2003 BELTWIDE COTTON CONFERENCES, NASHVILLE, TN – JANUARY 6-10

SITE-SPECIFIC HERBICIDE, GROWTH REGULATOR, AND DEFOLIANT APPLICATIONS IN COTTON

Jason C. Sanders, Daniel B. Reynolds, Charles G. O'Hara, and L. Thomas Barber
Mississippi State University
Mississippi State, MS

Abstract

The type and rate of chemicals needed for specific areas within most cotton (*Gossypium hirsutum* L.) fields can vary due to a number of factors. Due to population dynamics and the tendency for patchy aggregation, the presence of weeds is spatially variable. The density and species of weeds present in a field influences the herbicide type and rate necessary for effective control. Variation in cotton growth and maturity can be influenced by fertility, moisture, herbicides, insect pests, and various other adverse conditions. The internode length of the top five nodes, plant height, and previous mepiquat chloride applications influence the rate of mepiquat chloride necessary for effectively regulating plant growth. Harvest-aid type and rate depends on level of maturity, boll opening, regrowth potential, and weed pressure. The ability to site-specifically apply a chemical, based on a particular site's needs, would allow the producer to maximize the performance of the chemical application along with potential profits.

An experiment was conducted at the Black Belt Branch Experiment Station, Brooksville, MS to evaluate the possibilities of site-specifically applying chemicals in cotton using a differentially corrected global positioning system (DGPS) controlled point injection sprayer. There were approximately 20 acres in the field of interest, and the cotton variety was 'Deltapine 451 BG/RR'. Ground-truthed data for herbicide, growth regulator, and defoliant applications were collected on half-acre grids. Weed density sampling and visual weed control ratings were collected for herbicide applications. The data for plant growth regulator applications included internode length of the top five nodes and plant height. Ground-truthed data for defoliation included percent open bolls, nodes above cracked boll (NACB), visual defoliation rating, and hyperspectral reflectance (350 to 2500 nm) collected with a handheld spectrometer. Multispectral data were also collected with an airborne sensor. Ground truthing data were used to produce site-specific treatment maps for all three application types. The Normalized Difference Vegetation Index (NDVI) was calculated from both spectral data sources. Chemical applications were made using the respective treatment map.

There were no difference in weed control efficacy between site-specific and broadcast herbicide applications as indicated by weed density and weed control ratings. There were only 7 sites with greater than 15 percent height change from cutout to maturity after the application of plant growth regulator. Percent open bolls and visual defoliation ratings indicated no differences between site-specific and broadcast defoliant applications. It is possible that NDVI and other vegetation indices calculated from spectral data can be incorporated into the development of treatment maps for herbicide, growth regulator, and defoliant applications.