UTILIZATION OF SEQUENTIAL HERBICIDE APPLICATIONS AND TANK MIX COMPONENTS TO IMPROVE GLYPHOSATE EFFICACY. Ryan P. Miller, Lisa M. Behnken, Fritz R. Breitenbach, and Jeffery L. Gunsolus, Assistant Extension Professor, University of Minnesota, Rochester Regional Center, Rochester, MN 55904-4915, Extension Professor, University of Minnesota, Rochester Regional Center, Rochester, MN 55904-4915, Associate Extension Professor, University of Minnesota, Rochester Regional Center, Rochester, MN 55904-4915, and Professor, Department of Agronomy and Plant Genetics, University of Minnesota, St. Paul, MN 55108-6026.

Field research was conducted at Rochester, MN in 2007 to determine which tank mix components and sequential applications improved glyphosate efficacy. Sequential treatments included: preemergence products followed by glyphosate, tank mixtures including glyphosate or two postemergence glyphosate treatments. A randomized complete block design with four replications was used. Soybean variety 'Dairyland DSR 199'was planted 3.8 cm deep in 76 cm rows at a rate of 370,500 seeds ha^{-1} on May 17, 2007. All herbicide applications were made with a tractor-mounted sprayer delivering 187 l ha^{-1} at 221 kpa using 11002 flat fan nozzles. Adequate rainfall was received after each treatment date. Preemergence applications were made on May 18th, the first postemergence treatment was made to 7.5-12.5 cm tall weeds on June 15, and sequential postemergence treatments were made to 7.5-12.5 cm tall weeds on June 20th and to 5-7.5 cm weed regrowth on July 6th. A reduced rate of 0.42 kg ae glyphosate ha^{-1} was used to better determine the effect of corresponding tank mix and sequential treatments. Preemergence treatments included: flumioxazin and cloransulam-methyl at 89 & 29.4 g ai ha^{-1} (Gangster); flumioxazin at 89 g ai ha^{-1} (Valor); sulfentrazone and cloransulam-methyl at 130 & 16.6 g ai ha^{-1} (Sonic); s-metolachlor and fomesafen at 0.53 & 116 g ai ha^{-1} (Prefix), and sulfentrazone and metribuzin at 126 & 189 g ai ha^{-1} (Authority MTZ). Postemergence treatments were 0.42 kg ae glyphosate ha^{-1} alone or tank mixed with one of the following components: fomesafen at 197 g ai ha^{-1} (Flexstar); lactofen at 105 g ai ha^{-1} (Cobra); flumiclorac pentyl ester at 30 g ai ha^{-1} (Resource); cloransulam methyl at 19.4 g ai ha^{-1} (FirstRate); chlorimuron ethyl at 4.37 g ai ha^{-1} (Classic); chlorimuron ethyl at 6.63 g ai ha^{-1} (Classic); chlorimuron ethyl and thifensulfuron methyl at 5.7 & 1.8 g ai ha^{-1} (Synchrony XP), thifensulfuron methyl at 17.4 g ai ha^{-1} (Harmony GT), imazethapyr at 70 g ai ha^{-1} (Pursuit). Weeds were visually rated for percent control on June 6, 14, 20 and July 6, 18, and September 14. Plots were machine harvested and yields were calculated and adjusted to 13.5% moisture. Sequential treatments that included a preemergence application tended to have greater grain yields and better weed control than sequential glyphosate treatments or glyphosate with the various tank mix treatments.

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