INFLUENCE OF APPLICATION TIMING ON CONTROL OF STAR-OF-BETHLEHEM. Jennifer A. Hagerman, Bryan G. Young, and John E. Preece, Graduate Research Assistant, Associate Professor, and Professor, Southern Illinois University, Carbondale, IL 62901.

Star-of-Bethlehem is a bulbous perennial weed that has become increasingly problematic in certain no-till agricultural sites during spring field operations and early crop establishment. Seed production by star-of-Bethlehem is thought to be rare in the United States, making bulb management crucial for control. Star-of-Bethlehem emerges in late fall to early winter and appears to initiate bulblet growth prior to the blooming period which begins in early to mid-April. The greatest susceptibility of star-of-Bethlehem to selected herbicides can be determined by targeting various physiological stages of bulb development, prior to flowering.

Field research was conducted at Marion, IL in 2004 and Murphysboro, IL in 2005 to evaluate the efficacy of paraquat, glyphosate, flumioxazin, and combinations of paraquat + flumioxazin and glyphosate + flumioxazin for control of star-of-Bethlehem at three preplant application timings staggered by three-week intervals starting in early-March. Foliar control was evaluated 21 days after treatment (21 DAT) and one year after treatment (1 YAT). In general, foliar control of star-of-Bethlehem 21 DAT increased as application timing was delayed. For instance, control increased from 47 to 99% when paraquat was applied in early-March versus the mid-April application in 2004. Paraquat, flumioxazin and the tank mixtures provided similar control of star-of-Bethlehem 21 DAT, within each application timing. Glyphosate applied alone was the least effective treatment 21 DAT, with 15% or less star-of-Bethlehem control, regardless of application timing or year. At Marion, the greatest control of star-of-Bethlehem (96%) at 1 YAT was from the mid-March application of treatments containing paraquat. For the mid-April timing, control with flumioxazin was 45% or less 1 YAT, compared with 99% control observed 21 DAT, indicating that the efficacy of flumioxazin on star-of-Bethlehem is not sustained for long-term management. Control of star-of-Bethlehem from glyphosate was 30% or less, 1 YAT. Total bulb density was reduced by 99% with paraquat and paraquat + flumioxazin 1 YAT for the mid-March application timing. Glyphosate alone reduced total bulb density by 44% or less 1 YAT and increased total bulb density by 143% at the early March application timing, with most of the increase occurring in medium (0.5 to 1.0 cm) and large (> 1.0 cm) sized bulbs. Flumioxazin reduced total bulb density by 27% or less 1 YAT, regardless of application timing. Thus, paraquat applied in mid-March provided the greatest efficacy for both short- and long-term management of star-of-Bethlehem.

2005 North Central Weed Science Society Proceedings 60:136.