Tasha Ogoti
Nairobi, Kenya

Sophomore
Computer Science

Faculty Mentor: Dr. J. Chris Pires, Biological Sciences

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

Tasha Ogoti, Lauren Kirtley, Michael Pisias, and J.Chris Pires

Brassica oleracea is a diverse species that includes important domesticate varieties including cabbage, cauliflower, and kale. In some cases, populations of *B. oleracea* have escaped domesticated crop fields and undergone feralization, a process by which domesticated plants revert to or adapt to fit a new environment including things like extreme temperatures, poor soil quality, diseases, and pests that are not pressures on crop fields. These adaptations are of interest to us due to the possibility of future application in breeding or genetic engineering approaches to produce more hardy crops. Utilizing the traits that increase the fitness of ferals in their domestic crop ancestors could help to deal with mounting pressures on crops like global warming. We believe *Brassica oleracea* originated from wild species like *Brassica cretica*, *B. hilarionis*, *B. montana*, or *B. incana*; however, these relationships are unclear. Feral relatives offer unique leaf morphotypes; our data will consist of leaf scans from the fourth leaf of every feral *Brassica* species in our collection of germplasm. Scanned leaves will be analyzed using Plant CV to determine their leaf shape phenotype. We will use this data to evaluate the similarities of leaf shape across our ferals compared to wild relatives of *Brassica oleracea* and domesticated varieties within *Brassica oleracea*. Our sample will include 12 different feral accessions from the *Brassica cretica*, *B. hilarionis*, and *B. montana* species; we will grow 8 plants for each accession. Then, we will compare with leaf data from commonly grown crop species like cabbage, cauliflower, and kale. With this data we will construct a dendrogram to compare with existing morphological data for applicable information from our system. In the future, we hope to evaluate potential phenotypes of interest with multiple-omics approaches to obtain even more data that could be analyzed and used to refine our conclusions.