

**CROP MONITORING AND DEFOLIATION
TIMING VIA SPECTRAL DATA**

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Abstract

Cotton is a perennial plant with a natural mechanism for shedding leaves. Mechanical harvesters helped to make chemical defoliation a common agricultural practice. The defoliation process is now a common cultural practice to aid in mechanical harvest. Chemical defoliation allows one to control defoliation timing and thus harvest timing, but can be the most unpredictable process in cotton production. Harvest-aid application now encompasses not only defoliation but also regrowth, boll opening, and weed desiccation. The timing of harvest-aid application optimizes yield and fiber quality by not sacrificing older bolls, while maturing as many young bolls as possible. There are many techniques used to determine cotton maturity and thus harvest-aid application timing. Some of the more common techniques include percent open bolls, nodes above cracked boll (NACB), days after planting, visual inspection, and a computer-aided expert system (COTMAN). Using heat unit accumulation after physiological cutout, COTMAN can predict cotton maturity.

An experiment was conducted at the Plant Science Research Center, Starkville, MS to determine if remotely sensed crop data could be correlated to cotton maturity and to evaluate harvest-aid efficacy in respect to defoliation and boll opening. Plots were 40' x 26' and the cotton variety used was Paymaster 1560 BG/RR. Data collected included handheld ASD readings, NAWF, percent open bolls, visual ratings for defoliation, yield, and fiber quality. Treatments were initiated according to the previously mentioned timing techniques.

Data suggest that classification of spectral data with percent open bolls decreased from 100% to 69% from the beginning of the evaluation period until harvest. This indicates that more bolls naturally opened with time and that differences among treatments had decreased thus classification decreased. When percent crop defoliation was classified utilizing spectral data it was correctly classified 100% of the time. These data indicate that percent open bolls and visual defoliation ratings can be correlated with some application timing techniques such as COTMAN.