

SUGAR BEET (*Beta vulgaris* 'SX-2296N')
Cercospora Leaf Spot; *Cercospora beticola*

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Evaluation of foliar fungicides to manage *Cercospora* leaf spot of sugar beet in Michigan, 2021.

A field trial was established at the Saginaw Valley Research and Extension Center in Frankenmuth, MI to evaluate the efficacy of experimental and commercially available fungicides at managing *Cercospora* leaf spot (CLS) in sugar beets. The trial was planted 7 May at a rate of 50,000 seed/A using 30-in row spacing. Plots were four rows wide and 35 ft long. Liquid *C. beticola* inoculum (100 spores/mL) was applied at 15 gal/A using a tractor mounted sprayer on 12 Jul. Program 3 received a banded application Jun 22, using a CO₂ powered backpack sprayer equipped with TJ4002E nozzles at a rate of 10.5 gal/A. Five foliar applications were made for all programs (A, B, C, D, and E) on 6 Jul, 20 Jul, 3 Aug, 17 Aug, and 2 Sep. Foliar applications were made using a CO₂ powered backpack sprayer equipped with four TJ 8004XR nozzles (30-in spacing), calibrated at 20 gal/A. 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 17 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).

Significant differences in AUDPC were observed in this trial ($P < 0.0001$). All fungicide programs had significantly lower disease severity than the non-treated control. The lowest AUDPC values were observed in programs 7 and 11, however, these did not perform differently than half of the other tested programs. Significant differences were observed in estimated yield values for programs ($P < 0.0001$). Values ranged between 16.8 and 25.7 t/A, and 10 of the 20 programs had significantly greater yields than the non-treated control. Differences were also observed in the percent sugar ($P < 0.0001$) and RWST values ($P < 0.0001$).

No.	Treatment, Rate ^z , and Timing ^y	AUDPC ^{x, w}	Yield (t/A)	Sugar (%)	RWST ^v
1	Non-treated Control	103.8 a	19.8 e-g	15.0 g	216.5 f
6	Provysol (2.5 fl oz) ABCDE	80.5 b	17.3 fg	15.1 fg	217.0 f
12	Luna Flex (13.7 fl oz) ABCDE	57.0 c	16.8 g	15.8 d-f	229.5 d-f
13	Koverall (2 lb) ABCDE; Lucento (5.5 fl oz) B; Super Tin (8 fl oz) CE; Topsin (20 fl oz) C; Provysol (4 fl oz) D	56.5 c	24.3 a-d	16.4 a-e	239.0 a-e
8	Proline (5.7 fl oz) ABCDE	56.3 c	25.3 ab	16.2 a-e	234.8 a-e
5	Inspire XT (7 fl oz) ABCDE	54.0 c	22.1 b-e	16.2 b-e	235.9 a-e
17	Koverall (1.5 lb) ABDE; Sipcam TPTH (8 fl oz) ACE; Minerva (13 fl oz) B; Spinnaker (1.5 lb) C; Inspire XT (7 fl oz) D	53.8 cd	24.0 a-d	16.9 a	247.3 a
14	Koverall (2 lb) ABCDE; Lucento (5.5 fl oz) B; Super Tin (8 fl oz) CE; Topsin (20 fl oz) C; Proline (5 fl oz) D	51.0 cd	24.5 a-d	16.5 a-d	243.0 a-d
16	Manzate Max (1.6 qt) ABCDE; Eminent (13 fl oz) B; Super Tin (8 fl oz) CE; Provysol (5 fl oz) D	51.0 cd	21.5 de	16.8 ab	245.1 ab
19	Cercos (23 fl oz) AC; Sipcam TPTH (8 fl oz) ACE; Koverall (1.5 lb) BDE; Minerva (13 fl oz) B; Inspire XT (7 fl oz) D	50.8 c-e	22.7 a-e	16.6 a-c	243.8 a-c
2	Manzate Max (1.6 qt) ABCDE; Inspire XT (7 fl oz) BD; Super Tin (8 fl oz) CE	47.8 c-f	21.1 c-f	16.1 b-e	234.1 b-e
3	Growthful Post (3.5 fl oz) banded; Manzate Max (1.6 qt) ABCDE; Growthful Post (12.8 fl oz) ABCDE; Inspire XT (7 fl oz) BD	45.0 c-f	21.9 c-e	15.7 e-g	227.7 ef
15	Badge (2 PT) ABCDE; Eminent (13 fl oz) B; Super Tin (8 fl oz) CE; Provysol (5 fl oz) D	45.0 c-f	24.4 a-d	16.7 ab	243.4 a-d
18	Koverall (1.5 lb) ABDE; Minerva (13 fl oz) B; Sipcam TPTH (8 fl oz) CE; Miramar (21.8 fl oz) C; Inspire XT (7 fl oz) D	42.0 c-f	25.7 a	16.5 a-d	240.8 a-d
20	Cercos (23 fl oz) AC; Minerva (13 fl oz) A; Sipcam TPTH (8 fl oz) BD; Koverall (1.5 lb) BDE; Inspire XT (7 fl oz) C	42.0 c-f	22.6 a-e	16.1 b-e	232.9 b-e
10	Delaro (11 fl oz); Proline (1.71 fl oz) ABCDE	36.0 d-f	24.5 a-d	16.6 a-d	244.4 a-c
9	Propulse (13.6 fl oz) ABCDE	33.0 ef	25.1 a-c	16.6 a-c	242.6 a-d
4	Experimental 1 (10.8 fl oz) ABCDE	32.8 f	23.7 a-d	16.2 a-e	236.5 a-e
7	Experimental 2 (12 fl oz) ABCDE	30.0 f	21.5 de	16.0 c-e	231.6 c-e
11	Delaro Complete (11 oz) Proline (1.71 fl oz) ABCDE	30.0 f	25.7 a	16.7 ab	244.5 ab

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

^y Application letters code for the following dates: banded=22 Jun, A=6 Jul, B=20 Jul, C=3 Aug, D=17 Aug, E=2 Sep.

^x Area under the disease progress curve was calculated using disease severity scores (0-10 scale) collected Jul 1, Jul 23, and Aug 16.

^w Column values followed by the same letter were not significantly different based on Fisher's Protected LSD ($\alpha=0.05$).

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