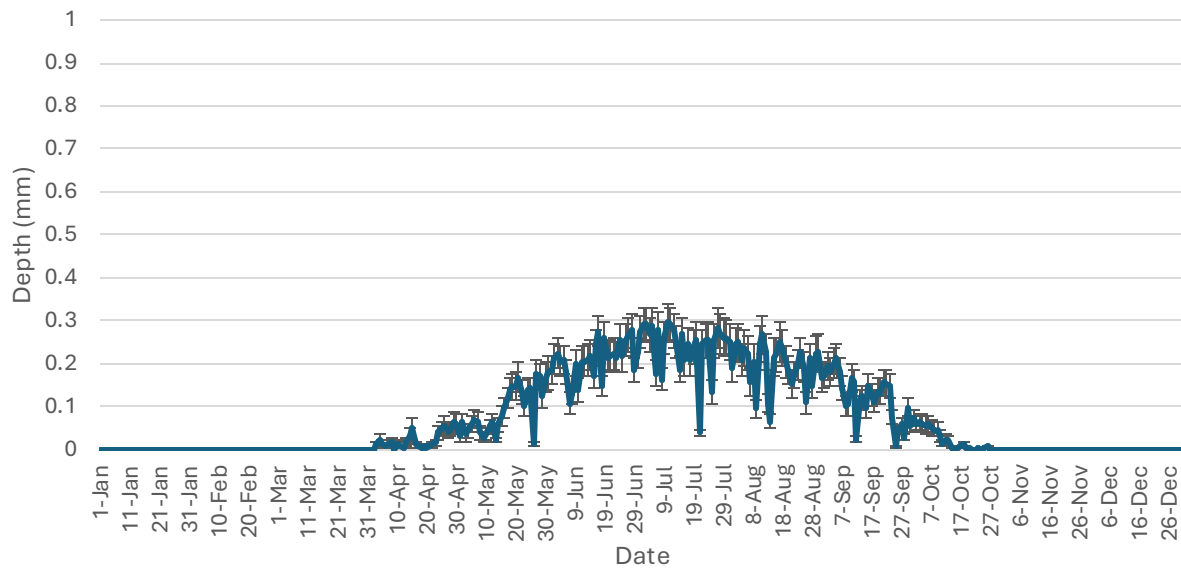
2021 August Sap Flux



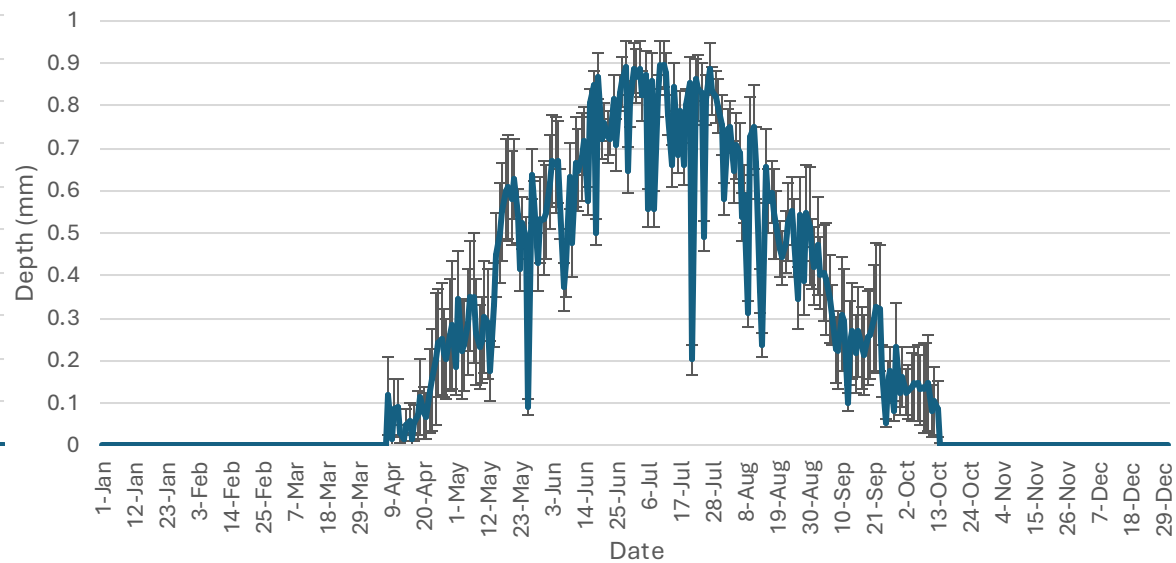
2021 September Sap Flux



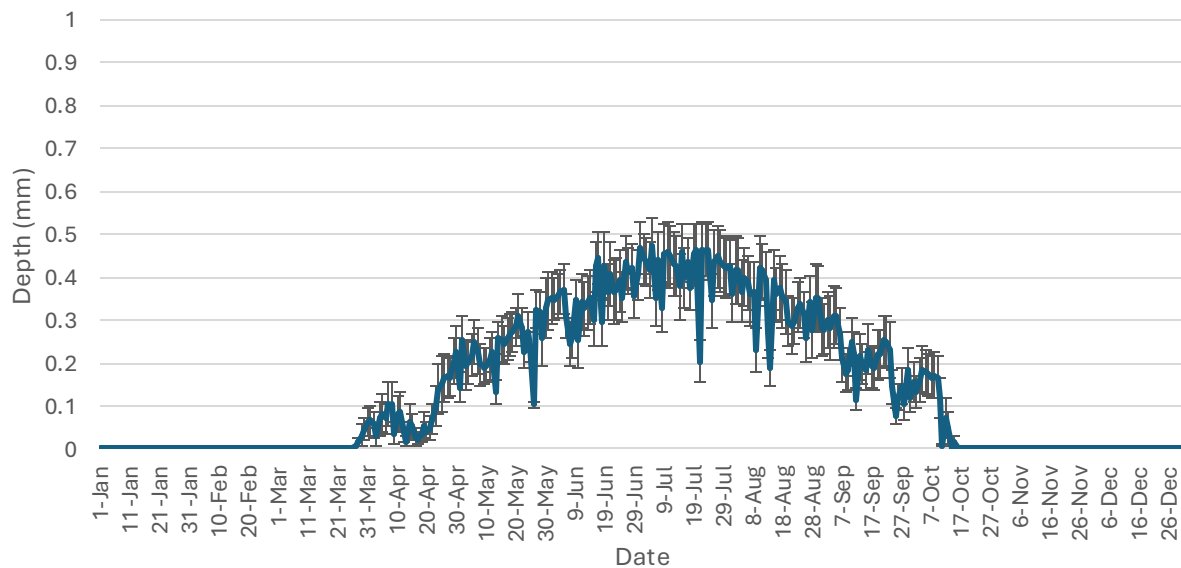
0 C Whole-Plot Transpiration



2.25 C Whole-Plot Transpiration

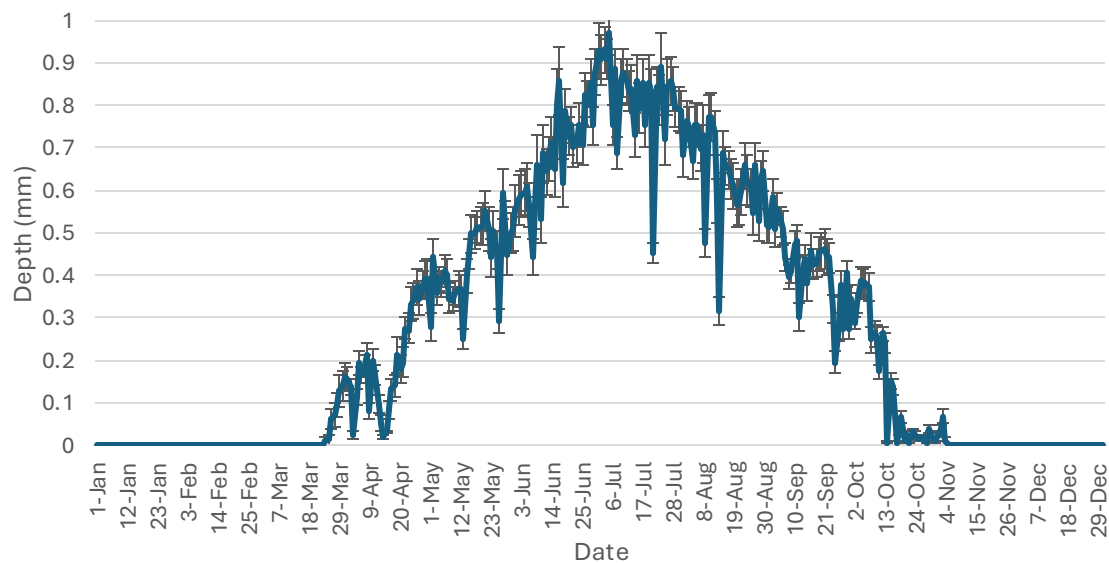


4.5 C Whole-Plot Transpiration

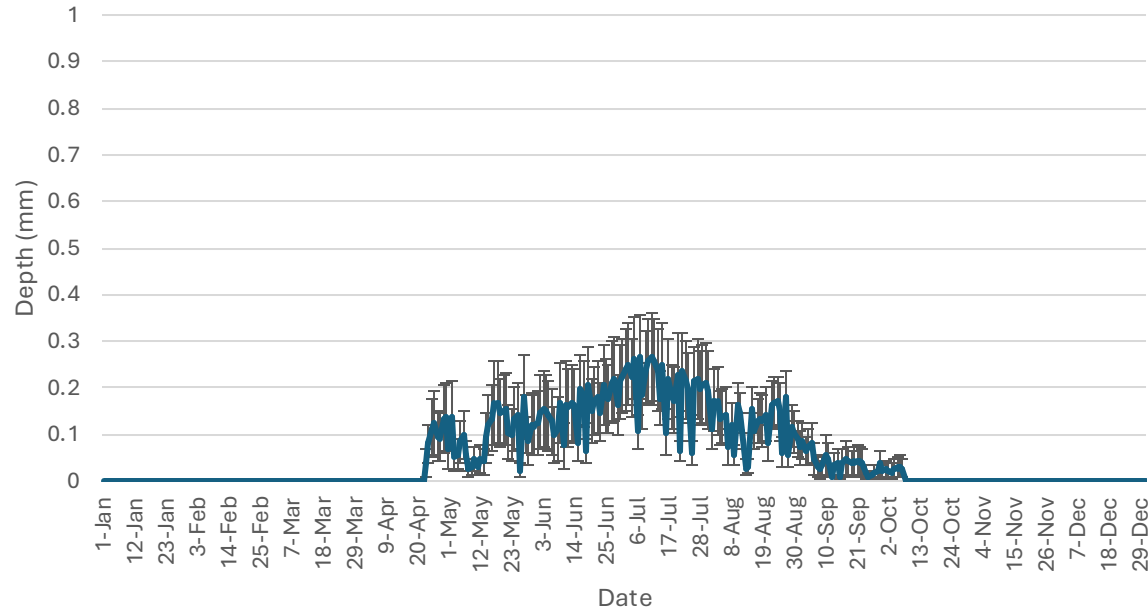


No Carbon Dioxide

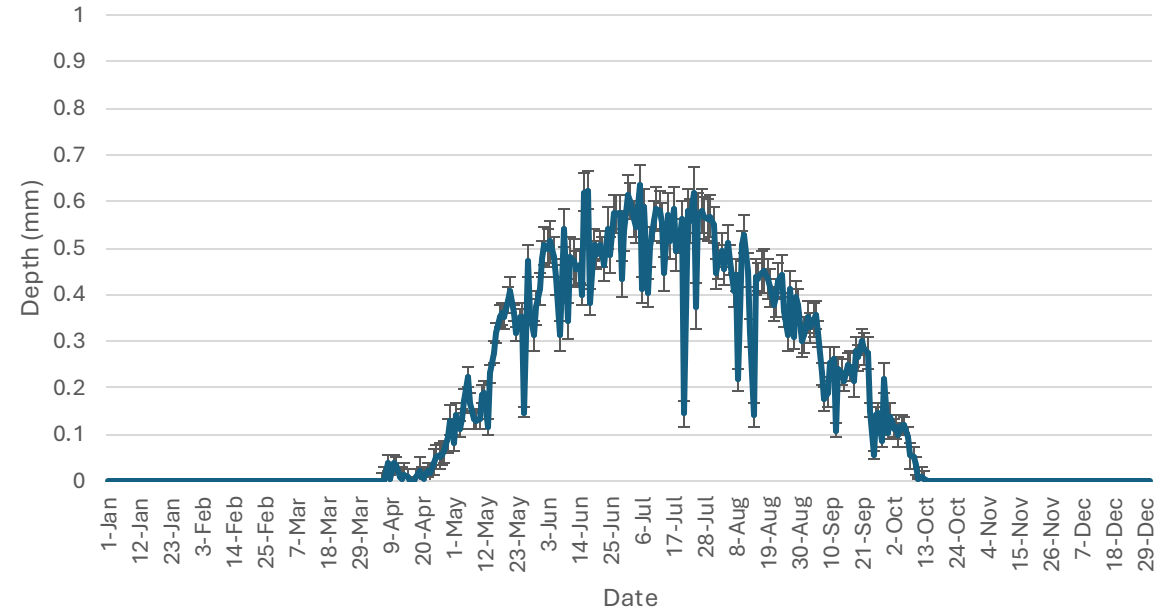
6.75 C Whole-Plot Transpiration



0 C Whole-Plot Transpiration

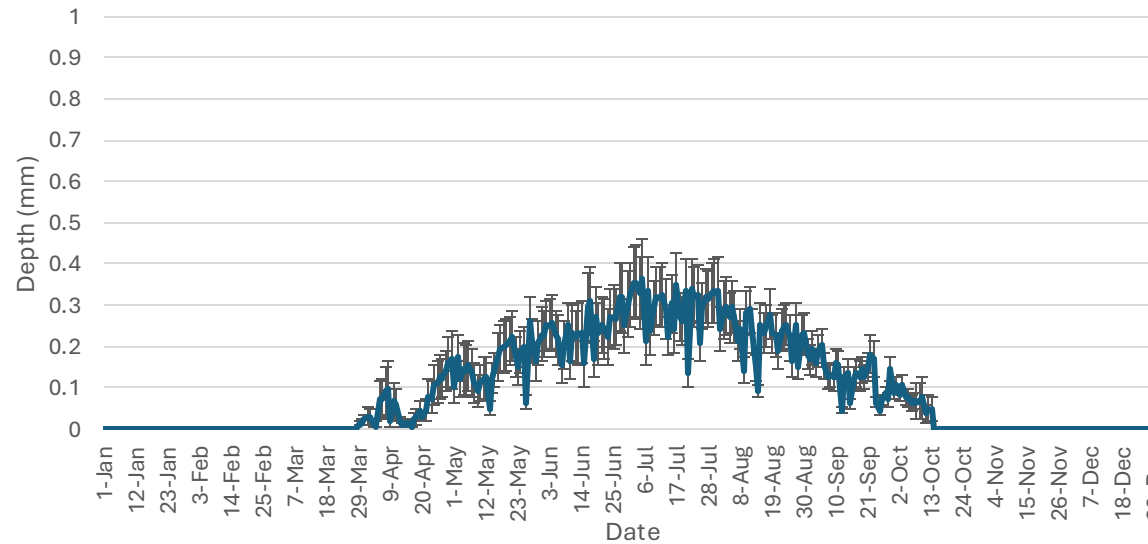


2.25 C Whole-Plot Transpiration

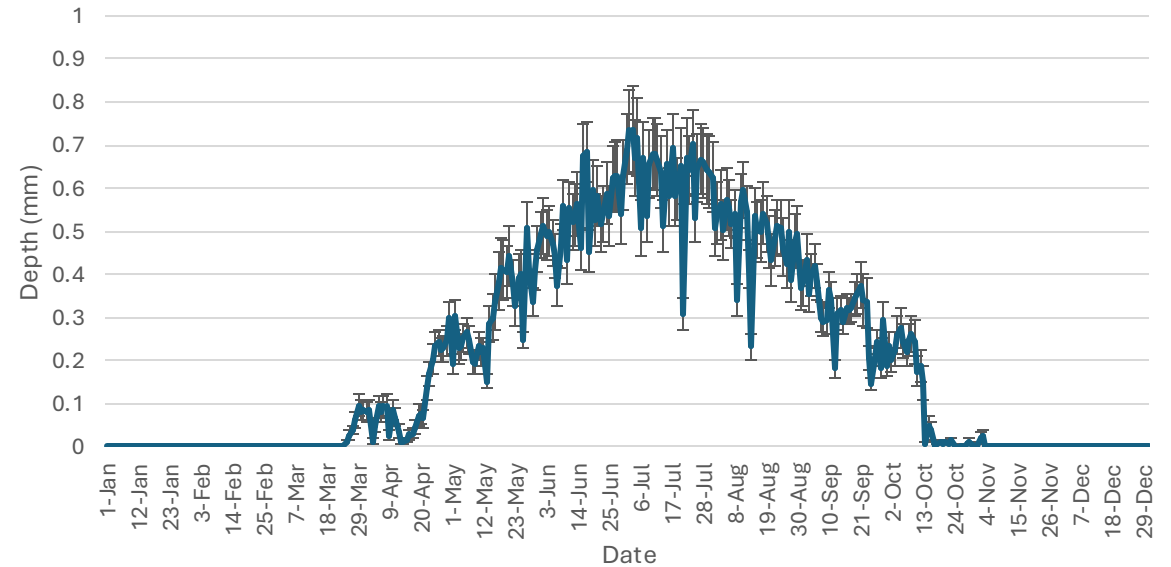


Carbon Dioxide

4.5 C Whole-Plot Transpiration

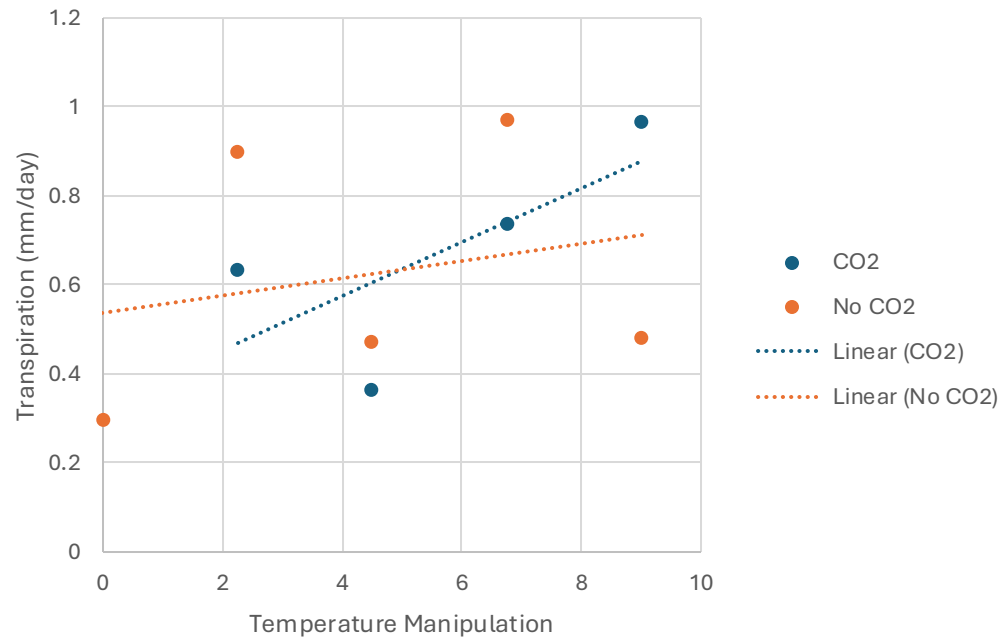


6.75 C Whole-Plot Transpiration

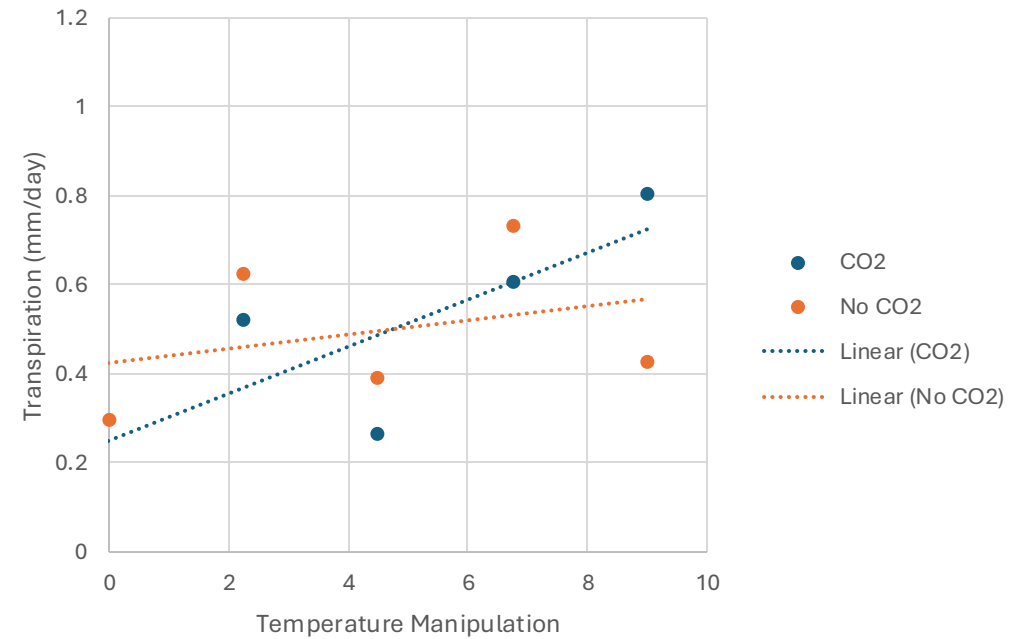


Maximum Daily Transpiration

2020 Max Daily Transpiration

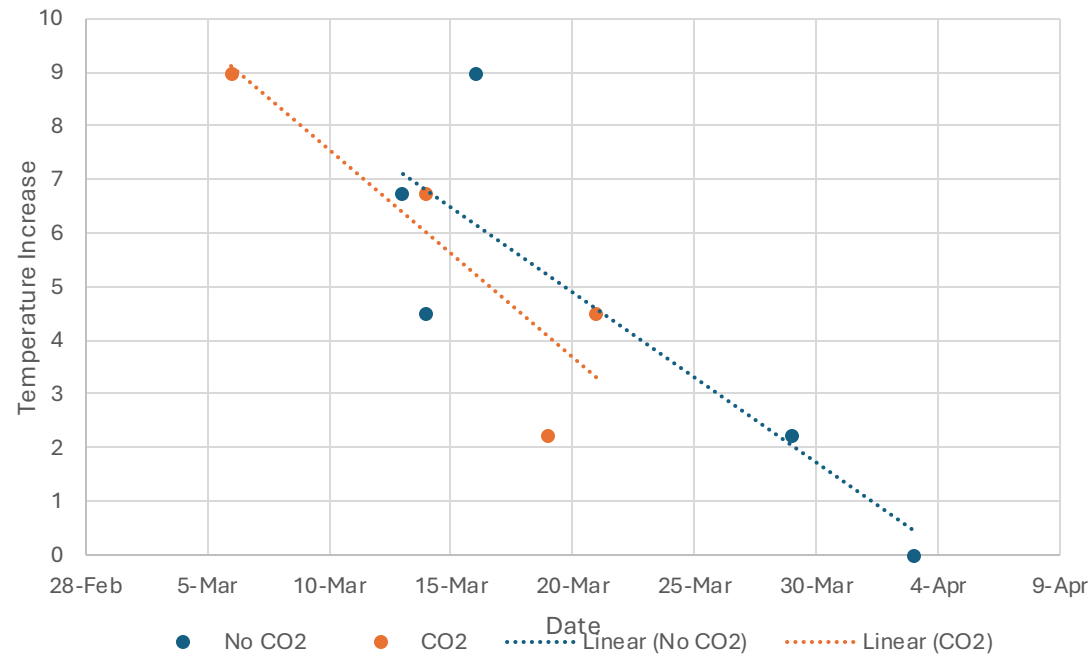


2021 Max Daily Transpiration



Transpiration Initiation/Termination

2021 Transpiration Initiation



2021 Transpiration Termination

