QUANTIFYING REDUCTIONS IN PALMER AMARANTH GROUNDCOVER FOLLOWING AN AUXIN HERBICIDE APPLICATION

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Abstract

In current and upcoming weed control technologies, sequential applications of contact and systemic herbicides for POST control of troublesome weeds can be utilized to mitigate the evolution of herbicide resistance. A clear understanding of the impact auxin herbicide symptomology has on Palmer amaranth groundcover will aid optimization of sequential herbicide applications. Field and greenhouse experiments were conducted in Fayetteville and a laboratory experiment was conducted in Lonoke, AR, in 2020 to evaluate changes in Palmer amaranth groundcover following an application of 2,4-D and dicamba with various nozzles, droplet sizes, and velocities. Field experiments utilized three nozzles: Extended Range (XR), Air Induction Extended Range (AIXR), and Turbo TeeJet Induction (TTI), to assess the effect of spray droplet size on changes in Palmer amaranth groundcover. Nozzle did not affect Palmer amaranth groundcover when dicamba was applied. However, nozzle selection did impact groundcover when 2,4-D was applied; the following nozzle order XR>AIXR>TTI reduced Palmer amaranth groundcover the greatest in both site years of the field experiment. This result (XR>AIXR> TTI) matches percent spray coverage data for 2,4-D and is inverse of spray droplet size data. Rapid reductions of Palmer amaranth groundcover from 100% at time zero to 39.4 to 64.1% and 60.0 to 85.8% were observed 180 minutes after application in greenhouse and field experiments, respectively, regardless of herbicide or nozzle. In one site-year of the greenhouse and field experiments, regrowth of Palmer amaranth occurred 10080 minutes (14 days) after an application of either 2,4-D or dicamba to larger than labeled weeds. In all experiments, complete reduction of live Palmer amaranth tissue was not observed 21 days after application with any herbicide or nozzle combination. Control of Palmer amaranth escapes with reduced groundcover may potentially lead to increased selection pressure on sequentially applied herbicides due to a reduction in spray solution contact with the targeted pest.