

WEED CONTROL IN GLYPOSATE-RESISTANT SUGAR BEETS. Jeff M. Stachler, Alan G. Dexter, and John L. Luecke, Assistant Professor, Professor, and Research Specialist, Department of Plant Sciences, North Dakota State University and University of Minnesota, Fargo, ND 58108-6050.

Glyphosate-resistant sugar beet was commercially available for the first time in 2008 in North Dakota and Minnesota. Glyphosate-resistant canola, corn, and soybean can be weed problems in glyphosate-resistant sugar beet, requiring the use of conventional sugar beet herbicides for control. Glyphosate-resistant and tolerant weeds will be difficult to control in glyphosate-resistant sugar beet, requiring the use of conventional sugar beet herbicides to obtain control. Two small-plot field research studies were conducted. Glyphosate-resistant sugar beets were not planted at either location. At Prosper, ND, glyphosate-resistant canola, corn, and soybean were planted in rows perpendicular to the treated plot length to establish plants for evaluation. At this location, triflurosulfuron at 9 g ai/ha, clopyralid at 34 g ae/ha and 78 g ae/ha, clethodim (Select Max) at 34 and 78 g ai/ha, clethodim (2EC) at 34 and 78 g ai/h, quizalofop at 34 and 78 g ai/ha, and desmedipham plus phenmedipham plus ethofumesate (Progress) at 370 g ai/ha plus triflurosulfuron at 9 g/ha were applied in combination with glyphosate at 1.1 kg ae/ha plus AMS 2.8 kg/ha. A non-ionic surfactant, a MSO, and a high surfactant (methylated) oil were added to each of the lowest rate conventional sugar beet herbicides, with the exception of quizalofop and clethodim (2EC). All treatments were applied on June 19, 2008 and again on July 1st.

At 20 days after the last application, clopyralid controlled greater than 94% of the glyphosate-resistant soybean regardless of rate or adjuvant. Triflurosulfuron plus the oils and Progress plus triflurosulfuron plus the oils controlled 71 to 79% of the glyphosate-resistant soybean. No other herbicide combination provided greater than 70% control of glyphosate-resistant soybean. Only Progress plus triflurosulfuron plus oils or with no adjuvant controlled 43 to 48% of glyphosate-resistant canola. All other treatment combinations provided less than 29% control. Quizalofop, clethodim (2EC), and Select Max at any rate plus any adjuvant controlled greater than 92% of the glyphosate-resistant corn with the exception of clethodim (2EC) at 34 g/ha plus no adjuvant and plus non-ionic surfactant. Triflurosulfuron plus oils and Progress plus triflurosulfuron plus oils controlled 60 to 69% of glyphosate-resistant corn. No other treatments provided greater than 55% control of glyphosate-resistant corn.

The second study was established at Kindred, ND in a 2007 sugar beet field having ladysthumb, wild buckwheat, Powell amaranth, and redroot pigweed. Several treatments were investigated. The treatments of interest included ethofumesate applied PRE at 4.2 kg ai/ha followed by Progress at 135 g/ha plus triflurosulfuron at 4.5 g/ha plus clopyralid at 34 g/ha plus Select Max at 34 g/ha plus MSO at 1.5% v/v on May 22, 2008 followed by Progress at 179 g/ha plus previous products applied on May 29th and June 17th followed by Progress at 280 g/ha plus previous products applied on June 24th. All treatments containing glyphosate were applied at 1.1 kg/ha plus AMS at 2.8 kg/ha. Glyphosate was applied on May 22 and June 17th, May 22nd and June 24th, May 29th and June 24th, May 29th and July 1st, and May 22, June 17th, and July 1st. Ethofumesate at 4.2 kg/ha plus glyphosate was applied on May 22nd followed by glyphosate on June 24th. Glyphosate was applied on May 22nd followed by glyphosate plus dimethenamid at 1.1 kg ai/ha on June 17th. Glyphosate plus triflurosulfuron at 9 g/ha and glyphosate plus clopyralid were applied on May 29th and June 24th.

At 28 days after the July 1st application, the conventional herbicide treatment provided more effective control of ladysthumb, wild buckwheat, Powell amaranth, and redroot pigweed, than glyphosate applied on May 22nd and June 17. Glyphosate followed by glyphosate plus dimethenamid controlled 87% of ladysthumb compared to glyphosate applied on May 22nd and June 17th. Glyphosate

applied on May 29th and July 1st provided the most effective control of ladythumb at 94%. The conventional herbicide treatment controlled 89% of wild buckwheat compared to the two sequential glyphosate applications last sprayed on June 24th. Glyphosate plus triflurosulfuron followed by glyphosate plus triflurosulfuron controlled 83% of wild buckwheat compared to glyphosate applied on May 29th and June 24th. The conventional herbicide treatment, ethofumesate plus glyphosate followed by glyphosate, glyphosate followed by glyphosate plus dimethenamid, and sequential applications of glyphosate plus triflurosulfuron controlled 87, 66, 83, and 80% of Powell amaranth and redroot pigweed compared to the sequential glyphosate treatments last applied on June 17th and 24th ranging from 28 to 53%.

For maximum control of glyphosate-resistant crops in glyphosate-resistant sugarbeet, three different herbicides/combinations will be necessary. However, with additional research it may be possible to control all glyphosate-resistant crops with a single herbicide, triflurosulfuron. The proper timing and combination of conventional sugar beet herbicides can improve weed control compared to early-season sequential glyphosate applications and provide similar control to late-season sequential glyphosate applications. The addition of dimethenamid and triflurosulfuron to glyphosate improved control of Powell amaranth and redroot pigweed and ladythumb for dimethenamid and wild buckwheat for triflurosulfuron at the Kindred location.