EVALUATION OF CHOLORPHYLL METER FOR NITROGEN MANGAGEMENT IN COTTON

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ABSTRACT: The Minolta Spad 502 Chlorophyll fluorescence meter has proven the most reliable hand held meters for infield readouts when monitoring nitrogen in cotton. Yet, this meter has its limitations when it comes to distinguishing between levels of nitrogen. The Spad meter was able to detect between plots having no nitrogen and plots with nitrogen during the first week of bloom. However, the Spad meter was unable to distinguish between levels of nitrogen at the first week of bloom. At the second and fourth week of bloom Spad readings were lower for 30 lb/ac than the 60, 90, 120, and 150 lb N/ac and the plots with no nitrogen were lower than all nitrogen rates. Yields were not different between the rates above 60 N/ac level and were lower for all rates below the 60 N/ac.

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KEYWORDS: Cotton, Nitrogen, Chlorophyll Meter

MATERIALS AND METHODS:

Objective: The purpose of this study was to evaluate the Minolta Spad 502 to determine if it could be used as a useful tool in distinguishing between nitrogen levels in cotton.

The experiment was located on a Grenada Silt Loam soil with less than 2% slope. The experimental design was a RCB with four replications. Plots were four rows spaced 38 inches apart and 50 ft long. Treatments were 0, 30, 60, 90, and 120 lb N/acre. The plot area was disked in late March and redisked in the second week of April before the plots were hipped. Five hundred pounds of 0-20-20 fertilizer/ac was broadcast across the entire study in April prior to planting.

Sure-Grow 215 BG/RR cotton was planted at approximately four seed per foot of row the first week of May with a John Deere 7300 planter. Nitrogen rates were broadcast by hand application two weeks after emergence. Terrachlor Super X (Pentachloronitrobenzene) 18.8G 1.5 lb ai/ac + Temik (aldicarb) 15G 0.75lb ai/ac were applied as granules in furrow at planting. Cotoran (fluometuron) 1.0 lb ai/ac was broadcast over the plot area after planting. Roundup at 1.0 lb ai/ac was sprayed over the entire plot area two weeks after emergence. CyPro (cyanazine) at 0.75 lb ai/ac was direct-sprayed broadcast over the plot area as a lay-by treatment.

Chlorophyll fluorescence measurements were made using a Minolta Spad 502 hand held fluorescence meter on the leaves of twenty plants selected at random within each plot and

averaged across the plants for a single plot reading. Leaf readings were taken on the fifth fully expanded leaf below the terminal of the plant. Chlorophyll fluorescence measurements were made at first week of bloom, second week of bloom and fourth week of bloom. Chlorophyll readings were recorded as Spad readouts. Cotton was defoliated the first week of October with Superboll (ethephon) 1.5 lb. ai/ac + DEF 6 (tribufos) 1.5 lb ai/ac and picked the third week of October.

RESULTS AND DISCUSSION: The Minolta Spad 502 Chlorophyll fluorescence meter has proven to the most reliable of the hand held meters for infield readouts for nitrogen monitoring in cotton. Yet, the Minolta Spad 502 meter has its limitations. At first week of bloom the Spad meter readings were unable to detect differences between those plots with 0 lbs N/ac and the 30, 60, 90, 120, and 150 lb N/ac. There was no difference within the plots having different nitrogen levels at first week of bloom. Readings at second week of bloom were lower for 30lb N/ac rate than the 60, 90, 120, and 150 lb N/ac rate. At the second week of bloom the plot having 0 lbs N/ac were lower than plots having 30, 60, 90, 120, and 150 lbs N/ac. At the fourth week of bloom the Spad differences were the same as the second week of bloom.

Yield differences were lower for the treatments with no N than those receiving nitrogen. The 30 lb N/ac was lower than the 60, 90, 120, and 150 lb N ac. There was no difference in the plot yield above the 60 lb/N ac.

TABLES:

Table 1. Spad Chlorophyll reading at 1st, 2nd, and 4th, week of bloom and Seedcotton yield.

N lb/ac	1st Wk of Blm	2nd Wk of Blm	4th Wk of Blm	Seed Cotton Lbs/ac
0	67.76	35.37	30.53	395
30	59.1	38.43	33.83	516
60	61.85	41.37	37.40	698
90	67.76	42.87	37.33	744
120	58.69	40.93	37.67	722
150	57.94	42.77	37.73	753
LSD 0.05	13.64	2.41	1.01	116