ESTIMATING COTTON STAND COUNT USING UAV-BASED IMAGERY

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Abstract

Accurate and rapid estimation of stand count is crucial to determine plant emergence rates for site-specific management, such as decision support for replanting. This study assessed the application of high-resolution unmanned aerial system (UAS) imagery in quantifying early-season cotton stand count. A UAV system equipped with an RGB camera was used to acquire images of a cotton research field 10 days after planting. Twelve vegetation indices derived from the red, green, and blue bands of the orthomosaic image were used. These vegetation indices are the Visible-band Difference Vegetation Index (VDVI), Visible Atmospherically Resistant Index (VARI), Normalized Green-Red Difference Index (NGRDI), Red-Green Ratio Index (RGRI), Modified Green Red Vegetation Index (MGRVI), Excess Green Index (ExG), Excess Red Index (ExR), Excess Blue Index (ExB), Excess Green minus Excess Red Index (ExGR), woebbecke Index (WI), Kawashima Index (IKAW), and Simple Ratio Index of Blue and Green bands (SRI-B/G). Results showed that ExGR index had the highest accuracy in detecting cotton stands while SRI-B/G index had the lowest accuracy value. This study shows the capacity of UAS-based RGB images in estimating the cotton emergence rate.