A Novel Image Analysis Strategy for Peanut Maturity Assessment

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Determining optimum maturity for peanut harvest can make or break profitability of a crop. Because pod mesocarp color is an excellent indicator of pod maturity, determining optimum digging time for a given field can be accomplished through maturity sampling. Clemson recommendations for maturity sampling involve hull scraping or pod blasting (pressure washing) of sampled pods, followed by sorting the pods into piles, according to mesocarp color. While this method has proven over years of research to be a reliable method of optimizing digging date to maximize revenue, it can be time consuming to process multiple samples and human subjectivity can result in slightly different counts from one observer to another.

This study discusses an image analysis system capable of producing consistent maturity results at high throughput. From a digital image of a pod-blasted sample, pixels in the image are analyzed to distinguish pod pixels from background pixels and algorithms are applied to predict percent of pods in each of the color categories: white, yellow, orange, brown, and black. Results are available within seconds of taking the photo. Algorithms were developed from manual counts of over 1,400 pod-blasted samples across more than ten peanut varieties. Average prediction accuracies were +/- 4% for orange-brown-black pods and +/- 3% for black pods.