GLYPHOSATE-RESISTANT PALMER AMARANTH COMPETITION WITH ROUNDUP READY COTTON

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Abstract

A study was conducted in Macon Co. Georgia in 2006 and 2007 to determine the effect of glyphosate-resistant Palmer amaranth (*Amaranthus palmeri*) density and establishment time on yield of cotton, Palmer amaranth biomass, and Palmer amaranth seed production. Trial design was a factorial arranged in a randomized complete block with four replications. Four densities of Palmer amaranth were established (2, 3, 5, and 10 per 20 ft of row) plus a weed-free check at four establishment times (3-, 8-, 12-, and 17-lf cotton) representing escapes from herbicide applications made to cotton PRE, at 4-lf, at 8-lf, and at layby, respectively. Palmer amaranth transplants (6- to 8-lf in size, 3 to 5 inches in height) were established in four cotton 'DP 555 BG/RR' rows 20 ft long from a nursery within the same field known to contain a glyphosate-resistant biotype. The nursery was sprayed with Roundup WeatherMax at 22 oz/A two wks prior to collection of transplants to ensure only the glyphosate-resistant biotype was collected. Palmer amaranth transplants were hand watered for one wk after planting to ensure establishment. Data collected were seed cotton yield, Palmer amaranth biomass, and Palmer amaranth seed production.

When studying the effect of Palmer amaranth density for each establishment time: a Palmer amaranth density of 2 plants per 20 ft of row would result in a predicted 16, 13, 6, and 3% yield loss if established at the 3-, 8-, 12-, and 17-lf stage of cotton, respectively. If the density is changed to 10 plants per 20 ft of row the predicted yield loss would be 59, 54, 25, and 9% for the 3-, 8-, 12-, and 17-lf stage of cotton establishment times, respectively. For the 3-, 8-, 12-, and 17-lf establishment times, Palmer amaranth biomass was predicted to increase 1500, 1300, 400, and 300 lbs/A, respectively, for every additional seedling established per 20 ft of row. Palmer amaranth seed production was predicted to increase by 20, 12, 11, and 4 million seeds for every additional Palmer amaranth planted per 20 ft of row for the 3-, 8-, 12-, and 17-lf stage of cotton establishment times, respectively.

When studying the effect of Palmer amaranth establishment time for each Palmer amaranth density: for every cotton leaf stage that the establishment of Palmer amaranth at 2 plants per 20 ft of row is delayed there is a predicted 1.3% increase in yield. This increase in yield was predicted to be 2.3, 2.6, and 4.2% for the 3, 5, and 10 plants per 20 ft of row, respectively. Palmer amaranth biomass was predicted to be reduced 260, 460, 430, and 1100 lbs/A for the 2, 3, 5, and 10 plants per 20 ft of row, respectively, for every cotton leaf stage that establishment is delayed. Palmer amaranth seed production was predicted to decrease by 2 million seeds for the 2 plants per 20 ft of row, respectively, for every cotton leaf stage that establishment is delayed. A predicted decrease of 2.1, 6.1, and 13 million seeds was observed for the 3, 5, and 10 plants per 20 ft of row, respectively.