



Utilizing Boron to Improve Cercospora Leaf Spot Management

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Location: Saginaw Valley Research and Extension Center	Tillage: Conv., 30-in. row
Planting Date: April 29, 2022 (Harvest 9/23/22)	N Rates: 150 lb./A
Soil Type: Clay loam; 2.8% OM; 6.2 pH; 22 ppm P (Olsen P); 178 ppm K	Population: 4 in. spacing
Variety: C-G932NT	Replicated: 4 replications

Table 1. Field trial treatments evaluating a high rate of foliar boron on sugarbeet yield, quality, and resistance to *C. beticola*.

Treatment	Product Rate [†] and Timing [‡]
Non-treated Check	No Fungicide, No Foliar Boron
Grower Standard	Manzate Max (1.6 qt) ABCDE + Inspire XT (7 fl oz) BE + Super Tin (8 fl oz) C + Propulse (13.6 fl oz) D + Topsin (20 fl oz) D
Foliar Boron (FBH)	SprayBor (0.7 lb) ABCDE
Grower Standard + Foliar Boron High (FBH)	SprayBor (0.7 lb) ABCDE + Manzate Max (1.6 qt) ABCDE + Inspire XT (7 fl oz) BE + Super Tin (8 fl oz) C + Propulse (13.6 fl oz) D + Topsin (20 fl oz) D

[†]All rates, unless otherwise specified, are listed as a measure of product per acre.

[‡]Application letters code for the following dates: A=Jul 8, B=Jul 19, C=Aug 2, D=Aug 16, E=Aug 30. MasterLock 0.25% V/V was added to all treatments.

Table 2. Sugarbeet yield, recoverable sugar per ton (RWST), and sugar % in 2022.

Treatment	Tons/A	RWST [†]	% Sugar
Non-treated Check	15.3	210 ab	14.6 ab
Grower Standard	24.1	222 a	15.3 a
Foliar Boron High (FBH)	17.2	204 b	14.3 b
Grower Standard + FBH	21.3	221 a	15.3 a
<i>Pr > F</i>	NS	= 0.05	< 0.05

[†]Values followed by the same lowercase letter are not significantly different at ($\alpha=0.05$).

Table 3. Gross grower payment and profitability analysis.

Treatment	Gross Grower Payment (\$/A)
Non-treated Check	813
Grower Standard	1,354
Foliar Boron High (FBH)	888
Grower Standard + FBH	1,191

‡Gross grower payment and net economic returns based upon harvest date adjustment factor for tonnage and RWST on 9/23/2022 and \$0.18 per pound of sugar payment.

Treatment	Final CLS Severity Sept. 8	AUDPC ^{†, ‡}
Non-treated Check	7.9	200 a
Grower Standard	1.9	35 b
Foliar Boron High (FBH)	8.3	173 a
Grower Standard + FBH	1.8	47 b
<i>Pr > F</i>	-	<0.0001

Table 4. Final area under the disease progress curve (AUDPC) in 2022.

[†]Values followed by the same lowercase letter are not significantly different at ($\alpha=0.05$).

[‡] AUDPC calculated from disease severity ratings recorded every 10-14 days post infection beginning July 26. Ratings were assigned using the KWS scale based on infected leaf area: 1=0.1% (1-5 spots/leaf), 2=0.35% (6-12 spots/leaf), 3=0.75% (13-25 spots/leaf), 4=1.5% (26-50 spots/leaf), 5=2.5% (51-75 spots/leaf), 6=3%, 7=6%, 8=12% 9=25%, 10=50%.

Summary: Trial quality was fair. Trial was established to evaluate the efficacy of foliar-applied boron for managing *Cercospora* leaf spot (CLS) in sugarbeet. Boron-containing compounds may have fungistatic properties as recent work has found reduced *in vitro* fungal growth and decreased disease severity in the field. All treatments received 90 lbs N A⁻¹ as pre-plant urea. Sidedress N was 60 lbs N A⁻¹ as UAN applied at the 4-6 leaf stage on June 2. Treatments initiated on July 8 and continued every 10-14 days through August 30. Applications were made using a CO₂ powered backpack sprayer equipped with four TJ 8004XR nozzles (30-in spacing), calibrated at 15 gal A⁻¹. Inoculation of *C. beticola* (1x10³ spores mL⁻¹) was applied at 15 gal/A using a tractor mounted sprayer on July 12. Disease ratings were collected bi-weekly starting July 26 and continued until September 8. Significant CLS pressure was observed uniformly throughout this study. The grower standard fungicide program resulted in significantly lower AUDPC ($P < 0.0001$), and greater RWST and percent sugar ($P < 0.05$), than the non-treated control. Five applications of foliar boron at 0.7 lb A⁻¹ did not significantly reduce CLS severity or improve sugar beet yield or quality.