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 and 2008 to determine which tank mix components and sequential applications improved glyphosate efficacy. 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. In 2008 soybean variety 'Dairyland DSR 1302' was planted 3.8 cm deep in 76 cm rows at a rate of 370,500 seeds ha^{-1} on May 23, 2008. All herbicide applications were made with a tractor-mounted sprayer delivering 187 l ha^{-1} at 221 kpa using 11002 flat fan nozzles. Treatments were made according to label instructions and adequate rainfall was received after each treatment date. 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. In 2007 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). In 2008 several preemergence treatments were added inclunding: sulfentrazone and imazethapyr at 346.6 & 70.4 g ai ha^{-1} (Authority Assist), chlorimuron ethyl, flumioxazin, and thifensulfuron methyl at 5.6, 71, and 17.25 g ai ha^{-1} (Enlite), and pendimethalin at 1596.5 g ai ha^{-1} (Prowl H_2O). All preemergence treatments were followed by a postemergence treatment. 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). In 2008 fluthiacet-methyl at 3.2 g ai ha^{-1} (Cadet) was added as a tank mix treatment. Weeds were visually rated for percent control and plots were machine harvested and yields were calculated and adjusted to 13% moisture. Sequential treatments that included a preemergence application tended to have greater grain yields and better weed control than postemergence tank mix treatments.