

# The Effects of Sudden Oak Death on Tree Species Composition in a Mixed Evergreen Forest

Presenter: Alex Martin

Committee Members:

Dr. Nathan Rank

Dr. Lisa Bentley,

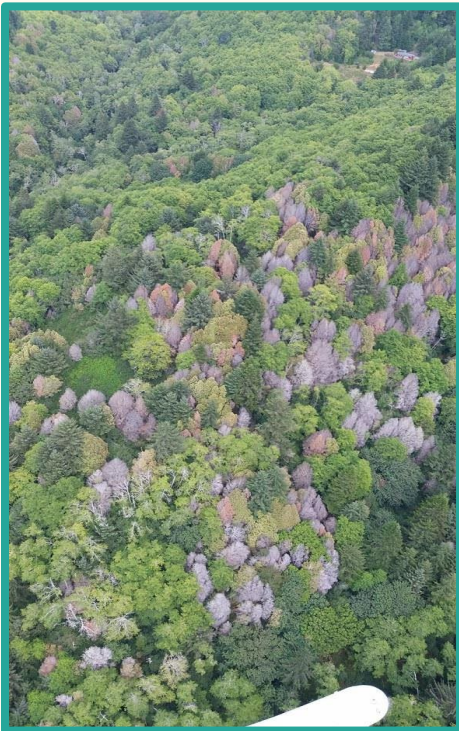
Dr. Ross Meentemeyer

Dr. Mackenzie Zippay



# Background

Differing effects of SOD may cause bay laurel to outcompete susceptible oaks, increasing infection densities.



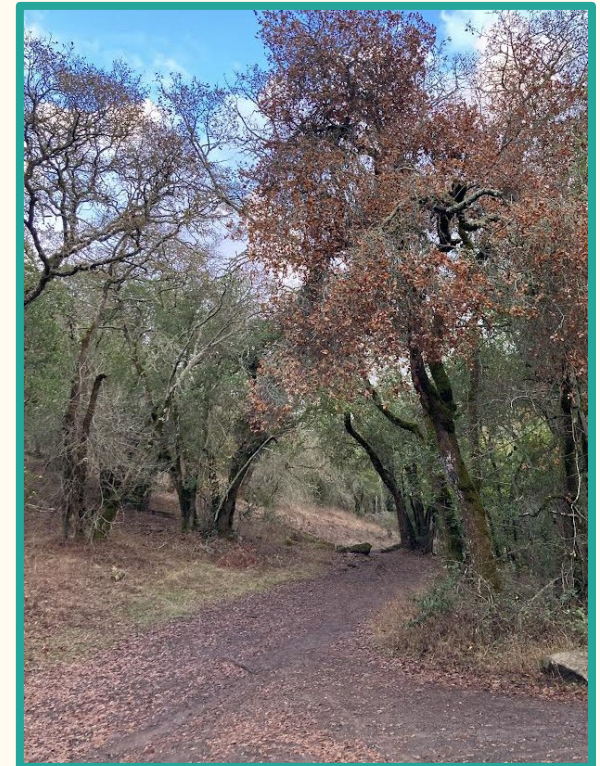
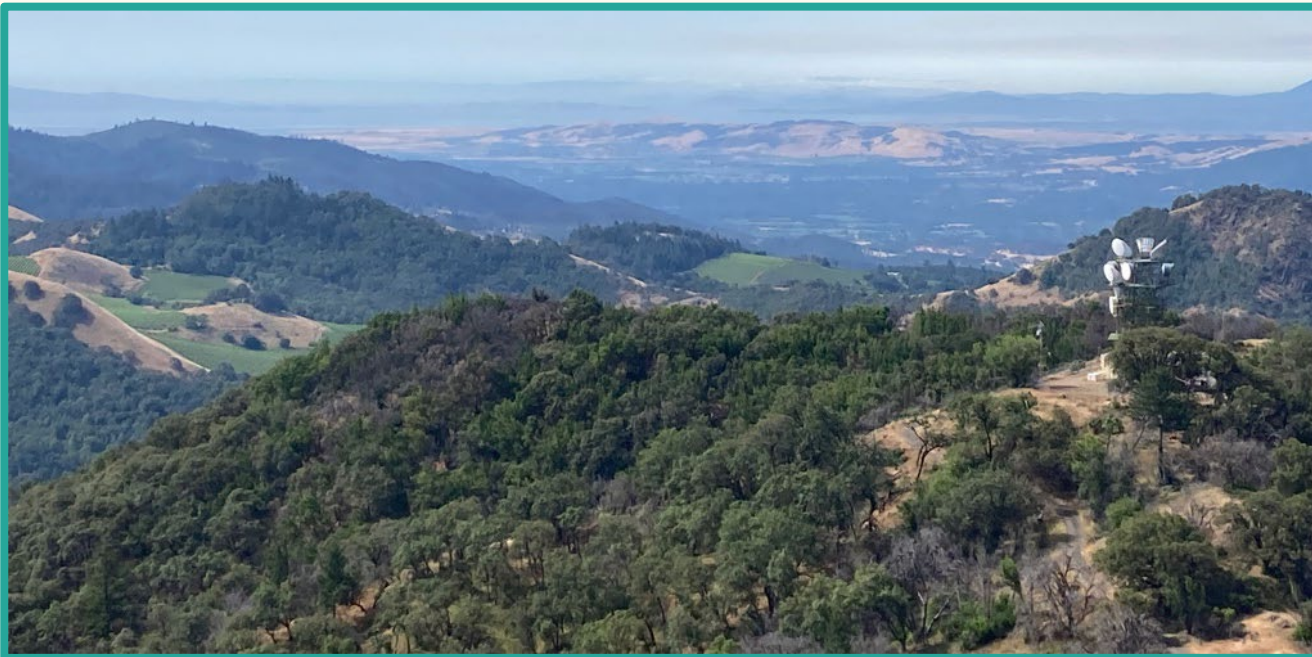
Oregon Department of Forestry

- This would cause predictable changes in the composition of forest stands.
- We could expect to see forests move towards bay laurel and away from susceptible oak species.



# Question

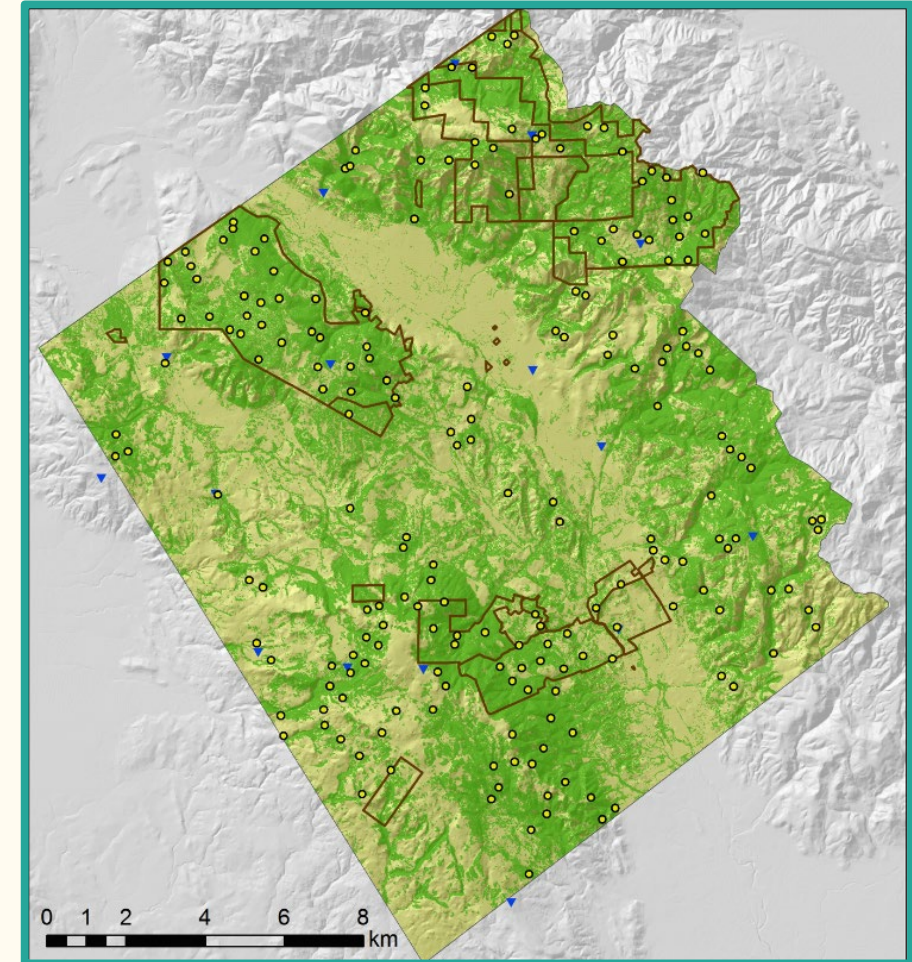
How do plot-level *P. ramorum* symptom levels, forest structure, and forest composition relate to long-term patterns of change in overstory vegetation composition?





# Field Methods

- Network of 196 225m<sup>2</sup> plots in SE Sonoma County.
- Plots established beginning in 2003 and measured until 2016.

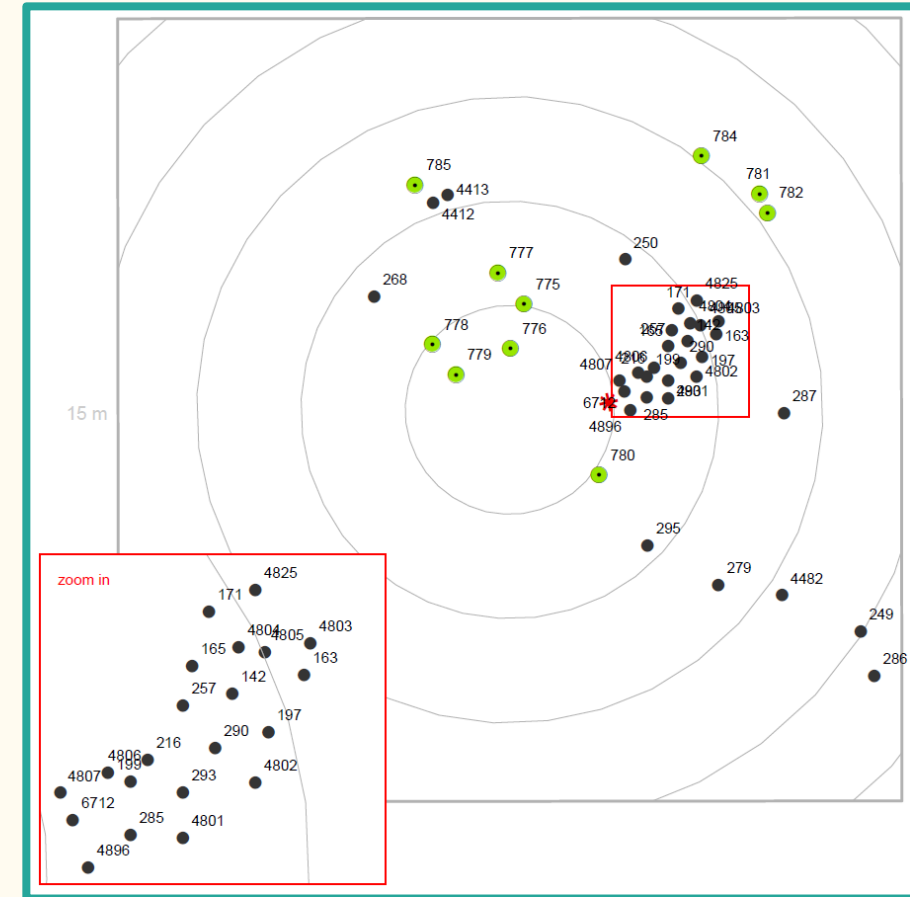


Whalon Dillon, NCSU



# Field Methods

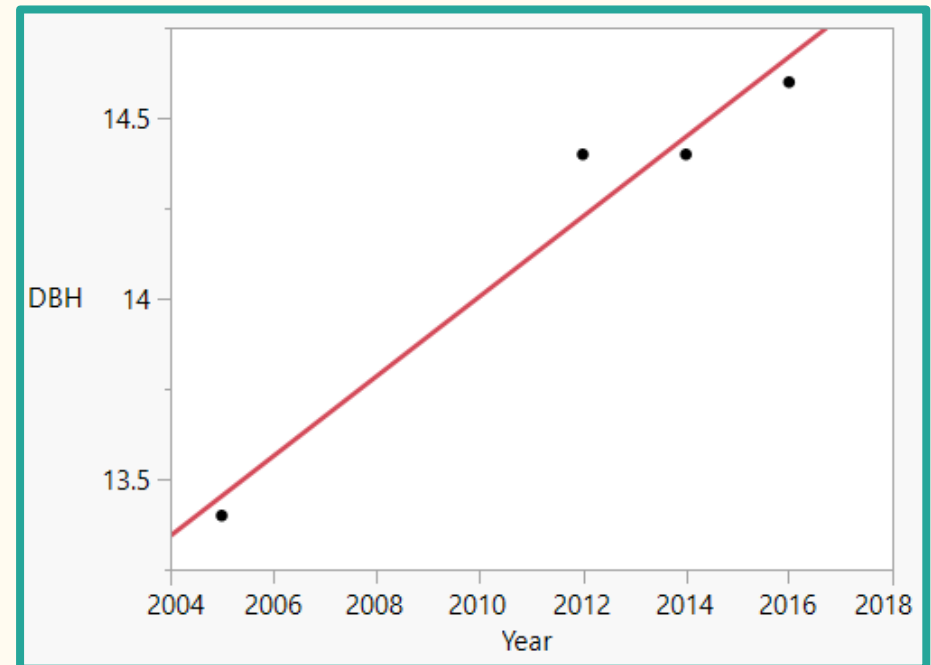
- Demographic information for all trees
- Annual counts of symptomatic leaves.
- Transect and quadrat sampling of seedlings and saplings.



# Preliminary Analysis

- Analyzing rate of growth over time at the individual tree-level using slopes as a dependent variable.
- This allows us to investigate how changes in size of individual trees relates to overall plot changes.

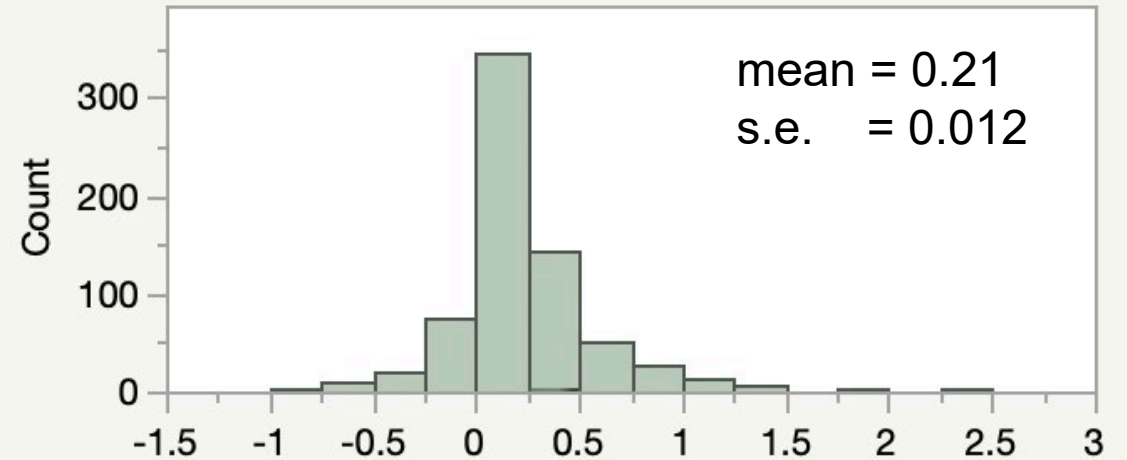
Species	Trees
Bay Laurel	1870
Coast Live Oak	667
Black Oak	206
Canyon Live Oak	108
Tanoak	61
Interior Live Oak	26
Hybrid (CLO and ILO)	4
Hybrid (CLO and BO)	2
Total	2944



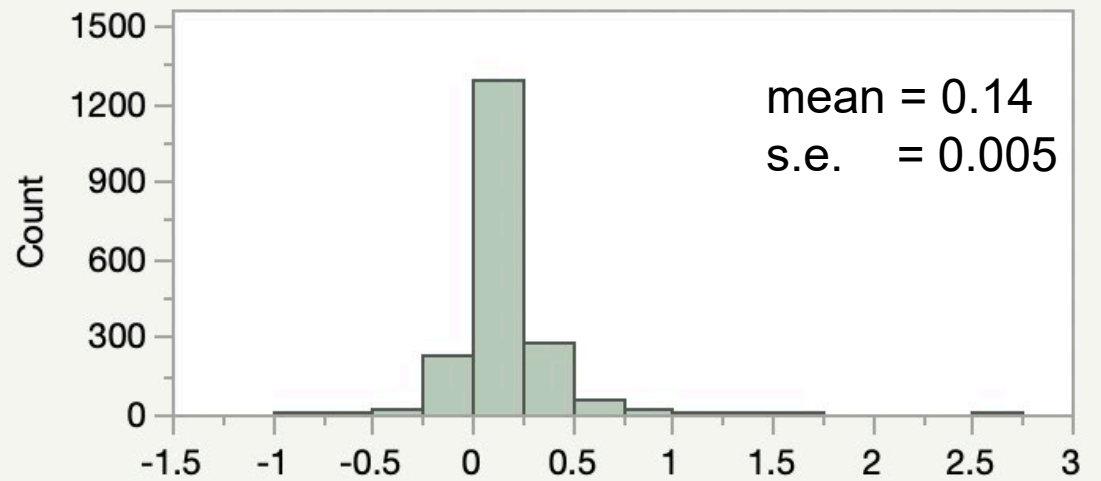
# Preliminary Analysis

- Bay laurel has lower growth rates than Coast Live Oak and other susceptible oak species.

Coast Live Oak ( $n = 667$ )



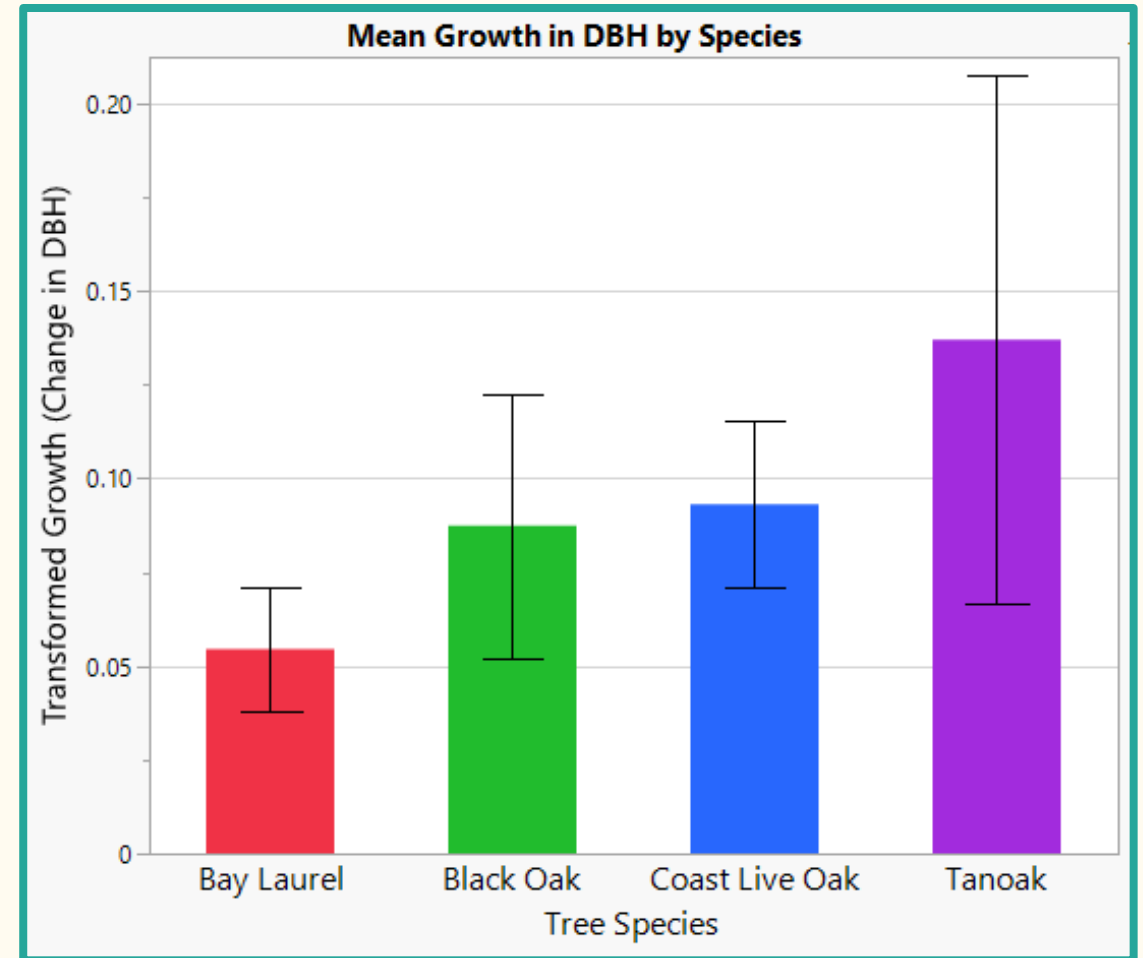
Bay Laurel ( $n = 1870$ )



Growth rate (change in dbh 2004-2016)

# Preliminary Analysis

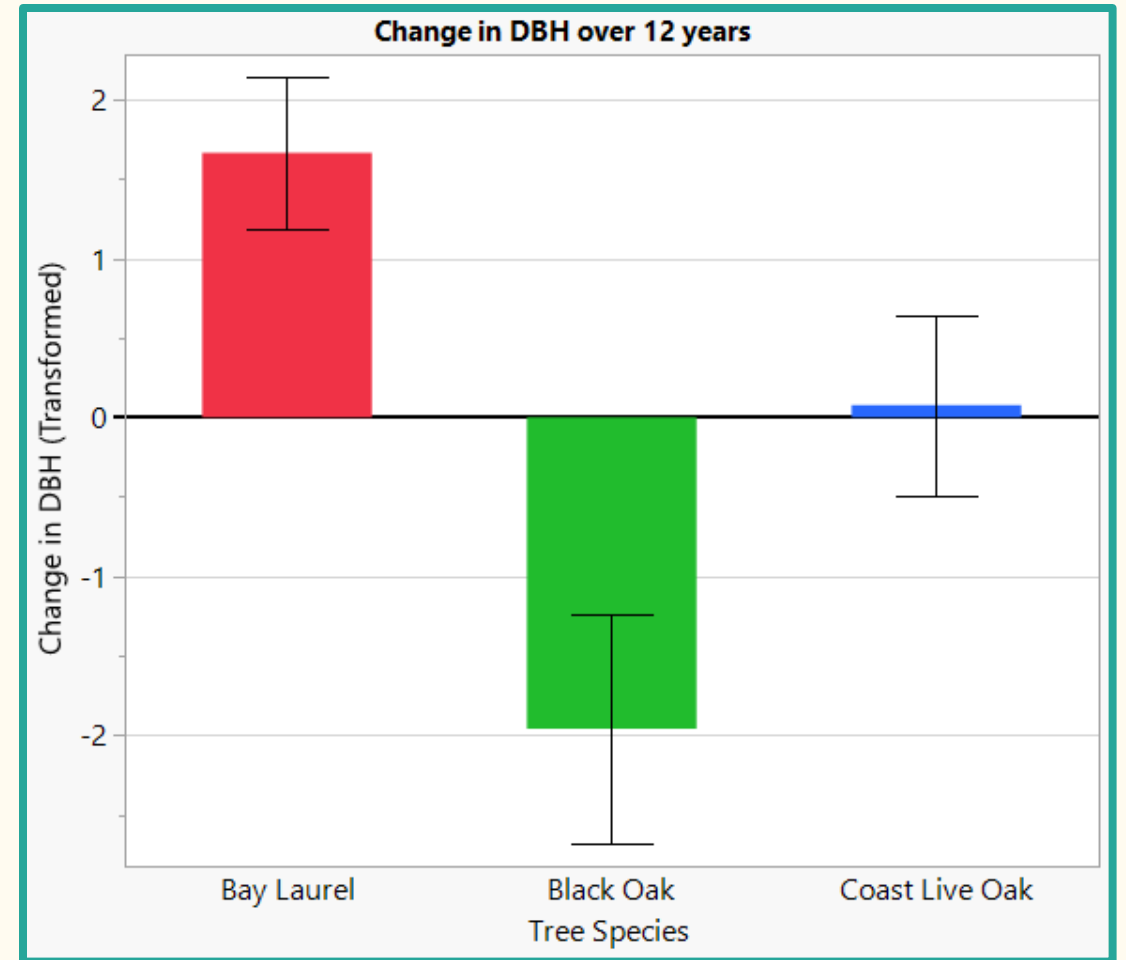
- Bay laurel has lower growth rates than Coast Live Oak and other susceptible oak species.
- Change in DBH provides a good measure for growth rate over the sampling period.





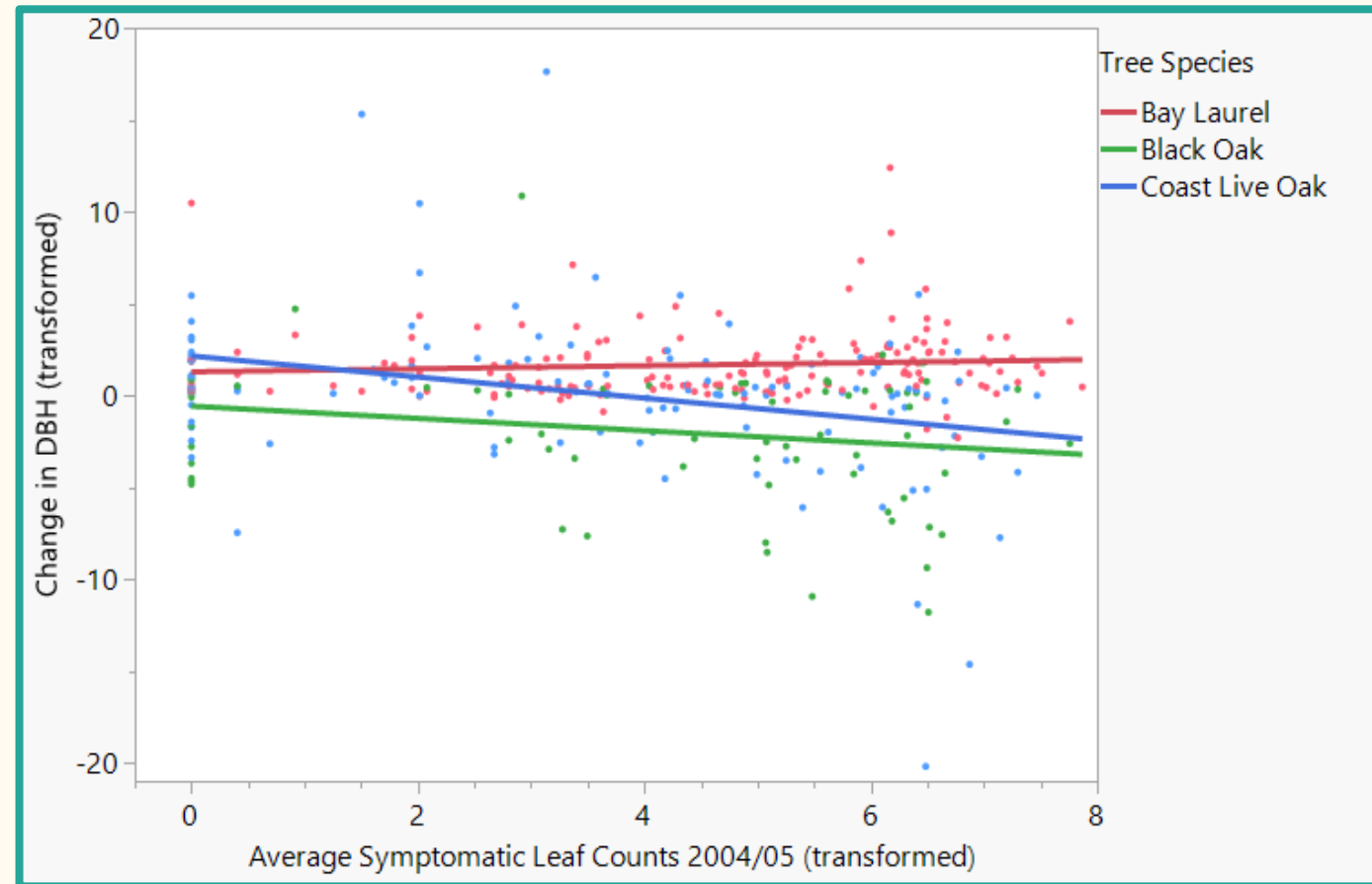
# Preliminary Analysis: Plot-Level Change

- At the plot level, Bay Laurel had the largest increase in mean DBH.
- Black Oak saw the greatest mean decrease in DBH.



# Preliminary Analysis: Plot-Level Change

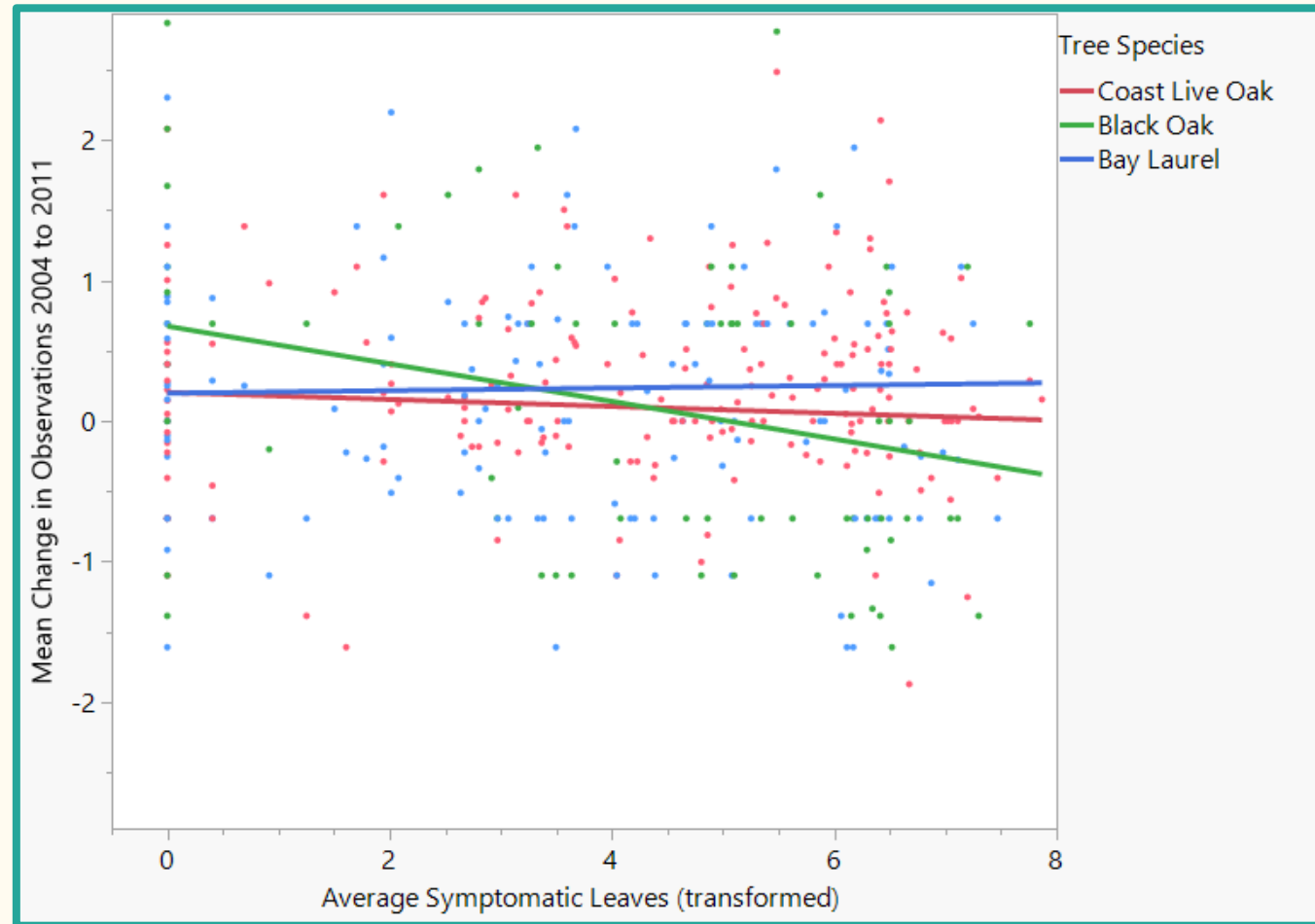
- Coast live oak has a substantial (-) relationship with symptom levels.
- The relationship between symptoms and black oak (-) and bay laurel (+) is much smaller.





# Preliminary Analysis: Seedling & Saplings

- No strong relationship between disease and recruitment for coast live oak and bay laurel.
- A much stronger (-) relationship for black oak.
- Perhaps reduced recruitment is part of the story for black oak.



# Questions?

Email: [martinale@sonoma.edu](mailto:martinale@sonoma.edu)

