

Competitiveness of volunteer corn in sugarbeet

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Glyphosate-resistant volunteer corn is a consistent problem in glyphosate-resistant sugarbeet. There are effective options for removal of volunteer corn, but many growers do not implement these strategies because the impact on sugarbeet yield and quality is not widely understood. Field experiments were conducted in 2012 and 2013 at the Michigan State University Agronomy Farm in East Lansing and at the Saginaw Valley Research and Extension Center near Richville, Michigan. The objectives of this research were to: 1) quantify the effects of volunteer glyphosate-resistant corn on glyphosate-resistant sugarbeet yield and sucrose quality, and 2) determine the effects of row-width on volunteer corn interference in sugarbeet. Glyphosate-resistant 'HM 9173 RR' was planted at 124,000 plants ha⁻¹ in 38- and 76-cm rows. At the time of planting, 'F₂' glyphosate-resistant corn seed was planted approximately 13-cm off the sugarbeet row at populations of 0; 2,150; 4,310; 8,610; 17,220; and 34,430 plants ha⁻¹. Sugarbeet canopy closure in the 38- and 76-cm row widths was measured throughout the season. Volunteer corn biomass was harvested and weighed prior to sugarbeet harvest. Sugarbeet were harvested for yield and sucrose quality and quantity. The sugarbeet canopy developed quicker in 38- than in 76-cm rows. Sugarbeet planted in narrow rows competed more effectively with volunteer corn than sugarbeet in wide rows. Narrow rows inhibited corn growth which resulted in lower corn biomass quantities than in wide rows. In 2012, sugar quality was lower in wide rows at both locations. In 2013, sugar quality was lower in wide rows at Richville. Yield results were combined over row widths. In 2012, sugarbeet yield was similar between 0 and 8,610 plants ha⁻¹ at both locations. At East Lansing, volunteer corn populations of 17,220 and 34,430 plants ha⁻¹ reduced sugarbeet yield by 15% and 27%, respectively. At Richville, 17,220 and 34,430 plants ha⁻¹ reduced sugarbeet yield by 19% and 14%, respectively. Under extreme early-season drought conditions at both sites, volunteer corn was less competitive with sugarbeet. In 2013, sugarbeet were able to withstand volunteer corn populations up to 17,220 plants ha⁻¹ at East Lansing. Volunteer corn growth was delayed at East Lansing due to poor germination and was, therefore, replanted at the 2-leaf stage of sugarbeet. Sugarbeet yield at Richville was similar between 0 and 8,610 plants ha⁻¹ in 2013. Volunteer corn populations of 17,220 and 34,430 plants ha⁻¹ reduced sugarbeet yield by 39% and 33%, respectively. In wide rows at Richville, 17,220 and 34,430 plants ha⁻¹ reduced sugarbeet yield by 54% and 38%, respectively. Planting glyphosate-resistant sugarbeet in narrow rows helped reduce competition from glyphosate-resistant volunteer corn. Volunteer corn needs to be controlled if populations are greater than 8,610 plants ha⁻¹ in order to maximize sugarbeet yield and quality.