Cabbages, Kale, and Cameras; Analyzing Leaf Shape Data Among *Brassica* Ferals

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Objective

Collect and analyze leaf phenotypic data to:

- **Compare leaf shape data** in *B. oleracea* domesticates, ferals, and closely related wild species.
- **Assess patterns of convergent evolution** within the species *Brassica oleracea*.

Background

Brassica oleracea includes economically important crops like cabbage, broccoli, cauliflower and kale.

Some plants have “escaped” domesticated crop fields and have undergone the process of **feralization**.

Why are Ferals important?
- Closely related to crops
- Adapted to local environment unlike crops
- Good candidates to find genetic targets for **crop improvement**.


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A method for identifying evolutionary history of feral Brassicas using a flatbed scanner and Raspberry Pi

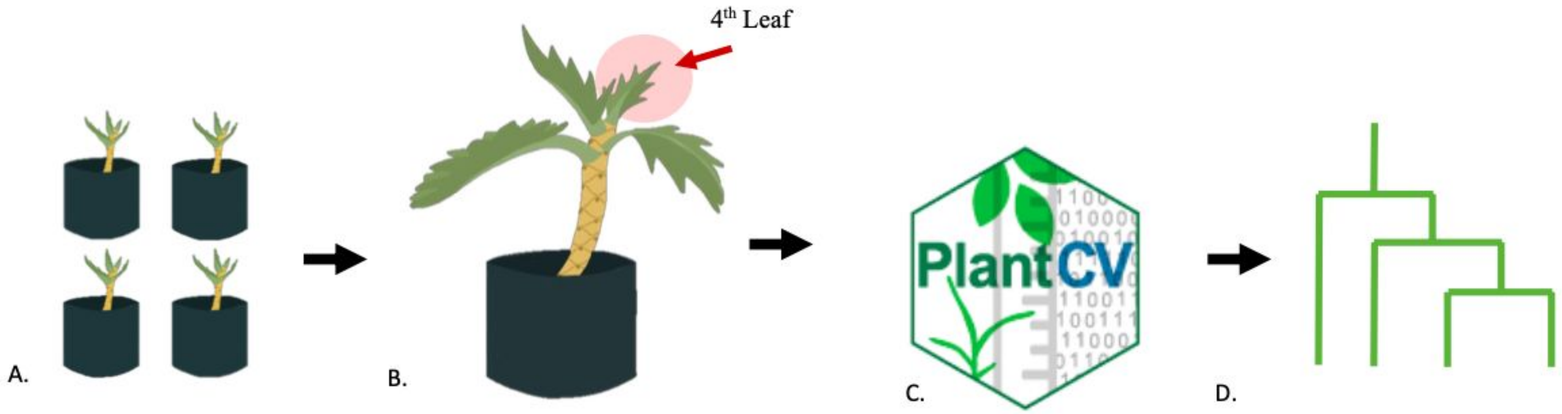
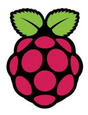


Figure 1. Workflow of project (A) The initial growth of a *Brassica oleracea* diversity subset from seed to 4th leaf stage.
(B) The 4th leaf of each plant is harvested and scanned on the flatbed scanner
(C) The scan data is analyzed within PlantCV.
(D) Using hierarchical clustering we will create a dendrogram and compare with existing phylogenetic trees to assess potential convergent evolution.

Methods

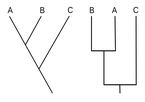
Grow Brassica Ferals and Scan on Flatbed

Raw Data



Analyze images in plant CV

Sorted



Compare shape data to phylogenetic relationships

Future Directions

- Write scripts to evaluate images data
- Automate scanning and analysis using a Raspberry Pi
- Express results in dendrogram form that will show the correlation between feralization and morphometric data gathered.

Current Progress is limited to the growth of the ferals while we determine the next steps

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