

HENNINGSSEN, J. DANIEL\*, DON W. MORISHITA and DONALD L. SHOUSE, University of Idaho, Twin Falls R&E Center, P. O. Box 1827, Twin Falls, ID 83303. **Herbicide, insecticide and fungicide tank mixtures with glyphosate in glyphosate-tolerant sugar beet.**

### ABSTRACT

2008 marked the first year of full-scale glyphosate tolerant sugar beet production in the US. There have been few reported problems with weed control in other glyphosate-tolerant crops when glyphosate is tank mixed with other herbicides, insecticides or fungicides. However, it is unknown if any potential problems can occur in glyphosate-tolerant sugar beet. Currently, the glyphosate label does not list any approved tank mixtures with other pesticides used in sugar beet. The glyphosate label states “tank mixtures of this product with herbicides, insecticides or fungicides may result in crop injury or reduced weed control.” Based on this label information, we determined there was need for information on the compatibility of glyphosate with other pesticides used on glyphosate-tolerant sugar beet. Field studies have been conducted from 2003 to 2008 to evaluate herbicide tank mixtures and to begin investigating potential interactions with insecticides and fungicides tank mixed with glyphosate for use on glyphosate-tolerant sugar beet. This paper includes data from studies conducted in 2007 and 2008.

The experimental design for all studies was a randomized complete block with four replications. Plots were four rows wide by 30 ft with 22-inch row widths. Sugar beet was planted April 14, 2007 and April 16, 2008 at 57,000 seed/acre. Pesticide applications were made at the pre-emergence, 2-leaf, 6-leaf and/or 10 leaf growth stages depending on pesticide and particular study parameter. The insecticides tank mixed with glyphosate in 2007 included esfenvalerate, chlorpyrifos, and zeta-cypermethrin. Methomyl and oxamyl were added in 2008. The fungicides tank mixed with glyphosate in 2007 were trifloxystrobin and azoxystrobin. In 2008, prothioconazole was included. The herbicides tank mixed with glyphosate in 2007 included cycloate, dimethenamid-P, EPTC, ethofumesate, and trifluralin. Metolachlor was substituted for trifluralin in 2008. Crop injury and weed control were evaluated June 14 and July 10, 2007 and June 24 and October 1, 2008. Common lambsquarters, kochia, redroot pigweed, hairy nightshade, green foxtail and barnyardgrass were the species evaluated. The center two rows were harvested mechanically October 2 and 15, 2007 and 2008, respectively.

With the glyphosate plus insecticide treatments, there was no crop injury or lack of weed control with any of the tank mixtures and thus, no difference in sugar beet yield among treatments in either year. In comparing glyphosate plus fungicide treatments, early season (June 24) weed control in 2008 was equal among the fungicides tank mixed with glyphosate. In 2007, a slight reduction in common lambsquarters and grass weed control was observed early in the season, but not at mid-season. In 2008, late season common lambsquarters and redroot pigweed control was best with glyphosate + azoxystrobin followed by glyphosate alone. All fungicides controlled green foxtail and barnyardgrass better than 70%. The generic glyphosate + azoxystrobin or glyphosate/metolachlor + azoxystrobin controlled the grasses better than glyphosate + trifloxystrobin, azoxystrobin, or prothioconazole. However, there was no difference in sugar beet yield among treatments. There was no crop injury from any of the glyphosate plus soil-active herbicide treatments. For common lambsquarters control, a single glyphosate application was not as good as two or three glyphosate applications or glyphosate tank mixtures. A single application of glyphosate + ethofumesate at any of the rates did not work as well as it had in our previous trials. EPTC and cycloate tank-mixtures with glyphosate controlled common

lambsquarters 90% at season end. There was no difference in redroot pigweed control except for the single application of glyphosate. A single application of glyphosate + ethofumesate at any of the rates used, provided the poorest kochia control late in the season except for the single glyphosate application. For grass control, all treatments controlled green foxtail and barnyardgrass early. Glyphosate + dimethenamid-P in any of the three combinations and glyphosate + EPTC or cycloate controlled barnyardgrass and green foxtail at season end  $\geq 90\%$ . All treatments except glyphosate + ethofumesate at any of the four rates tested (0.375, 0.5, 1.0, and 1.5 lb ai/A) had equal root yields.