KEMP, NATHAN J.[1]*, KAREN A. RENNER[1], TERESA CROOK[2], and LEE HUBBLE[3], [1]Michigan State University, East Lansing, MI 48824, [2]Michigan Sugar Company, Caro, MI 48723, [3]Monitor Sugar Company, Bay City, MI 48706. Weed Competitiveness in Glyphosate- and Glufosinate- Resistant Sugarbeet.

ABSTRACT

The introduction of glyphosate and glufosinate resistant sugarbeet will allow growers new options for weed control. Unlike conventional sugarbeet herbicides that are affected by application time of day, weed size, and crop growth, glyphosate and glufosinate can be applied to genetically modified species under a wide range of conditions. Michigan State University conducted research in cooperation with Michigan and Monitor Sugar Companies evaluating the performance of genetically modified sugarbeet. The objective of this research was to examine weed competitiveness with sugarbeet and to determine if late-emerging weeds reduce sugarbeet yield. Research consisted of six trials located at three sites in Michigan. Each trial was arranged in a randomized complete block design with four replications. Glyphosate and glufosinate were applied at 0.56 lb/A and 0.26 lb/A respectively to weeds less than 4 inches in height, and 0.75 lb/A and 0.36 lb/A respectively to weeds greater than 4 inches in height. The predominant weeds at each location were common lambsquarters and redroot pigweed. Glyphosate or glufosinate was applied postemergence to the appropriate transgenic beet variety when weeds reached 1, 2, 4, or 8 inches in height. Following herbicide application, plots were maintained weed-free for the duration of the growing season. Within the same experiment, treatments evaluated differing duration of weed-free conditions. Additional treatments evaluated the effect of two versus three postemergence applications of glyphosate or glufosinate.

Sugarbeet yield was not significantly reduced until weeds were not removed before reaching 4 inches or greater in height. This suggested that in 1998 weeds were not competitive with sugarbeet until 6 weeks after planting. Sugarbeet yield was reduced when weed-free conditions were maintained only 4 to 5 weeks after planting. Yield increased if weed-free conditions were extended until 8 weeks after planting. There was no difference in sugarbeet yield when comparing the effects of two versus three glyphosate or glufosinate applications made during the same four-week period.