Mississippi Corn Promotion Board
2020 Progress Report

Title: Residual Activity of Atrazine, Dual II Magnum, Metribuzin, Lexar, Callisto, Prowl, Outlook, Zidua, Corvus, Impact, Capreno, Warrant, and Acuron on Glyphosate-Resistant Palmer Amaranth

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Project Summary

Palmer amaranth (Amaranthus palmeri) control has become a challenge because of its high propensity to evolve herbicide resistance, resulting in reduced herbicide options in infested crops such as corn, soybean, and cotton. A field study was conducted in 2020 at the Delta Research and Extension Center, in Stoneville, Mississippi, to evaluate the residual activity of Atrazine, Dual II magnum, Metribuzin, Lexar, Callisto, Prowl, Outlook, Zidua, Corvus, Impact, Capreno, Warrant, and Acuron, on glyphosate-resistant Palmer amaranth. The experiment was conducted as a randomized complete block design with 18 herbicide treatments and four replications. Plot size was 4 (40 inch) rows 13.3-ft wide by 20-ft long with 10-ft alleys between replications. Also, glyphosate-resistant Palmer amaranth seed was broadcasted in the entire experiment site to make sure for uniform Palmer amaranth distribution per plot. Visual estimates of glyphosate-resistant Palmer amaranth emergence/control were recorded at prescribed intervals after peremergence herbicide applications on May 14. The following herbicide treatments were used: 1) Dual II Magnum; 2) Atrazine; 3) Dual II Magnum + Atrazine; 4) Outlook; 5) Outlook + Atrazine; 6) Callisto; 7) Callisto + Atrazine; 8) Callisto + Atrazine + Dual II Magnum; 9) Metribuzin; 10) Metribuzin + Dual II Magnum; 11) Corvus; 12) ImpactZ; 13) Prowl; 14) Lexar; 15) Capreno; 16) Zidua; 17) Warrant; and 18) Acuron. A nontreated check was included in the study. The visual Palmer amaranth control was evaluated 2, 3, 4, 5, 6, and 7-weeks after herbicide application.

Project Results/Outcomes

Glyphosate-resistant Palmer amaranth control was 86, 95, 100, 94, 100, 97, 100, 100, 95, 96, 96, 94, 75, 100, 80, 88, 70, and 99% for herbicide treatment 1 through 18 by four-weeks after herbicide application, respectively. By seven-weeks after herbicide treatment, the glyphosate-resistant Palmer amaranth control was 60, 73, 76, 75, 76, 74, 88, 95, 84, 81, 83, 73, 28, 90, 40, 74, 45, and 94% for treatment 1 through 18, respectively. In summary, only three residual herbicide treatment of Callisto + Atrazine + Dual II Magnum, Lexar, and Acuron provided the best and longer residual activity of up to seven weeks for glyphosate-resistant Palmer amaranth control (> 90%). The other weed species was evaluated as follows: entireleaf morningglory (Ipomoea hederacea Jacq. var. integriuscula), prickly sida (Sida spinosa), and barnyardgrass (Echinochloa crus-galli). Also, the data from this experiment may be used to update the herbicide ratings chart in Mississippi Weed Control guidelines.

Project Impacts/Benefits

This research needs to be repeated over time (at least for 2 more years) to verify these results.

Project Deliverables

The detail of this research will be presented at Southern Weed Science Society in 2021.