RESCUE TREATMENTS FOR PALMER AMARANTH CONTROL Andrew B. Denton D.M. Dodds C.A. Samples J.D. Copeland Mississippi State University Mississippi State, MS

<u>Abstract</u>

An experiment was conducted in 2014 at Hood Farms in Dundee, MS to determine the effect of multiple herbicide applications and programs on GR-Palmer amaranth control. The experiment was initiated in grower's field with heavy natural infestations of glyphosate-resistant Palmer amaranth. Applications were initiated when Palmer amaranth plants were 20 to 25 cm in height as well as 40 to 50 cm in height beginning at each pre-determined timing, either one, two, or three herbicide applications were made. For treatments receiving two applications, the second application was made two weeks after the initial application regardless when treatments were initiated. For treatments receiving three applications, the third application was made two weeks after the second application regardless when treatments were initiated. Applications were made with a CO₂ powered backpack sprayer at a pressure of 317 kPa and an application volume of 140 L/ha. Treatments utilized in this experiment included: glyphosate + dicamba at 0.8 kg ae/ha and 0.6 kg ai/ha; glufosinate + dicamba at 0.6 kg ai/ha each; glyphosate + 2, 4-D at 0.8 kg ae/ha and 1.1 kg ae/ha; glufosinate + 2, 4-D at 0.6 kg ai/ha and 1.1 kg ae/ha. All herbicide treatments were applied using Turbo Teejet Induction 110015 tips. Visual estimates of weed control, the number of Palmer amaranth plants per square meter, count reduction of Palmer amaranth plants per square meter, height of Palmer amaranth plants per square meter, and height reduction of Palmer amaranth plants per square meter were collected at two and four weeks after each herbicide application. Experiments were conducted using a factorial arrangements of treatments in a randomized complete block design with four replications. Visual estimates of weed control, number of plants per square meter, count reduction, plant height, and plant height reduction were subjected to analysis of variance and means were separated using Fisher's Protected LSD at p = 0.05.

Two weeks after final applications, two and three applications provided greater than 95% visual control when initial application was 20 and 25 cm in height, regardless of herbicide program. When initial applications were made to Palmer amaranth 40 and 50 cm tall, glufosinate + dicamba and glufosinate + 2, 4-D provided 99% height reduction two weeks after the third application. Two weeks after the second application, glyphosate + dicamba, glyphosate + 2, 4-D, glufosinate + dicamba, and glufosinate + 2, 4-D provided 60, 86, 79 and 85% height reduction, respectively, when initial applications were made to 40 to 50 cm Palmer amaranth. Treatments containing glufosinate provided significantly greater height reduction (>60%) compared to treatments containing glyphosate two weeks after initial application on 40 to 50 cm Palmer amaranth. Visual estimates of control indicated two and three applications provided significantly greater control (90 and 94%) compared to a single application at two weeks after final application when the initial application was made to 40 and 50 cm Palmer amaranth. Four weeks after final applications, two and three applications provided significantly greater reduction in the total number of plants per square meter (≥87%) compared to one application when the initial application was made to 20 and 25 cm Palmer amaranth. A similar trend for count reduction was observed at four weeks after final applications when initial applications were made to 40 and 50 cm Palmer amaranth. Visual estimates of weed control were significantly greater for two and three applications (96 and 98%) compared to one application four weeks after final applications when plans were 40 to 50 cm tall at the time of initial application.

No significant differences with respect to application timing or herbicide were observed for percent height reduction when treatments were initiated to 20 to 25 cm Palmer amaranth. Multiple applications of any of the herbicide combinations tested will be needed in a rescue application scenario.