EFFECT OF PREEMERGENCE AND POSTEMERGENCE HERBICIDES ON SUGARBEET YIELD AND QUALITY. Trevor M. Dale, Karen A. Renner, Graduate Research Assistant and Professor, Department of Crop and Soil Sciences, Michigan State University, East Lansing, MI 48824, James Stewart, Research Manager, Michigan Sugar Company, Carrollton, MI 48724 and Lee Hubbell, Research Manager, Monitor Sugar Company Bay City, MI 48707.

Sugarbeet weed control in Michigan has followed a program approach with both PRE and POST herbicide applications. Cycloate, pyrazon, or ethofumesate are applied PRE to provide residual weed control, and POST herbicides such as desmedipham & phenmedipham + triflusulfuron + clopyralid, are then applied twice (commonly referred to as a standard split application) to control weeds not controlled by the PRE herbicides. Weed control is very expensive and cultivation or hand labor is frequently needed. In 2000 the "micro-rate," a combination of desmedipham & phenmedipham at 0.09 kg/ha or desmedipham & phenmedipham & ethofumesate at 0.09 kg a.i./ha + triflusulfuron at 0.004 kg/ha + clopyralid at 0.03 kg/ha + 1.5% methylated seed oil (MSO), received registration in Michigan. The micro-rate provides good to excellent annual weed control and allows the grower to apply POST herbicides throughout the day and not just in the evening. However, the timing of the four to five micro-rate applications is important to achieve complete weed control and some growers have reported more injury from micro-rate applications.

The objective of this study was to evaluate weed control, sugarbeet injury, yield, and quality under various herbicide programs. Herbicide treatments consisted of a factorial arrangement of five PRE herbicides, including no PRE, cycloate at 3.36 kg a.i./ha, pyrazon at 8 kg a.i./ha, ethofumesate at 1.68 kg a.i./ha, s-metolachlor at 1.42 kg a.i./ha, and five POST herbicides, including no POST, desmedipham & phenmedipham at 0.56 kg/ha + triflusulfuron at 0.017 kg/ha, desmedipham & phenmedipham & ethofumesate at 0.56 kg/ha + triflusulfuron at 0.017 kg/ha, desmedipham & phenmedipham at 0.09 kg/ha + triflusulfuron at 0.004 kg/ha+clopyralid at 0.03 kg/ha + 1.5% MSO, desmedipham & phenmedipham & ethofumesate at 0.09 kg/ha + triflusulfuron at 0.004 kg/ha + clopyralid at 0.03 kg/ha + 1.5% MSO. The experimental design was a split plot with POST treatments as the main plot and PRE treatments as the sub-plots. There were three locations, and each location had the same design with four replicates. PRE only treatments were hand weeded to determine the effect of herbicide only on sugar beet yield and quality.

Common lambsquarters control was greater than 91% in all treatments combined over locations. However, common lambsquarters control at one location increased significantly from 95% with POST herbicides to 99% when PRE herbicides were followed by POST herbicides. Redroot pigweed control was excellent with all treatments at two locations. At the site with the highest pigweed density, redroot pigweed control with the standard split application of desmedipham & phenmedipham + triflusulfuron provided 91% control, while the micro-rate of desmedipham & phenmedipham + triflusulfuron + clopyralid + MSO provided 99% control when combined over PRE herbicides.

Sugarbeet injury did not differ due to herbicide treatment when combined over locations. Sugarbeet stand and yield were reduced at one site from cycloate PRE compared to the no PRE treatment when combined over all POST treatments.