

**WEED MANAGEMENT AND CROP RESPONSE WHEN
INTERCROPPING CANTALOUPE AND COTTON****P. M. Eure****A. S. Culpepper****R. M. Merchant****T.B. Tankersley****The University of Georgia****Tifton, GA****Abstract**

Traditionally, spring planted watermelon in southern Georgia are harvested by July allowing that land to be planted to sorghum. Returns on sorghum following watermelon are often marginal, prompting growers to seek other potential crops and strategies that may generate greater revenue; one such strategy is a watermelon-cotton intercropping system. Land preparation, fertilizer, and irrigation are in place for the watermelon; therefore, intercropping cotton could potentially increase resource efficiency and improve grower profit. However, a major impediment to intercropping systems in Georgia is the management of glyphosate-resistant Palmer amaranth. Therefore research was conducted to (1) Identify herbicide systems to manage troublesome weeds in watermelon-cotton intercropping production and to (2) Determine the profitability of watermelon-cotton intercropping versus a monoculture of watermelon or cotton.

Three field studies were conducted at the UGA Ponder Research Farm near Ty Ty, Georgia on a Tifton loamy sand; two during 2011 and one during 2012. `Melody` watermelon was transplanted into a 0.8 mil plastic mulch having an 46 cm wide bed top on March 24, 2011, April 7, 2011, and March 26, 2012. Plots were 6 ft wide and 50 ft long with a single row of watermelon placed 3 ft apart within the row. Overhead irrigation was the primary water source. Each study consisted of three herbicide systems and a non-treated control. Herbicide systems included ethalfluralin (0.75 lb ai/A) or ethalfluralin + fomesafen (0.25 lb ai/A) preplant or ethalfluralin + fomesafen + terbacil (0.20 lb ai/A) preplant. All herbicides were applied broadcast and preplant herbicides were washed off of the mulch prior to planting using 0.5 inches of overhead irrigation. Cotton (`PHY 499`) plantings were made when the initial watermelon vine reached the mulch edge just prior to touching the soil (April 14, 2011, April 26, 2011 and April 15, 2012). For profitability comparisons, monoculture cotton and cantaloupe were planted during their ideal planting windows and maintained weed free with standard herbicide programs coupled with hand weeding. Intercropping systems were managed for watermelon production until harvest in late June. Immediately following watermelon harvest, vines were desiccated with topical applications of glyphosate (1.1 lb ae/A) and a second topical application of glufosinate (0.5 lb ai/A). A layby application of MSMA + diuron (1.0 + 1.5 lb ai/ha) was made just prior to cotton canopy closure. Palmer amaranth control, watermelon and cotton injury, cotton height, and watermelon vine length were recorded throughout the season. Watermelon was harvested 2 to 3 times by hand while cotton was harvested with a spindle picker designed for plot harvesting.

Herbicide systems did not injure watermelon or impact vine growth or maturity. Immediately prior to watermelon harvest and combined over locations, Palmer amaranth control with ethalfluralin alone was 55%. Fomesafen based systems controlled Palmer amaranth greater than 91% and terbacil did not improve control. Watermelon yields of 19,135 lbs/A were noted in the ethalfluralin only system while the addition of fomesafen to the system increased yields at least 260% in response to greater Palmer amaranth control. When comparing watermelon intercropped with cotton using a fomesafen system to the monoculture watermelon; no differences in growth, maturity or yield were noted. Terbacil was the only herbicide to injure cotton; resulting in complete crop death by 5 weeks after planting. Prior to cotton harvest, cotton height was reduced 17% in the ethalfluralin only system in response to poor Palmer amaranth control when compared to the monoculture cotton system. In treatments where fomesafen was used and Palmer amaranth was controlled, cotton height was reduced 12% due to competition with watermelon. Due to poor Palmer amaranth control, intercropping cotton yields were not recordable when using ethalfluralin alone. Intercropping cotton yields were 980 lb/A when Palmer amaranth were controlled using fomesafen based systems. Intercropped cotton produced 14% lower yields than monoculture cotton.

When calculating value of the products generated from each crop minus the cost to produce each crop, intercropping watermelon and cotton increased total value/A 14% when compared to watermelon grown in monoculture and >1,000% when compared to cotton grown in monoculture. Although cotton yield was reduced when intercropped

with watermelon, these data suggest that watermelon-cotton intercropping systems would improve grower profitability when compared to monoculture production practices. Results indicate that herbicide options do exist for watermelon-cotton intercropping systems; however, fomesafen is not currently labeled for use in watermelon.