EFFECT OF SPRAY TIP SELECTION AND HERBICIDE PROGRAM ON PALMER AMARANTH

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Abstract

Experiments were conducted in 2012 at Dundee, MS and Robinsonville, MS to determine the effect of spray tip selection and herbicide program on glyphosate-resistant Palmer amaranth control. Experiments were initiated in grower fields with heavy natural infestations of glyphosate-resistant Palmer amaranth. Applications were initiated when Palmer amaranth plants were 10 to 15 cm in height. Applications were made with a CO₂ backpack sprayer at a pressure of 324 kPa and an application volume of 140 L/ha. Treatments utilized in these experiments included: dicamba at 0.6 kg ai/ha; glufosinate at 0.6 kg ai/ha; dicamba + glufosinate at 0.6 kg ai/ha each; dicamba + glufosinate at 0.3 kg ai/ha each; and glyphosate + dicamba at 0.75 kg ae/ha and 0.6 kg ai/ha, respectively. All herbicide treatments were applied using each of the following spray tips: Extended Range Flat Fan, Greenleaf Asymmetric Dual Fan, Extended Range Air Induction, and Turbo Teejet Induction. All tips utilized in these studies delivered 0.06 liters per minute (0.015 GPM) at 276 kPa. Visual estimates of weed control, the number of Palmer amaranth plants per square meter, and height of Palmer amaranth plants in each square meter were collected weekly following herbicide application. In addition, above ground plant biomass from each square meter was collected four weeks after application and dried in a forced air dryer for one week. Experiments were conducted using a factorial arrangement of treatments in a randomized complete block design with four replications. Visual estimates of weed control, number of plants per square meter, plant height, and plant biomass were subjected to analysis of variance and means were separated using Fisher's Protected LSD at p = 0.05.

Two weeks after application, dicamba + glufosinate at 0.6 kg ai/ha provided greater than 80% reduction in total plants compared to the untreated check. Glufosinate alone, glyphosate + glufosinate, dicamba + glufosinate at 0.3 kg ai/ha, and dicamba alone provided 66, 55, 40, and 23% reduction in the total number of plants per square meter, respectively, two weeks after treatment. No difference in plant height was observed two weeks after treatment. All plant heights were reduced 15 to 38%. Visual estimates of control indicated that dicamba + glufosinate at 0.6 kg ai/ha provided significantly greater control (90%) compared to all other treatments two weeks after application. Similar control was observed following application of glufosinate at 0.6 kg ai/ha reduced the total number of plants and plant height approximately 70% compared to the untreated check. In addition, glyphosate + dicamba reduced the total number of plants by 60% and height plant height by 80%. Visual estimates of weed control and reduction in above ground biomass were similar in that dicamba + glufosinate and glyphosate + dicamba each provided greater than 75 to 80% reductions compared to the untreated check.

Spray tip selection did not impact efficacy of the herbicides tested on Palmer amaranth. The most consistent treatments were dicamba + glufosinate at 0.6 kg ai/ha and glyphosate + dicamba. However, no single treatment provided adequate control four weeks after treatment. A combination of herbicide applications and timings is recommended for season long control of glyphosate resistant Palmer amaranth.