

## Role of preemergence herbicides in Roundup Ready<sup>®</sup> crops. I. Protecting yields.

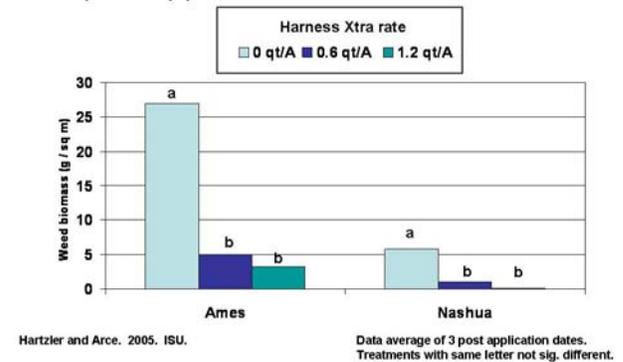
One of the primary advantages of Roundup Ready<sup>®</sup> crops is glyphosate's ability to consistently control larger weeds than other postemergence herbicides. This is a tremendous benefit for large farms and in situations when conditions prevent timely herbicide application. However, this benefit creates the risk of delaying application beyond the time when weeds have begun to compete with crops, therefore resulting in significant yield losses. One method of reducing the risk of early-season competition is the use of preemergence herbicides to reduce densities of weeds that emerge with the crop.

Experiments were conducted in conventional tillage corn and soybean to determine the effectiveness of low rates of preemergence herbicides at preventing early-season competition. Harness Xtra<sup>®</sup> 6L (0, 0.6 or 1.2 qt/A) was used in corn, whereas in soybean INTRRO<sup>®</sup> (alachlor) was applied at 0, 1 or 2 qt/A. Within each preemergence treatment, glyphosate (29 oz Roundup WeatherMax<sup>®</sup> /A) was applied at either the V2, V4 or V6 stage of crop development; a full-season competition treatment receiving no glyphosate was also included. A second glyphosate application was made in the V2 and V4 treatments to eliminate any late-emerging weeds. Weed biomass at the time of glyphosate application was determined by harvesting weeds within four arbitrarily selected 1 ft<sup>2</sup> quadrats within each plot. End of season biomass was also determined in plots not treated with glyphosate.

Both rates of Harness Xtra<sup>®</sup> reduced weed biomass by at least 80% at the two experiments (Figure 1). Giant foxtail, velvetleaf and

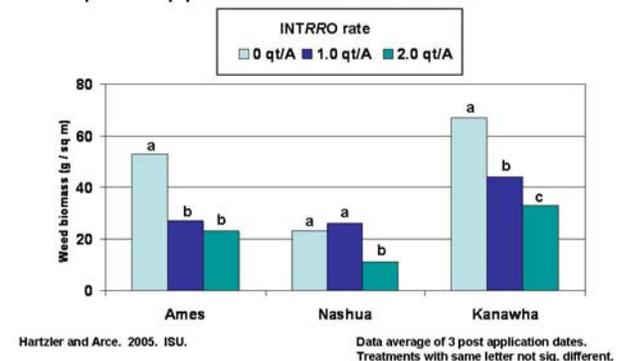
cocklebur were the primary weeds escaping control at Ames, whereas at Nashua velvetleaf was the species that most commonly escaped the preemergence treatment.

Figure 1. Reduction in weed biomass at post application due to Harness Xtra.



INTRRO<sup>®</sup> reduced weed biomass less than Harness Xtra<sup>®</sup> (Figure 2). At Ames, both rates reduced weed biomass by approximately 50%. At Nashua only the 2 qt rate reduced weed biomass, whereas at Kanawha weed biomass was reduced 35 and 50% by 1 and 2 qt of INTRRO<sup>®</sup>, respectively.

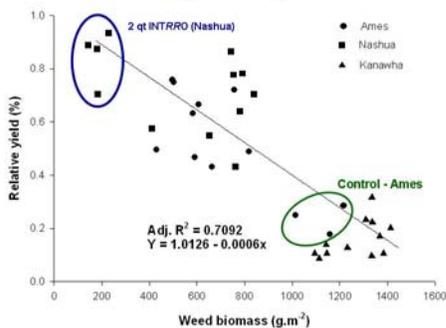
Figure 2. Reduction in weed biomass at post application due to INTRRO.



Weed densities were relatively low (< 10 weeds / ft<sup>2</sup>) at most experiments, thus yields were only affected by early-season competition at Kanawha. Soybean yields were reduced 17% when glyphosate application was delayed until the V6 stage with no preemergence herbicide. INTRRO<sup>®</sup> at 1 and 2 qt/A resulted in 1 and 10% yield loss, respectively, with the same post application timing. Thus, the preemergence herbicide provided greater application flexibility at the site with high weed densities, but at sites with lower weed densities yields were not affected when weeds were controlled as late as the V6 crop stage.

The relationship between weed biomass and full-season competition at the three soybean experiments is shown in Figure 3. As one would expect, yield losses increased with end-of-season weed biomass.

Figure 3. Relationship between weed biomass and soybean yield loss



Hartzler and Arce. 2005. ISU.

Preemergence herbicides can provide growers protection from early-season competition in Roundup Ready<sup>®</sup> crops. The preemergence herbicide does not need to provide complete weed control since a planned postemergence glyphosate application will be made. Thus, reduced rates can be used in order to reduce costs. In order to widen the application window for glyphosate, the preemergence herbicide must have good activity on the dominant weeds found in the field. In these experiments, INTRRO<sup>®</sup> reduced weed biomass less than Harness Xtra<sup>®</sup> since INTRRO<sup>®</sup>

(alachlor) is not as broad-spectrum as the combination of acetochlor and atrazine found in Harness Xtra<sup>®</sup>.

The role of preemergence herbicides in reducing the risk of selecting glyphosate resistant weeds is discussed in another article:

<http://www.weeds.iastate.edu/mgmt/2006/rolepre2.pdf>

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