2,4-D ANTAGONIZES CUTLEAF GROUNDCHERRY (*PHYSALIS ANGULATA* L.) CONTROL BY GLYPHOSATE

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Abstract

Cutleaf groundcherry (*Physalis angulata* L.) is controlled well by glyphosate but research is limited on control of this weed by 2,4-D or glyphosate + 2,4-D. In 2018, a cotton producer complained of poor cutleaf groundcherry by Enlist Duo® (2,4-D choline + glyphosate). Seed from this population was collected and a preliminary greenhouse screening was conducted. The preliminary findings indicated glyphosate controlled cutleaf groundcherry well, but treatments containing 2,4-D choline and 2,4-D choline + glyphosate did not. This led to the initiation of greenhouse studies to test for antagonism. Treatment structure consisted of a 3 by 3 factorial including 3 rates of 2,4-D choline by 3 rates of glyphosate. Rates of 2,4-D choline included 0, 532 (1/2X), and 1064 (1X) g ae ha^{-1} whereas of rates of glyphosate were 0, 433 (1/2X), and 866(1X) g ae ha^{-1}. Treatments were arranged in a RCBD with 4 replications. Two runs of the 2,4-D experiments have currently been conducted. Treatments were applied in a CO_2 pressurized spray chamber when cutleaf groundcherry height averaged 6.5 and 8 cm in each run, respectively. Visual estimates of percent weed control were collected 14 and 28 days after application (DAA). Additionally, cutleaf groundcherry height and biomass were collected 28 DAA. Data were subjected to ANOVA using the PROC GLIMMIX procedure in SAS and means separated using Fisher's Protected LSD at $p \leq 0.05$. Colby's method was used to calculate expected weed control as well as expected biomass as a percent of the nontreated check (NTC) for combinations of 2,4-D choline and glyphosate. A separate ANOVA using PROC GLIMMIX was used to compare expected values calculated using Colby's method to observed weed control by combinations of 2,4-D choline and glyphosate. Both rates of 2,4-D choline controlled cutleaf groundcherry < 10% 28 DAA. In contrast, glyphosate alone at the 1/2X and 1X rate controlled cutleaf groundcherry 70 and 94%, respectively. The 1/2X rate of 2,4-D + glyphosate 1/2X provided 46% cutleaf groundcherry control compared to an expected value of 70%; 2,4-D 1X + glyphosate 1/2X resulted in 45% control compared to 71% expected. The 1/2X rate of 2,4-D + glyphosate 1X controlled cutleaf groundcherry 72% compared to 95% expected whereas 2,4-D 1X + glyphosate 1X controlled the weed 54% compared to expected control of 94%. In general, control by combinations of 2,4-D choline + glyphosate provided less control than glyphosate alone, and the observed control by combinations were statistically less than expected control calculated using Colby's method. These experiments demonstrate that 2,4-D antagonizes control of cutleaf groundcherry by glyphosate.