

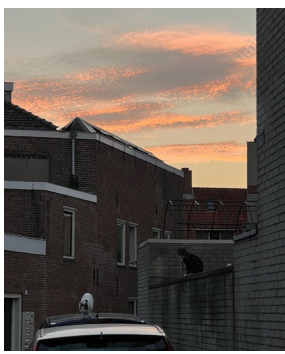
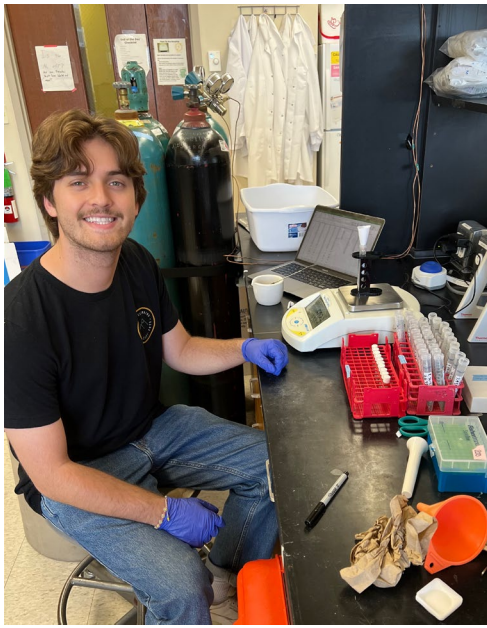
Microbial stress response to temperature and its effect on Oak tree growth

Gage R. Coon

Project Supervisor: Dr. Sofia F. Gomes

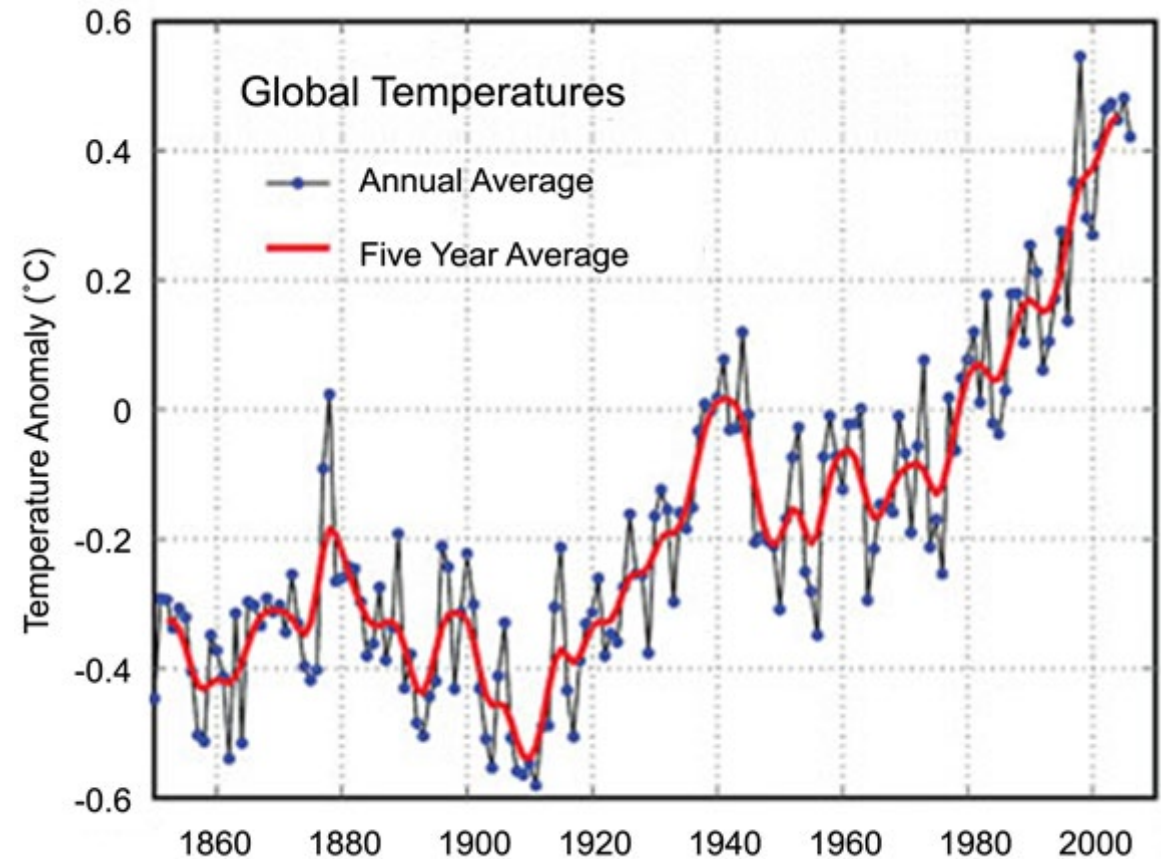
Host University: Leiden University





Climate change

- Average NL soil temperatures have increased 1°C in the past 23 years
- Average soil temperatures - 0.5 meters deep - increase by 2.2°C due to deforestation
- This changes the environments and therefore microbial communities
- How can we learn about the effect temperature has on community composition?



Research questions

How does temperature affect biotic factors?

- Microbial biomass – decrease
- Respiration – same, but increase per g
- Fungal: Bacterial ratio – decrease

How does temperature affect abiotic factors?

- NO₃, NH₄, PO₄, pH – increase

What are the effects of the changed community?

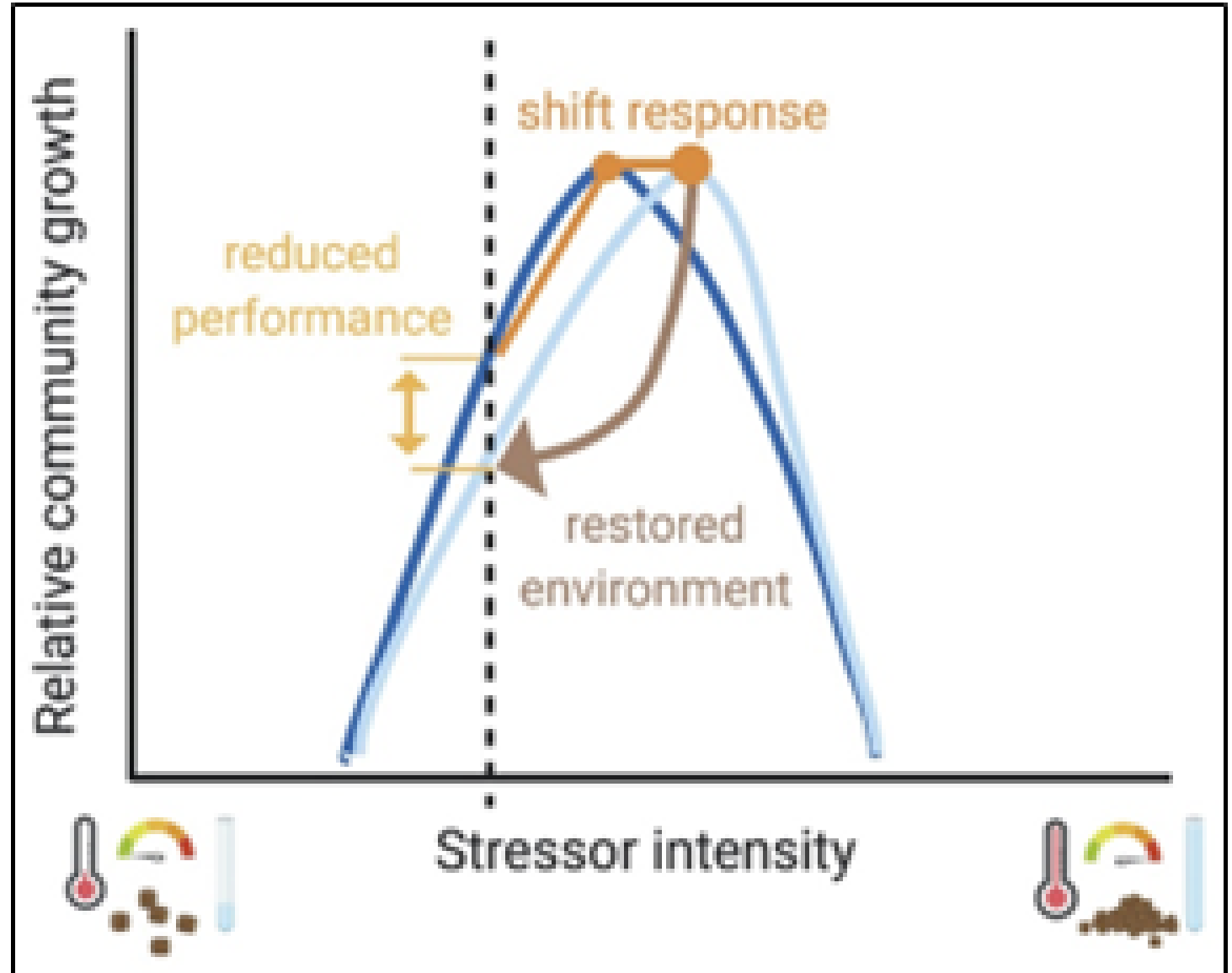
- Tree growth – optimum @ 30-40 C, decrease before and after
- Enzyme activity - increase



Response curves

- Blue line = 15 C incubation
- Light blue line = 50 C incubation

The reduced performance is how much of some function, y , is lost when the environment is restored



Incubation

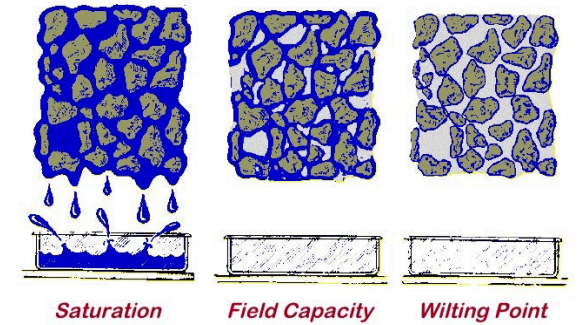
- 4, 15, 25, 30, 35, 40, 45, 50, and 60 °C for one month



Unincubated soil measurements

- Measure soil density to replicate in the plant performance experiment
- Measure grain size with stack of sieves on the first floor
- Measure water holding capacity
- Measure respiration rate and microbial biomass to test methods

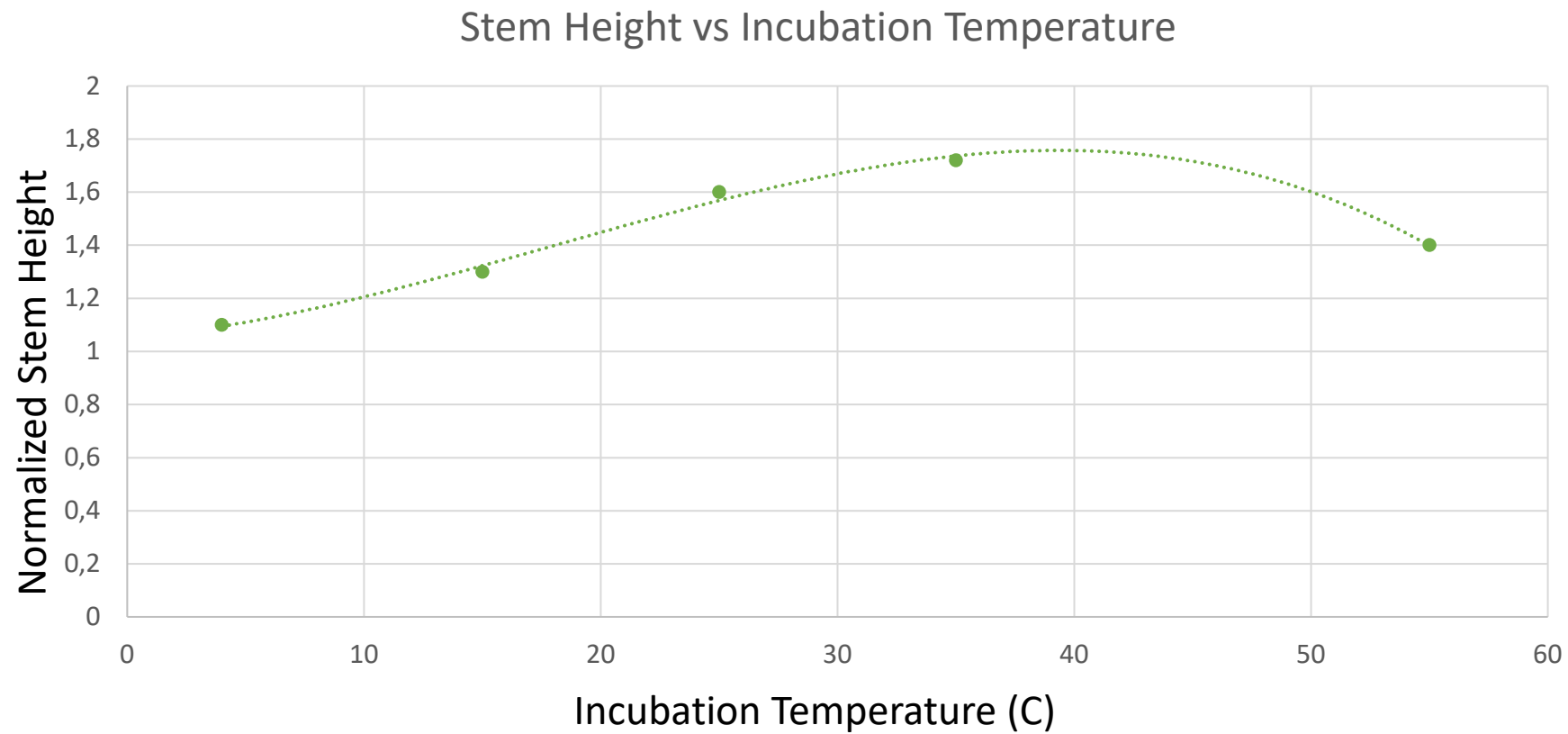
Water holding capacity



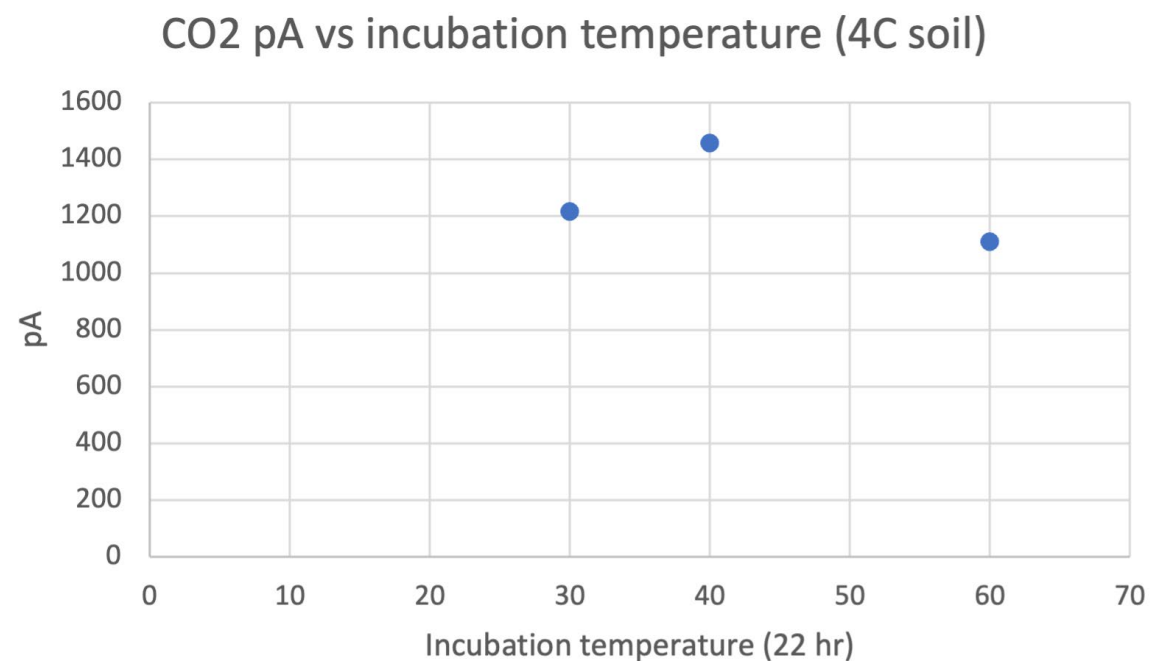




Plant Growth



Current progress



Thanks!