PRECISION AG PRESENTATIONS

Increasing Farm Profitability Using Automatic Section Control (ASC) On Planters

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Precision agriculture technologies enable producers to increase profits by applying crop production inputs such as seed, fertilizer, pesticides, growth regulators and defoliants on a site-specific basis in the field. There are several technologies commercially available today to apply production inputs based on the location of farm equipment in the field. One example of this technology is Automatic Section Control (ASC) for row crop planters.

ASC for row crop planters has been on the market for several years. ASC eliminates double-planting in areas of fields where planter overlap normally occurs such as end rows, point rows, and around internal field obstacles. ASC utilizes the Global Positioning System (GPS)/Global Navigation Satellite System (GNSS) location of the planter and previously planted coverage maps to control individual planter units or sections of planter units. As the planter travels across the field, the controller continually checks to see if the planter units are passing over previously planted areas or areas that have been mapped as no plant zones. When the planter units pass into these areas, it is turned off automatically and turned back on when it passes back into areas that are unplanted (Figure 1). By eliminating planter overlap, ASC has the potential to reduce seed input costs and yield losses resulting from harvesting inefficiency.

Figure 1. Field planted with Automatic Section Control

There are several economic benefits of equipping planters with ASC. A recent study in Tennessee showed the potential of reducing seed costs in cotton production systems with ASC. In this study, the Real-Time Kinematic (RTK) GPS position of the planter and planter status (i.e. planting or not planting) was monitored every 1/10th of a second in 52 cotton production fields that totaled 1725 acres. Percentage of minimum double-planted area was found to range from as low as 0.1% to as high as 15.6% with an average of 4.6% across all 52 fields. The total minimum double-planted area across all fields was 54.7 acres. With seed cost of $110 per acre, planting with ASC would reduce seed cost by over $6000 a year for this 1725 acres.

Another benefit of planting with ASC is the potential to eliminate harvest losses in these double-planted areas. In cotton production systems, end rows are typically picked in one direction and then stalks are mowed with a rotary cutter. The Tennessee study showed cotton yield losses in double-planted areas resulted from this harvesting method. Treatments used for this study included single-planted rows that would result from using ASC on the planter and three double-planted treatments at angles of 30°, 60°, and 90° in relation to the straight rows not using ASC. All treatments were picked in one direction and weighed to determine if yields differed among treatments. As shown in Figure 2, the two year average lint yields from the single-planted treatments were statistically different from the double-planted treatments. The two year average lint yield from the single-planted treatments was 1389 lbs/ac compared to 917, 943, and 1033 lbs/ac for the double-planted treatments with rows crossing at 30, 60, and 90 degrees, respectively. These differences in yield were attributed to the fact that some cotton plants in the crossing rows were not harvested (Figure 3a) on the first pass due to the configuration of the picker header (Figure 3b). However, the angle at which the picker intersected the cross rows did not have a significant impact on the amount of cotton left behind in double-planted plots after a single harvest pass.

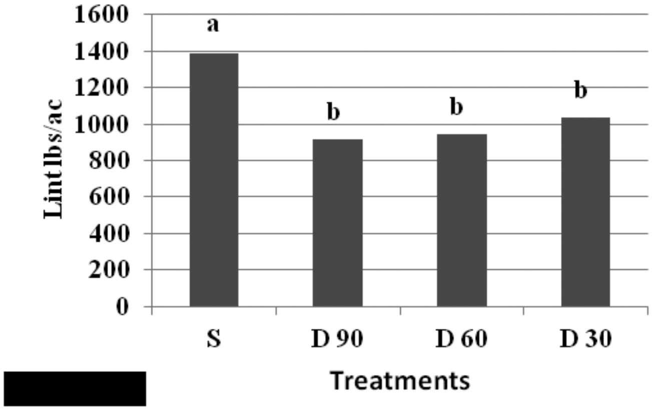

Figure 2. Two year average lint yield in lbs/ac per treatment.

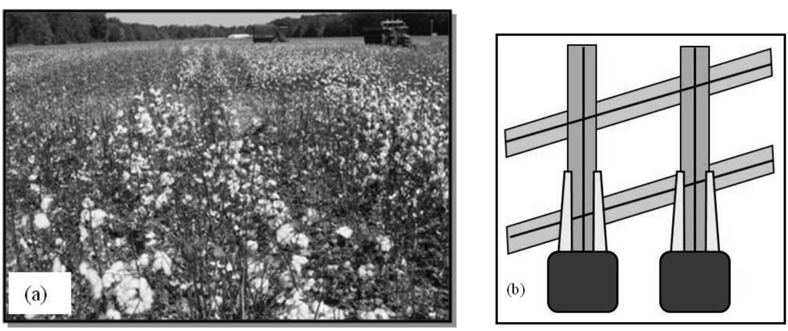

Figure 3. (a) Cotton not harvested during the first pass of double-planted plots and (b) picker header limitations when harvesting crossing rows.

The amount of double-planting that occurs in fields is dependent on several factors such as field size, field shape and planter width. Fields that are more irregular in shape tend to have higher incidences of double-planting. Also, as farming operations become larger, producers are purchasing wider planters to speed up planting. As planter width increases, a potential risk of increasing planter overlap, especially in end rows and point rows, can occur. This talk will demonstrate the Automatic Section Control for Planters Cost Calculator (ASCCC) that was developed by The University of Tennessee (http://economics.ag.utk.edu/asccc.html). This computerized decision aid tool estimates the number of years it will take to pay off investing in ASC on planters based on a producer's farming operation.