

STACHLER, JEFF M.\*, ALAN G. DEXTER and JOHN L. LUECKE, Department of Plant Sciences, North Dakota State University and University of Minnesota, Department 7670, P. O. Box 6050, Fargo, ND 58108-6050. **Weed control in glyphosate-resistant sugar beets.**

### ABSTRACT

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. Conventional sugar beet herbicides may be required to obtain control of weed species inadequately controlled by glyphosate. Two small-plot field research studies were conducted. Glyphosate-resistant sugar beets were not planted at both locations. 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 68 g ae/ha, clethodim (Select Max) at 34 and 68 g ai/ha, clethodim (2EC) at 34 and 68 g ai/ha, quizalofop at 34 and 68 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 conventional sugar beet herbicides applied at the lowest rate, 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 both oil adjuvants and Progress plus triflurosulfuron plus both oil adjuvants controlled 71 to 79% of the glyphosate-resistant soybean, respectively. Progress plus triflurosulfuron plus the oil adjuvants or the combination with no additional adjuvant controlled 43 to 48% of glyphosate-resistant canola. All other treatment combinations provided less than 29% control. Quizalofop and Select Max at any rate and any adjuvant and clethodim (2EC) at 68 g/ha controlled greater than 92% of the glyphosate-resistant corn. Triflurosulfuron plus oil adjuvants and Progress plus triflurosulfuron plus oil adjuvants 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 29<sup>th</sup> and June 17<sup>th</sup> followed by Progress at 280 g/ha plus previous products applied on June 24<sup>th</sup>. 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 17<sup>th</sup>, May 22<sup>nd</sup> and June 24<sup>th</sup>, May 29<sup>th</sup> and June 24<sup>th</sup>, May 29<sup>th</sup> and July 1<sup>st</sup>, and May 22, June 17<sup>th</sup>, and July 1<sup>st</sup>. Ethofumesate at 4.2 kg/ha plus glyphosate was applied on May 22<sup>nd</sup> followed by glyphosate on June 24<sup>th</sup>. Glyphosate was applied on May 22<sup>nd</sup> followed by glyphosate plus dimethenamid at 1.1 kg ai/ha on June 17<sup>th</sup>. Glyphosate plus triflurosulfuron at 9 g/ha and glyphosate plus clopyralid were applied on May 29<sup>th</sup> and June 24<sup>th</sup>.

At 28 days after the July 1<sup>st</sup> application, the conventional herbicide treatment provided more effective control of ladysthumb, wild buckwheat, Powell amaranth, and redroot pigweed,

than glyphosate applied on May 22<sup>nd</sup> and June 17<sup>th</sup>. Glyphosate followed by glyphosate plus dimethanamid controlled 87% of ladystumb compared to glyphosate applied on May 22<sup>nd</sup> and June 17<sup>th</sup>. Glyphosate applied on May 29<sup>th</sup> and July 1<sup>st</sup> controlled 94% of ladystumb. The conventional herbicide treatment controlled 89% of wild buckwheat compared to the two sequential glyphosate applications last sprayed on June 24<sup>th</sup>. Glyphosate plus triflusaluron followed by glyphosate plus triflusaluron controlled 83% of wild buckwheat compared to glyphosate applied on May 29<sup>th</sup> and June 24<sup>th</sup>. The conventional herbicide treatment, ethofumesate plus glyphosate followed by glyphosate, glyphosate followed by glyphosate plus dimethanamid, and sequential applications of glyphosate plus triflusaluron controlled 87, 66, 83, and 80% of Powell amaranth and redroot pigweed, respectively, compared to sequential glyphosate treatments last applied on June 17<sup>th</sup> and 24<sup>th</sup> that ranged from 28 to 53%.

For maximum control of glyphosate-resistant crops in glyphosate-resistant sugarbeet, three different herbicides/combinations will be necessary. Future research needs to investigate the potential for triflusaluron to control all glyphosate-resistant crops. The addition of dimethanamid, ethofumesate, and triflusaluron to glyphosate improved control of Powell amaranth and redroot pigweed. Control of ladystumb was improved when dimethanamid, clopyralid, or triflusaluron was mixed with glyphosate compared to glyphosate alone. Control of wild buckwheat was improved when triflusaluron was mixed with glyphosate compared to glyphosate alone. Conventional sugar beet herbicides mixed with glyphosate can improve the control of certain weed species compared to glyphosate alone.