

PREEMERGENCE HERBICIDES TO MANAGE EARLY-SEASON WEED COMPETITION IN CORN. Timothy L. Trower, Chris M. Boerboom, and Joseph D. Bollman, Senior Outreach Specialist, Professor, and Graduate Student, University of Wisconsin, Madison, WI 53706.

Planned postemergence herbicide programs in corn have an inherent risk because early-season weed competition may reduce grain yields if early emerging weeds are not managed. Field studies were conducted at Arlington, WI in 2005 and 2006 to determine the efficacy of reduced rates of preemergence herbicides at managing early season weed growth in field corn. Selected preemergence herbicides were applied alone or followed with glyphosate. A nontreated control and glyphosate-only treatment were included as controls. Acetochlor at 1.1 kg ai ha⁻¹, atrazine at 0.84 kg ai ha⁻¹, flufenacet at 0.35 kg ai ha⁻¹, isoxaflutole at 40 g ai ha⁻¹, pendimethalin at 0.67 kg ai ha⁻¹, s-metolachlor at 0.85 kg ai ha⁻¹, and mesotrione plus s-metolachlor at 0.11 plus 1.1 kg ai ha⁻¹ were applied after planting glyphosate-resistant corn. Two 0.25 m² permanent quadrats were established in each 3 by 8 m plot. Weed density and height were counted and measured at near weekly intervals, except that the isoxaflutole treatment was not recorded in 2005. When average weed height reached 13 cm, glyphosate was applied postemergence at 0.84 kg ae ha⁻¹ in the designated treatments. Corn was harvested for yield and grain was adjusted to 15.5% moisture. The study had a randomized complete block design with four replications.

Giant foxtail and common lambsquarters were the dominant weed species in the studies. All of the preemergence herbicides reduced the density and height of at least one of the weed species in both years at the time glyphosate was applied. Atrazine was the least effective in reducing giant foxtail density compared to the nontreated control, averaging a 46% reduction in 2005 and no reduction in density in 2006. Acetochlor controlled 100% of the giant foxtail in 2005 while s-metolachlor reduced foxtail density by 98% in 2006. Atrazine in both years and pendimethalin in 2006 reduced giant foxtail height the least compared to the nontreated control. In 2005, s-metolachlor plus mesotrione reduced giant foxtail plant height the most in the treatments in which giant foxtail survived while s-metolachlor reduced height the most in 2006. S-metolachlor plus mesotrione and atrazine in both years and isoxaflutole in 2006 controlled 100% of the common lambsquarters. S-metolachlor reduced common lambsquarters density the least in both years with 26% and 83% reductions. Of the treatments with surviving common lambsquarters, acetochlor and pendimethalin reduced plant height the most at 80% and s-metolachlor reduced height the least at 20% in 2005. Acetochlor, s-metolachlor, pendimethalin, and flufenacet all reduced plant height by 33% in 2006.

All preemergence herbicides yielded more than the nontreated control in both years. The nontreated controls yielded 3,760 kg ha⁻¹ in 2005 and 3,130 kg ha⁻¹ in 2006. In 2005, yields with preemergence herbicides ranged from a low of 5,960 kg ha⁻¹ with s-metolachlor to a high of 12,290 kg ha⁻¹ with s-metolachlor plus mesotrione. In 2006, yields ranged from a low of 6,080 kg ha⁻¹ with pendimethalin to a high of 12,610 kg ha⁻¹ with s-metolachlor plus mesotrione. The yield increase attributed to the sequential glyphosate application varied by year. In 2005, three of seven sequential treatments yielded more than the respective preemergence herbicide alone. However, six of seven sequential treatments increased the yield compared to the preemergence herbicide applied alone in 2006. Yield differences between the sequential herbicide programs and the single postemergence glyphosate application were mixed. Four of seven sequential programs yielded more than the single glyphosate application in 2005 while only two of seven treatments yielded more in 2006.

Giant foxtail and common lambsquarters were effectively controlled with reduced rates of select preemergence herbicides due to their weed spectrum. Consequently, these preemergence herbicides reduced early-season weed competition and often provided corn yields greater than when glyphosate was applied alone. The reduced early-season competition resulted from a combination of reduced weed

density and height. This suppression may allow postemergence herbicides to be applied over a longer time period while minimizing risk.