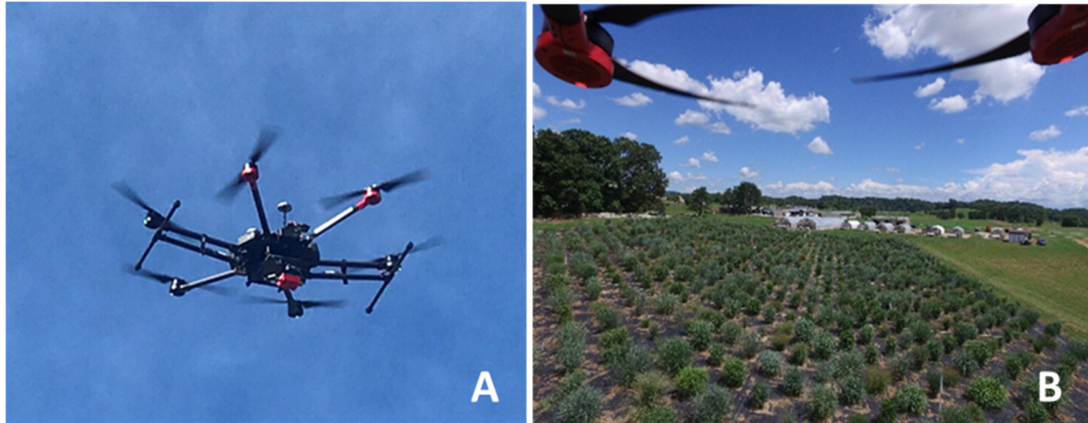
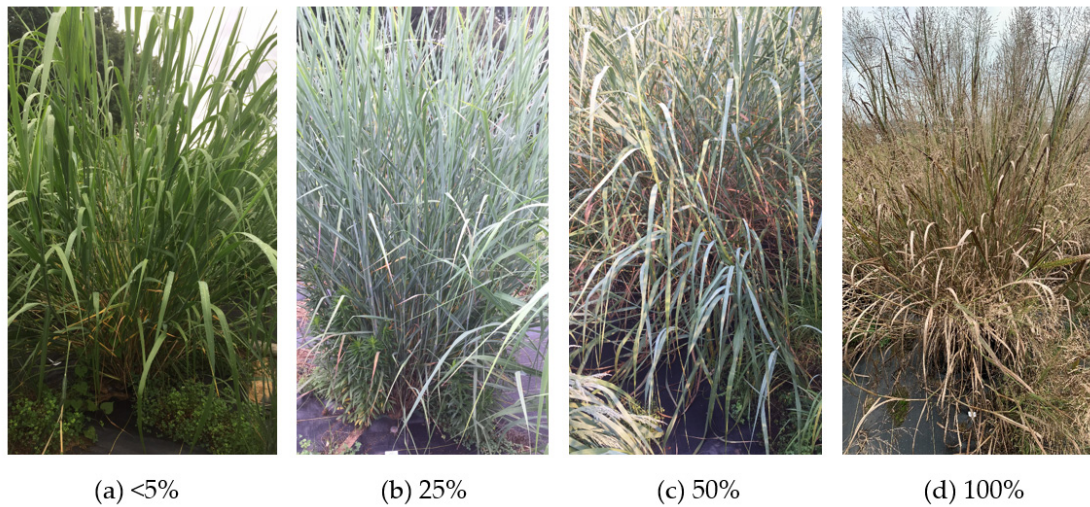


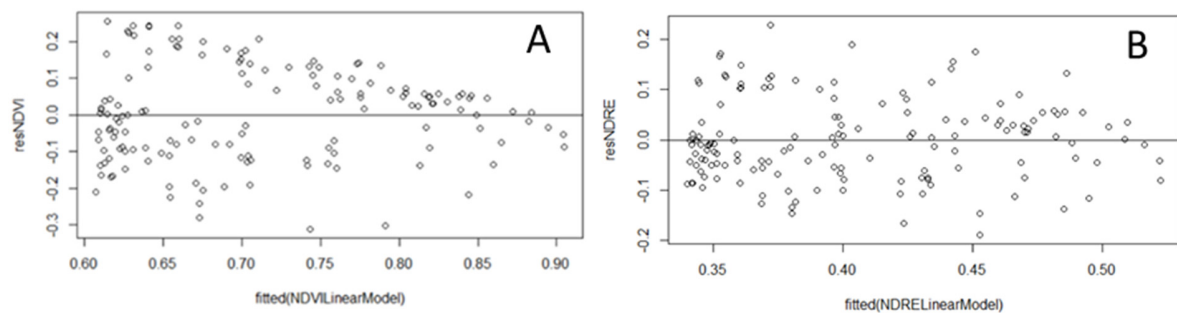
**Figure S1.** The field layout for the switchgrass nitrogen study. The field design includes 330 accessions (2 replicates per nitrogen treatment), ‘Alamo’ AP13 controls, ‘Blackwell’ buffer zone, and ‘Blackwell’ border with 2.8 m interplant spacing. The field site also includes weed cloth boundary. The field covered 0.92 hectares.



**Figure S2.** UAV system with the multispectral camera. **(A)** DJI Matrice 600 Pro with MicaSense RedEdge-M multispectral camera. **(B)** UAV system in a flight mission over switchgrass field site.



**Figure S3.** The rust disease (*Puccinia novopanici*) severity of the switchgrass population was evaluated by a visual rating system, (a) less than 5%; (b) 25%; (c) 50%; (d) 100%. Less than 5% is when no rust disease or the first sign of rust disease emerges. 100% is the whole plant is infected by rust disease.



**Figure S4.** Residual plots as a comparison between the NDVI model and NDRE model for chlorophyll content. **(A)** residual plot for the NDVI model; **(B)** residual plot for the NDRE model. NDVI model shows less homogeneity as compared to the NDRE model. X-axis represents the linear model, and y-axis represents the residuals of that model.