DETERMINING THE EFFECT OF ELEMENTAL ADDITIVES ON EFFICACY OF DICAMBA MIXTURES

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Abstract

Palmer amaranth (*Amaranthus palmeri*) is one of the most common, troublesome, and economically damaging agronomic weeds throughout the southern U.S. Product labels for new dicamba formulations recommend the pH of spray solutions to be ≥5.0 due to the risk of volatilization, but recent findings suggest that dicamba efficacy can be maximized when the spray solution pH is more acidic. Elemental additives have the potential to alter spray solution pH, which may influence dicamba efficacy. In 2019, three field experiments were conducted at the Lon Mann Cotton Research Station near Marianna, AR, the Milo J. Shult Agricultural Research & Extension Center in Fayetteville, AR, and at an on-farm site near Crawfordsville, AR. The experiments were implemented as three-factor randomized complete block designs with four replications. The objective of the experiments was to determine what effect elemental additives have on spray solution pH and efficacy of dicamba mixtures. Herbicides and elemental additives used were Engenia (dicamba), Xtendimax (dicamba), Coron Full Bor, Ele-Max K-Leaf 0-0-30, Brandt Smart Fe, Hydri-Gro Mn, Hydri-Gro Mg, and Hydri-Gro Ca. At 21 and 28 days after treatment (DAT), treatments containing dicamba + Hydri-Gro Mg provided >90% Palmer amaranth control. The addition of Coron Full Bor to dicamba mixtures increased spray solution pH to ~8.5 at all locations. At 21 DAT, the addition of Coron Full Bor to dicamba mixtures elicited decreased Palmer amaranth control compared to dicamba alone. The addition of Coron Full Bor increased spray solution pH, rendering dicamba mixtures less effective in controlling Palmer amaranth. Overall, there was a weak relationship between pH and dicamba efficacy. These results suggest that the addition of elemental additives to dicamba mixtures can alter spray solution pH, thus effecting dicamba efficacy. Further research is needed to evaluate which elemental additives influence spray solution pH and the efficacy of dicamba the greatest to validate this conclusion.