

SUGAR BEET (*Beta vulgaris* 'SX-2283')
Cercospora Leaf Spot; *Cercospora beticola*

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Evaluation of banded and foliar compounds to manage *Cercospora* leaf spot of sugar beet in Michigan, 2022.

A field trial was established at the Saginaw Valley Research and Extension Center in Frankenmuth, MI with the objective of evaluating the efficacy of banded and foliar applications at managing *Cercospora* leaf spot (CLS) in sugar beets. Variety SX-2283 was planted on 29 Apr at 50,000 seed/A. Research plots were four rows wide (30-in. row spacing) by 35 ft long. The trial was inoculated with liquid *C. beticola* inoculum (1×10^3 conidia/mL) on 12 Jul using a tractor mounted sprayer (15 gal/A). Two banded applications (α and β) were made 13 Jun and 27 Jun. A CO₂-powered backpack sprayer was used to apply products in an 8-in. band at 15 gal/A (TJ4001E; 19 psi). Five foliar applications (A, B, C, D, and E) were made 8 Jul, 19 Jul, 2 Aug, 16 Aug, and 30 Aug. Foliar applications were made using a CO₂-powered backpack sprayer equipped with four TJ8004XR nozzles (30-in spacing), calibrated at 20 gal/A (32 psi). Disease ratings were collected through the summer; plots were assigned a severity using the following 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%. The ratings were used to calculate area under the disease progress curve for disease severity (AUDPC). The center two rows of the plots were harvested on 23 Sep to estimate yield in t/A. After weights were collected, subsamples from each plot were sent to Michigan Sugar Company (Bay City, MI) to determine percent sugar and pounds of recoverable white sugar per ton (RWST). A generalized linear mixed model procedure was used to conduct the ANOVA and mean separations at the $\alpha=0.05$ significance level (SAS version 9.4).

Tested programs had AUDPCs ranging from 44.3 to 142.3, compared to the control with an AUDPC value of 165.5. All programs, except for 7, had significantly lower AUDPCs than the non-treated control ($P < 0.0001$). No differences were observed among yields ($P > 0.05$); however, significant differences were observed among sugar content ($P < 0.05$) and RWST ($P < 0.05$). The greatest sugar content was observed from programs 2, 3, and 5, which ranged between 15.4 and 16.3%; the greatest RWST was observed from programs 2, 3, and 5.

No.	Treatment, Rate ^z , and Timing ^y	AUDPC ^{x, w}	Yield (t/A)	Sugar (%)	RWST ^v
1	Non-treated Control	165.5 a	9.2	14.6 c	210.0 c
2	Manzate Max (1.6 qt) ABCDE; Inspire XT (7 fl oz) BD	48.8 c	12.6	15.8 ab	231.0 ab
3	Manzate Max (1.6 qt) ABCDE; LifeGard (4.5 oz/100 gal) ACE; Inspire XT (7 fl oz) BD	44.3 c	15.2	16.3 a	238.9 a
4	LifeGard (4.5 oz/100 gal) AC; Manzate Max (1.6 qt) BDE; Inspire XT (7 fl oz) BD	88.0 b	8.2	15.2 bc	220.4 bc
5	LifeGard (4.5 oz/100 gal) ABCDE; Mankocide (4.3 lb) ABCDE	52.8 c	13.7	15.4 a-c	223.1 a-c
6	Sunergist (6.4 fl oz/100 gal) $\alpha\beta A$	102.3 b	9.3	14.6 c	209.3 c
7	Sunergist+Chitosan (6.4 fl oz/100 gal) $\alpha\beta A$	142.3 a	9.1	14.6 c	208.6 c
8	Sunergist (6.4 fl oz/100 gal) $\alpha\beta AB$	105.0 b	13.2	14.9 bc	217.2 bc
9	Sunergist (6.4 fl oz/100 gal) $\alpha\beta AB$; Proline (5.7 fl oz) B	102.5 b	14.0	15.0 bc	216.2 bc

^z All rates, unless otherwise specified, are listed as a measure of product per acre. MasterLock was added to all foliar tank mixes at a rate of 0.25 % v/v. NIS was added to banded tank mixes at a rate of 0.25% v/v.

^y Banded application letters code for the following dates: α =13 Jun and β =27 Jun. Foliar application letters code for the following dates: A=8 Jul, B=19 Jul, C=2 Aug, D=16 Aug, and E=30 Aug.

^x Area under the disease progress curve was calculated using disease severity scores (0-10 scale) collected Jul 26, Aug 11, Aug 23, and Sep 8.

^w Column values followed by the same letter were not significantly different based on Fisher's Protected LSD ($\alpha=0.05$). If no letter, then means were not significantly different.

^v Pounds of recoverable white sugar per ton of beets.