INFLUENCE OF A RYE COVER CROP ON THE CRITICAL WEED-FREE PERIOD IN COTTON

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Abstract

The critical period of weed control (CPWC) is an estimate of the duration of effective weed control necessary to prevent weed interference from reducing yields. In order to design a management strategy that minimizes weed interference during the critical growth period of a crop, an understanding of the CPWC is essential. A field experiment was conducted during 2009 and 2010 at the Lon Mann Cotton Research Station in Marianna, AR, in which a rye cover crop was used to determine its effect on the critical weed-free period in cotton. This experiment was organized in a split-plot design replicated four times. The main factor was the use of a rye cover crop. The subplot factor was the duration of the weed-free period and the duration of the weed-interference period. Both the weed-free period and the weed-interference period had durations of 0, 1, 2, 3, 4, 5, 7, and 9 wk, as well as season long. Initial weed control consisted of Roundup WeatherMax plus Dual Magnum followed by Roundup WeatherMax as needed. Weed biomass was collected from a 0.5-m^2 area in each treatment in the weed-interference plots and once at the end of the growing season in the weed-free period plots. Yield data were collected in all the plots, and all data were subjected to regression analysis. Throughout most of the growing seasons, weed biomass in the presence of a rye cover crop was less than that in the absence of a rye cover crop. In 2009, in weeks 2 through 7, there was at least a two-fold reduction in weed biomass in the presence of a rye cover crop compared to the absence of rye. In 2009, in both the presence and absence of a rye cover crop, weed removal needed to begin prior to 108 g/m^2 of weed biomass, or approximately 3 wk after planting to prevent greater than 5% yield loss. Biomass production was lower in 2010 than in 2009, so weed removal did not need to begin until 385 g/m^2 of weed biomass was present when no cover crop was used, or when 175 g/m^2 of weed biomass was present when a cover crop was used, which was 7 wk after planting.