

WEED REMOVAL TIMING IN ROUNDUP READY CORN

Reid J. Smeda
Associate Professor
Chad L. Smith
Graduate Student

Introduction:

Much research indicates early season weed competition can significantly impact corn development and grain yield. Preemergence (PRE) herbicides prevent early season weed competition; however since the advent of glyphosate-resistant corn in 1999, weed control have began to shift towards more postemergence (POST) oriented programs. The timing of POST based programs is critical to minimize early season weed competition, which is usually reduced using a PRE herbicide. Glyphosate-resistant corn allows more flexibility in POST herbicide programs. Research at the University of Missouri indicates that delayed herbicide applications lead to nitrogen loss and reduced crop yield, especially in areas under intense grass pressure. Further research is needed to evaluate the proper removal timings of weeds in order to maximize nitrogen use in glyphosate-resistant corn.

Objective:

To determine the optimal weed removal timing for grasses and broadleaves in glyphosate-resistant corn by measurement of nitrogen accumulation and grain yield.

Materials and Methods:

Glyphosate-resistant corn was planted in 30 inch rows on April 29, 2004. Prior to planting, 150 lbs of nitrogen was broadcast over the experimental area. To ensure adequate grass pressure, large crabgrass and barnyardgrass seed was also broadcast across the plots. Plots containing only broadleaf pressure were accomplished by making a PRE application of Dual II magnum (*s*-metolachor) at a reduced rate. Plots containing only grass pressure were accomplished by early POST applications of 2,4-D. The weed-free check had a PRE application of Degree Xtra (acetochlor & atrazine) followed by sequential POST applications of glyphosate. An untreated treatment was also included to determine the maximum impact of weeds on the crop. Prior to the removal of the weeds, weed densities were counted by species, harvested and with dry weights taken to evaluate the total biomass. The removal timings of the weeds were done with glyphosate at the timings described in Table 1. Plant nitrogen was estimated throughout the season with a Minolta SPAD-502 chlorophyll meter on treatments 1, 8, 11, 12, and 16. At the end of the season, corn stalks were harvested and evaluated for nitrate accumulation and the grain yield was determined from the center 2 rows of each treatment and adjusted to 15.5% moisture.

Table 1. List of treatments used to evaluate weed removal timing.

Trt. No	Herbicides	Rate	Rate Unit	App. Timing
1	UNTREATED			
2	ROUNDUP WEATHERMAX	21.3	OZ/A	2-4" WEEDS
	ROUNDUP WEATHERMAX	21.3	OZ/A	2-4"
	ROUNDUP WEATHERMAX	21.3	OZ/A	REGROWTH
3	ROUNDUP WEATHERMAX	21.3	OZ/A	2-4" WEEDS
	ROUNDUP WEATHERMAX	21.3	OZ/A	4-6"
	ROUNDUP WEATHERMAX	21.3	OZ/A	REGROWTH
4	ROUNDUP WEATHERMAX	21.3	OZ/A	2-4" WEEDS
5	ROUNDUP WEATHERMAX	21.3	OZ/A	4-6" WEEDS
	ROUNDUP WEATHERMAX	21.3	OZ/A	2-4"
	ROUNDUP WEATHERMAX	21.3	OZ/A	REGROWTH
6	ROUNDUP WEATHERMAX	21.3	OZ/A	4-6" WEEDS
	ROUNDUP WEATHERMAX	21.3	OZ/A	4-6"
	ROUNDUP WEATHERMAX	21.3	OZ/A	REGROWTH
7	ROUNDUP WEATHERMAX	21.3	OZ/A	4-6" WEEDS
8	DEGREE XTRA	3.7	QT/A	PRE
	ROUNDUP WEATHERMAX	21.3	OZ/A	4-6" WEEDS
9	2,4-D ESTER	0.5	PT/A	EPOST BLW
9	ROUNDUP WEATHERMAX	21.3	OZ/A	5" GRASSES
10	2,4-D ESTER	0.5	PT/A	EPOST BLW
	ROUNDUP WEATHERMAX	21.3	OZ/A	7.5" GRASSES
11	2,4-D ESTER	0.5	PT/A	EPOST BLW
	ROUNDUP WEATHERMAX	21.3	OZ/A	10" GRASSES
12	2,4-D ESTER	0.5	PT/A	EPOST BLW
	ROUNDUP WEATHERMAX	21.3	OZ/A	12.5" GRASS
13	DUAL II MAGNUM	1	PT/A	PRE
	ROUNDUP WEATHERMAX	21.3	OZ/A	2-4" BLW*
14	DUAL II MAGNUM	1	PT/A	PRE
	ROUNDUP WEATHERMAX	21.3	OZ/A	4-6" BLW*
15	DUAL II MAGNUM	1	PT/A	PRE
	ROUNDUP WEATHERMAX	21.3	OZ/A	6-8" BLW*
16	DUAL II MAGNUM	1	PT/A	PRE
	ROUNDUP WEATHERMAX	21.3	OZ/A	8-10" BLW*

*BLW = Broadleaf weeds

Results:

For 2003, the SPAD-502 chlorophyll meter values indicate that through 90 days after planting the weed-free check were on average 25% higher than the weedy check. However, by the end of the season, differences were minimal among the measured treatments. The collected weed biomass showed that the initial removal timing of 4-6 inch mixed weeds had 1.7 times more biomass when compared to the initial removal timing of 2-4 inches. Yields followed this trend as well, with the earlier initial removal timing of 2-4 inches having overall greater yields than the delayed 4-6 inches initial timing. In the broadleaf only treatments, there was a minimal effect on yield by the 2-4 inch and 4-6 inch weeds, however the 8-10 inch broadleaf plots had almost as great of effect on yield as the 12.5 inch grass plots.