

The Effect of Row Spacing, Plant Population, and Weed Density on Growth and Yield of Roundup Ready Sugarbeet

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In 2007, field experiments were established at the Bean and Beet Farm and on a producer's field near St. Charles to evaluate the effect of row width and plant population on weed control in glyphosate-resistant sugar beet. Three row widths (15-, 20-, and 30-inch) and four plant populations (21,954, 31,363, 40,772, and 50,181 plants/acre) were investigated.

Canopy cover measurements were taken weekly from approximately 40 days after planting until maximum canopy closure. At the Bean and Beet Farm, 15- and 20-inch rows showed greater canopy cover than 30-inch rows beginning at 63 days after planting and lasting through the remainder of the growing season. Plant population did not have an effect on canopy cover.

Weed density and biomass data was also collected near the end of the growing season from each plot. In untreated plots, weed biomass was not different among row widths. This is likely due to the slow growth habit and relatively poor competitiveness of sugar beet early in the season. However, a trend of slightly reduced biomass in narrower rows was observed. In treatments which received only a single glyphosate application when weeds were 4-inches tall, subsequent weed biomass was reduced by 80% and 34% in 15- and 20-inch rows, respectively, compared with 30-inch rows. Though producers will not be able to achieve season-long weed control with only one application of glyphosate, reduced weed biomass following an initial application indicates increased competitiveness of sugar beet in narrow rows. If a producer does plant in narrow rows, this may potentially reduce the number of glyphosate applications necessary for satisfactory weed control.

In addition to the benefits of weed control, planting sugar beet in narrow rows may also increase root and sugar yield. In the preliminary trial from 2006, sugar beet root yields were 30% greater in 15-inch rows (34.1 tons/acre) compared with 30-inch rows (26.4 tons/acre) in weed-free plots. Sugar concentration and recoverable white sugar per ton (RWST) were similar among the row widths, but the increase in root yield per acre led to an increase in recoverable white sugar per acre (RWSA). Plant population did not have an effect on root or sugar yields. In 2007, the yield advantage of narrow rows was not as evident as it was in 2006. At the Bean and Beet Farm, the 20-inch row spacing was the only row width in which there was a significant yield advantage. The yield advantage was from tons per acre. Sugar concentration and RWST were similar among all row widths. Again, plant population did not have an effect on root or sugar yields.