EVALUATING COTTON SEEDLING VIGOR IN THE MISSOURI BOOTHEEL FOR 2018

Calvin D Meeks
University of Missouri
Portageville, MO

Characterizing canopy development in the past using Normalized Difference Vegetation Index (NDVI) was demonstrated to be an effective tool. However, characterizing seedling development with NDVI has not been properly demonstrated. Alternatives, such as digital conventional cameras that detect red, green, and blue (RGB) channels are incredibly common today and require a minimal investment compared to conventional NDVI equipment. Furthermore, vegetation indices, such as the Green-Red Vegetation Index (GRVI) can be easily calculated from RGB images. The goal of the project was to evaluate the ability to discern differences in seedling vigor utilizing RGB-derived indices and NDVI methodologies to detect differences in seedling development. Research was conducted at the University of Missouri's Lee Farm in Portageville, MO. This study included a total of fifty-eight cotton varieties treatments and 4 replicate plots. Remote sensing data were collected 14 and 21 days after planting and included Normalized Difference Vegetation Index (NDVI) and aerial RGB photography. RGB images were converted with Imagej into vegetation index images and vegetation indices were derived for each plot. Significant differences were noted between all fifty eight varieties when overserving the NDVI of each plot. Significant differences were not observed in the GRVI most likely due to the altitude of the UAV. A list of the ten most and ten least vigorous varieties are attached as Figures 1 and 2.

Table 1. Top ten most vigorous cotton cultivars in Missouri for 2018. Values are means ± standard error (n = 4)

NDVI	Cultivar
0.2816 a	PHY 330 W3FE
0.2732 ab	ST 5020 GLT
0.2711 bc	BX 1975GLTP
0.2707 bc	PX3B07W3FE
0.2691 bcd	PHY 340 W3FE
0.2687 bcde	CROPLAN 3475
0.2669 bcdef	DP 1518 B2XF
0.2649 bcdefg	17R818B3XF
0.2638 cdefgh	PX5D28BW3FE
0.2637 cdefgh	ST 4949 GLT

Table 2. Ten least vigorous cotton cultivars in Missouri for 2018. Values are means ± standard error (n = 4)

NDVI	Cultivar
0.24 vwxyz	NG 4689 B2XF
0.24 vwxyz	PX3C06W3FE
0.24 vwxyz	CPS 18506-D
0.2385 wxyz	CPS 18507-D
0.2355 wxyz	DP 1646 B2XF wxyz
0.2338 wxyz	DG 3214 B2XF wxyz
0.2323 yz	NG 3780 B2XF
0.2308 z	DP 1614 B2XF
0.2291 z	CPS 18501-B
0.2289 z	NG 4777 B2XF