

## **IMPACT OF NITROGEN AND WEEDS ON GLYPHOSATE-RESISTANT SUGARBEET YIELD AND QUALITY**

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Field experiments were conducted in 2010 and 2011 at two locations in Michigan to determine the effects of nitrogen (N) and weed removal on glyphosate-resistant sugarbeet yield and quality. Nitrogen rates were 0, 67, 100, 134 and 67:67 kg N ha<sup>-1</sup> and weeds were removed when they were <2, 8, 15 and 30 cm tall. At the beginning of the growing season, weeds responded to N sooner than sugarbeet. Nitrogen assimilation by weeds was 3 times greater than sugarbeet at 0, 67, 100 and 134 kg N ha<sup>-1</sup> and 4 times greater than sugarbeet with the split application of N (67:67 kg N ha<sup>-1</sup>) averaged over weed removal timings. Higher N rates increased N sufficiency index values and sugarbeet canopy closure; weeds 30 cm tall had lower N sufficiency index values and reduced the sugarbeet canopy. The effect of N on root yields varied, but the highest N rates (134 kg N ha<sup>-1</sup> or 67:67 kg N ha<sup>-1</sup>) was amongst the highest sugarbeet yields at all locations. Highest yields were achieved when weeds were controlled prior to reaching 2 cm tall at three of the four site-years. Waiting to control weeds until they were 8 or 15 cm tall resulted in up to 15% yield reductions, while 30 cm tall weeds reduced yields up to 21%. Recoverable white sucrose per ha (RWSH) followed the same trends as root yield, and values were 8 to 16% lower if weeds were not controlled until they were 8 cm tall. These results indicate weeds are highly competitive with sugarbeet and weeds assimilate large quantities of N early in the growing season, especially at larger growth stages. Weed competition negatively impacted sugarbeet canopy development, root yield and sucrose production, and weeds should be controlled prior to 8-cm heights to avoid negative impacts.