Improving Agronomic Performance in Mississippi Soybean Production Systems. 42-2020

Quarter 4 & Final

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Cool and wet conditions during planting season in Mississippi have led to non-uniform emergence of corn (*Zea mays* (L.) and soybean [*Glycine max* (L.) Merr.]in recent years. In cases necessitating replanting, questions on herbicide treatments and application timings for termination of failed stands of corn and soybean were common. Therefore, research was conducted to identify optimum herbicide treatment and application timing combinations for control of simulated failed stands of corn and soybean.

Two studies (Corn Study and Soybean Study) were conducted in 2020 at the Delta Research and Extension Center in Stoneville, MS. Both studies were designed as a two-factor factorial in a randomized complete block with four replications. For the Corn Study, Factor A was herbicide treatment and included paraquat at 0.84 kg ai ha^{-1} plus (COC) at 0.5% v/v, paraquat at 0.84 kg ai ha^{-1} plus metribuzin at 0.21 kg ai ha^{-1} plus COC at 0.5% v/v, or glyphosate at 1.12 kg ae ha^{-1} plus clethodim at 0.053 kg ai ha^{-1} plus NIS at 0.25% v/v. Factor B was application timing and included applications to corn in the cotyledon stage (VC) and 5 (VC + 5 d), 10 (VC + 10 d), 15 (VC + 15 d), or 20 (VC + 20 d) after VC. A nontreated control was included for comparison. All levels of both factors in the Soybean Study were similar to the Corn Study except glyphosate plus clethodim was not included as a herbicide treatment. Control of corn or soybean was visibly estimated 3 and 14 d after treatment (DAT). . All data were subjected to ANOVA and estimates of the last square means were used for mean separation at $p \leq 0.05$.

The addition of metribuzin to paraquat improved control 8 to 54% 3 DAT compared with paraquat alone for all application timings. Paraquat plus metribuzin and glyphosate plus clethodim controlled more corn 14 DAT than paraquat alone across all application timings. Glyphosate plus clethodim controlled simulated failed corn stand 14 DAT as well as paraquat plus metribuzin with applications made at VC + 5, 15, or 20 d. Control with paraquat plus metribuzin was optimized at VC + 5 d.

Soybean control 3 DAT was greatest with applications at VC + 10 d. Control with applications at VC + 5 and 20 d was similar, and this control was greater than with VC applications. Soybean control 14 DAT was similar and $\leq$73% following paraquat or paraquat plus metribuzin applied at VC. Control with paraquat plus metribuzin was optimized at 96 to

99% with applications at VC + 5 d. For maximum soybean control with paraquat alone, applications needed to be delayed until VC + 15 or 20 d.

In conclusion, clethodim plus glyphosate was effective for control of simulated failed corn stand from VC to VC + 20 d. Paraquat plus metribuzin controlled failed stands of corn and soybean, but both can be both too small or large for optimal control.