Establishing an awareness of ideal plant phenotype based on environmental challenges

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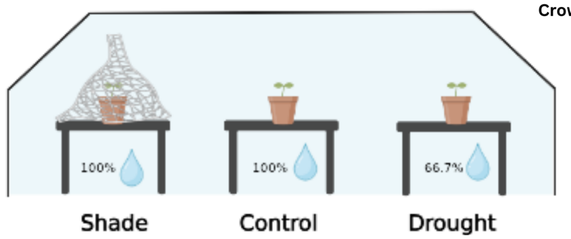
Exploring the characteristics based on abiotic different environments

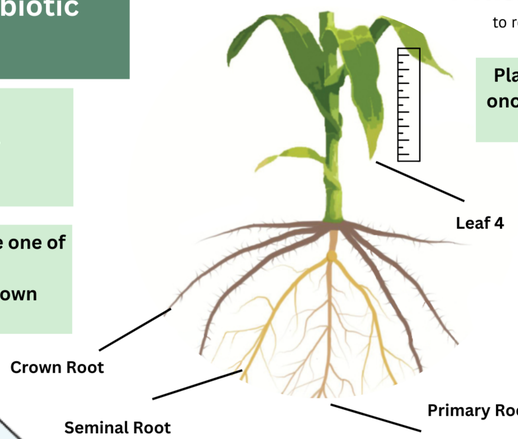
- Hawai'i is very susceptible to climate change and abiotic stressors thus leading environments to change over time.
- Evaluate physiological responses of plant and root characteristics of different genotypes.

- Model plant was Maize (Zea Mays L.) since it is known to be one of the most understood and abundant crops.
- Each inbred line was sourced from a diversity panel and grown over different years and conditions in a greenhouse.



Malama i ka 'āina

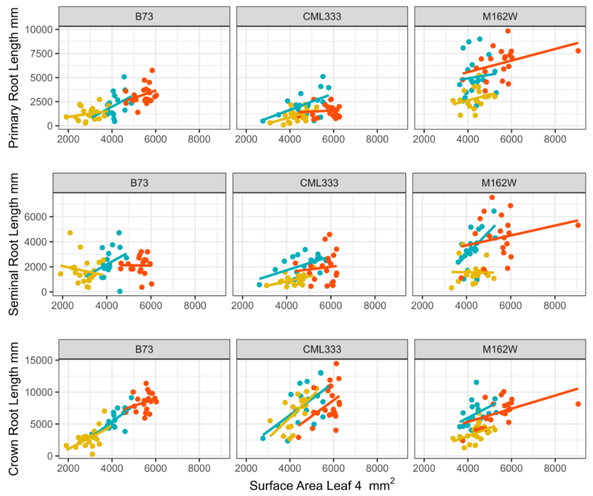
to respect and care for the land



Plants considered mature once leaf 4 growth stopped growing

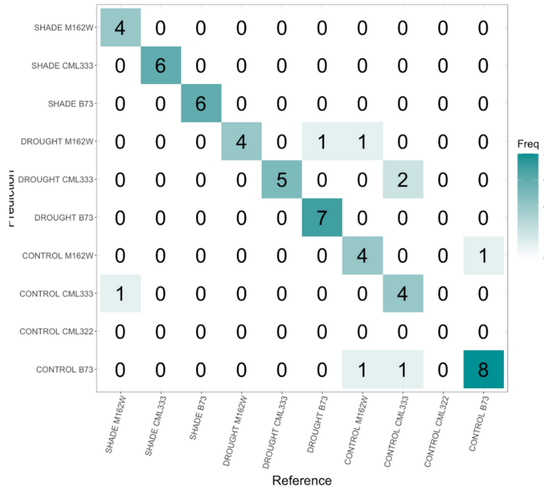
All roots and leaves were scanned to determine mature characteristics

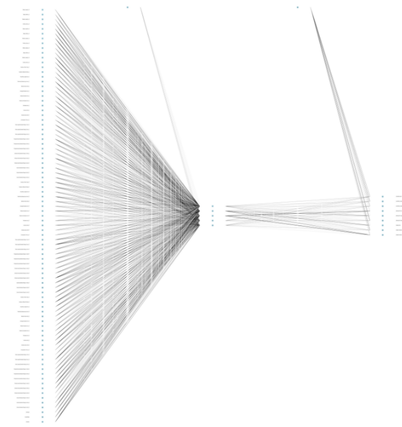
Correlations between leaf 4 surface area and length of each root type



Abiotic stressors affect relationships of characteristics

Characterizing based on shoot and root characteristics

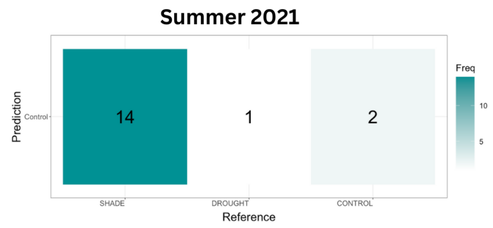




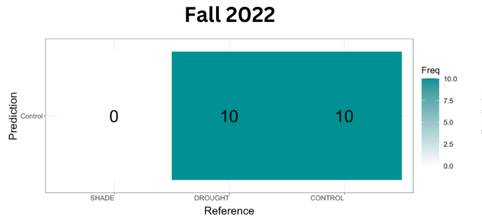
85.71% accuracy in model using 88 characteristics for treatment and genotype combination.

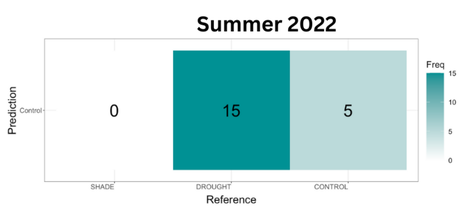
Complexity of attributes differentiates genotype and treatment.

Determining environment of previous experiments



Environmental conditions of previous experiments based on 2023 Summer data of common B73 inbred line

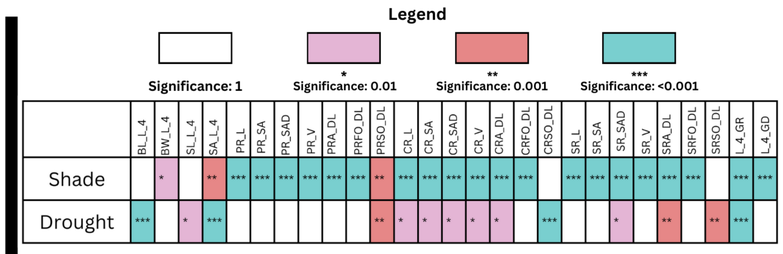




Why understand the relationships?

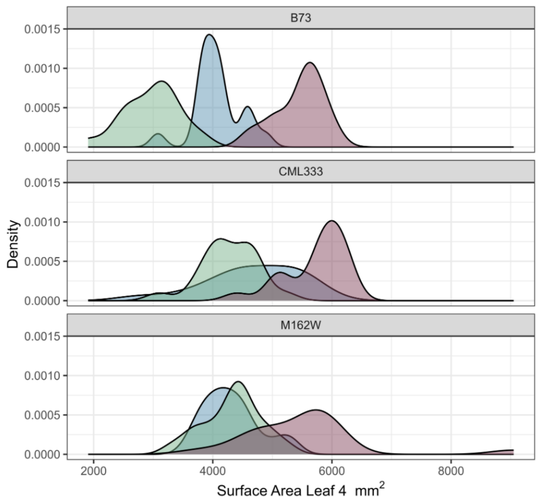
- Different abiotic stress are best understood when looking at both leaf & root characteristics
- Climate differs greatly across the different island In Hawai'i, determining how plants react to ongoing effects of climate change helps to plan for more resilient use of land.

Analyzing variance of shoot and root traits



Using Analysis of Variance, applying abiotic stressors, there are significant differences in characteristics development

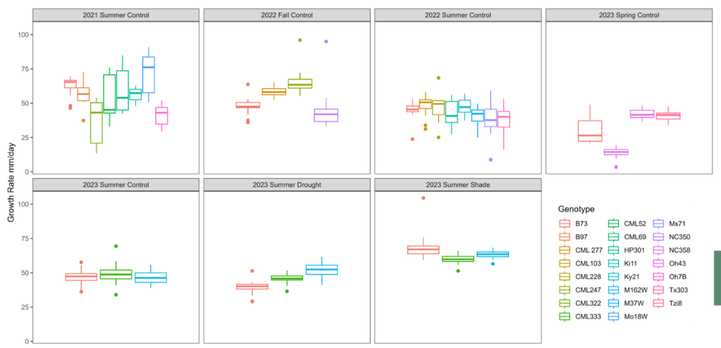
Distributions of leaf 4 surface area across each genotype and treatment



M162W is more resilient to abiotic stressors.

Shade Avoidance Response causes greater leaf 4 surface area.

Growth rate in each genotype and treatment



Growth Rate differs between environments

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