Sorghum bicolor Tillering Decreases in Response to Trimming

Seth Polydore[1] and Noah Fahlgren[1]

[1]Donald Danforth Plant Science Center

November 1, 2022

Sorghum bicolor Tillering Decreases in Response to Trimming

Seth Polydore[1] and *Noah Fahlgren*[1]

[1]Donald Danforth Plant Science Center, Data Science Facility

975 N. Warson Rd, St. Louis, MO. 63132

ORCiD: 0000-0002-7779-7367

Keywords: tiller counting, PlantCV, *Sorghum bicolor*, TERRA-REF project

Abstract

Tillers are shoots that arise from the base of a plant. When plants tiller, they place more carbon resources into vegetative growth as opposed to their grains. Understanding the environmental and genetic factors behind tillering is hampered by lack of high-throughput phenotyping for determining plant tiller count and angle. Currently, plant tiller counts are determined through manual inspection, which is laborious and low-throughput. In this study, we introduce a PlantCV (https://plantcv.danforthcenter.org/)-based algorithm for detecting tillers. This method uses OpenCV's line detection algorithm to detect lines that correspond to the tillers of the plant. From this, tiller count and angle of growth can be inferred. We use this method on *Sorghum bicolor* accessions from the TERRA-REF project that were grown for two weeks, cut back, and then allowed to regrow for two weeks. Of 200 randomly chosen images, this algorithm was able to accurately count within 1 tiller of the true number of tillers for 165 images. Furthermore, we find that these *Sorghum bicolor* accessions appear to place less resources into their tillers in the regrowth phase.