PRECISION SEEDED LOW PLANT POPULATION COTTON: EFFECT ON YIELD AND WEED CONTROL

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Abstract

Precise seeding rates for cotton have become practical since the introduction of air planters designed for agronomic crops. Cotton seeding rates in Georgia average about 3/ft, with a range of just under 2 to over 5 seed/ft. With these relatively low rates, it was thought that there might be a local cost advantage for genetically engineered cultivars based on the assumption that costs would be built solely into the price of seed. [In retrospect, this assumption about cost was correct for some technology but not others.] While reduced seeding rates may lower costs, they may also create a need for greater weed control inputs.

A field experiment was conducted at the Southwest Branch Experiment Station, Plains, GA, in 1995 and 1996 to evaluate the influence of reduced seeding rates on cotton yield and weed control requirements. A Monosem planter was set up to deliver l, 2, 3, 4, and 6 seed/ft in 36-inch rows. Effect of weed interference was measured for periods of weed competition (weeds allowed to compete for a time and then removed for the remainder of the season) and for periods of weed-free maintenance (weeds removed for a period and then allowed to establish and compete for the remainder of the season). Weed competition periods were 0, 3, 6, and 16 weeks. Weed-free conditions were maintained for 0, 3, 6, 9, and 16 weeks. Herbicide programs of varying intensity--low, medium, and high--were also evaluated . The "low" input program consisted of fluometuron @ 1.5 lb/A applied preemergence. The "medium" program also included a single post-directed application of either fluometuron plus MSMA @ 1.0 + 2.0 lb/A or cyanazine plus MSMA @ 0.8 + 2.0 lb/A. The "high" program included fluometuron plus norflurazon @ 1.5 + 1.5 lb/A applied preemergence followed by an early directed application of fluometuron plus MSMA @ 1.0 + 2.0 lb/A and in 1995 an additional directed application of cyanazine plus MSMA @ 0.8 + 2.0 lb/A. The entire experimental area was treated with trifluralin preplant incorporated and all plots were mechanically cultivated twice in 1995 and three times in 1996. Collected data included cotton stand and yield.

Data were remarkably similar for the two years. The lowest seeding rates (1 to 3/ft) had the least percent stand, approximately 50 to 75 percent versus 90 percent for the two highest densities. It was not determined if this was related to failure to deliver the seed or to an adverse seeding rate/environment interaction.

Seeding rates of 2/ft, which yielded cotton stands of 1.3 to 1.6 plants/ft, produced yield comparable to higher seeding rates if adequate weed control was maintained. Yield reduction due to periods of weed competition were evident only at the lowest seeding rate. The fact that the entire study was cultivated multiple times reduced the overall effects of weed competition. Chemical weed control inputs were more critical with the two lowest seeding rates. This study indicates that low seeding rates may be agronomically acceptable in regards to cotton yield potential and weed management.

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