

EFFECT OF PREEMERGENCE HERBICIDES ON THE CRITICAL PERIOD IN GLYPHOSATE RESISTANT CORN AND SOYBEAN. Guillermo D. Arce and Bob Hartzler, Graduate Research Assistant and Professor, Iowa State University, Ames, 50011.

Research was conducted at three Iowa locations in 2005 to determine whether preemergence herbicides provide greater flexibility for postemergence glyphosate applications in glyphosate resistant corn and soybean. In soybean, alachlor was applied at 1.1 or 2.2 kg/ha, whereas in corn a combination of acetochlor and atrazine at 0.7 + 0.3 or 1.4 + 0.6 kg/ha was used. An untreated control was included in the experiments. Glyphosate (0.84 kg/ha) was applied at the V2, V4 or V6 crop stage, with an untreated control. V2 and V4 treatments were also sprayed at V6 to eliminate late-emerging weeds.

The preemergence treatments reduced weed densities (pooled across the three post timings) between 60 and 80% depending on crop, rate and location compared to no preemergence herbicide. Reductions in weed biomass by the preemergence herbicides were similar to weed density reductions in corn, but were smaller and more variable in soybean. The high rate of acetochlor + atrazine reduced weed biomass by approximately 90%, whereas 2.2 kg/ha alachlor reduced weed biomass by only 50 to 60% in soybean. The smaller reductions in weed biomass in soybean versus corn were due to the narrow spectrum of control provided by alachlor compared to acetochlor + atrazine. The high rate of alachlor provided excellent control of foxtail species and waterhemp (>90% reduction in density), but had little or no affect on common ragweed, velvetleaf and common cocklebur. The greater variability in weed biomass in soybean was due to the patchy distribution of the large-seeded weed species that escaped effects of alachlor.

Yield responses to the treatments were inconsistent, possibly due to moderate weed infestations at all locations. A significant interaction between pre and post treatments occurred at two of the three soybean experiments and one of two corn experiments. At these experiments, the lowest yields in the V6 postemergence timing occurred in the no preemergence herbicide treatment. These locations had significantly more weed biomass in the preemergence control treatment than in the low or high preemergence treatment. Soybean yield response to full-season weed competition was determined by adjusting yield to the 'weed-free' treatment (high pre/V2 post) at the three soybean experiments. Regression analysis indicated a linear response in yield to end-of-season weed biomass in the postemergence control treatments ($\text{Relative yield (\%)} = 1.0126 - 0.0006x$; $R^2 = 0.71$; where $x = \text{g weed biomass m}^{-2}$.)