

SUGAR BEET (*Beta vulgaris* 'C-G333NT')
Cercospora Leaf Spot; *Cercospora beticola*

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Evaluation of foliar fungicides to manage *Cercospora* leaf spot of sugar beet in Michigan, 2020.

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 Apr 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 9 Jul and 23 Jul. Four trial applications were made (A, B, C, and D) on 29 Jun, 13 Jul, 21 Jul, and 20 Aug. Fungicide applications were made using a CO₂ powered backpack sprayer equipped with four TJ 8004XR nozzles (30-in spacing), calibrated at 20 gal/A. Maintenance applications of Badge (2 pt/A) were made to the entire trial 7 Aug and 3 Sep by research farm staff. Disease ratings were collected bi-weekly starting 1 Jul and continued until 16 Sep. 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 18 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 recoverable white sugar per ton (RWST). A generalized linear mixed model procedure was used to conduct the ANOVA ($\alpha=0.05$) and mean separations (SAS version 9.4).

Differences in AUDPC were observed in this trial. All fungicide programs had significantly lower disease severity than the non-treated control ($P < 0.0001$). The lowest AUDPC value was observed in program 11, however, it did not perform differently than over half of the other tested programs. Estimated mean yield values ranged between 13.9 and 20.5 t/A, but no differences were observed among treatments ($P > 0.05$). Additionally, percent sugar and RWST were not different among treatments ($P > 0.05$).

No.	Treatment, Rate ^z , and Timing ^y	AUDPC ^{x, w}	Yield (t/A)	Sugar (%)	RWST ^v
11	Manzate Max (1.6 qt) ABCD + Provysol (5 fl oz) B + Super Tin (8 fl oz) C + Priaxor (8 fl oz) D + Topsin (20 fl oz) D	22.3 k	17.5	17.9	229.7
25	Exp ^u 3 (58 fl oz) A + Manzate Max (1.6 qt) ABCD + Super Tin (8 fl oz) BCD	24.0 g-k	16.5	17.5	223.9
26	Inspire XT (7 fl oz) A + Manzate Max (1.6 qt) ABCD + Super Tin (8 fl oz) BC + Exp 3 (58 fl oz) D	25.8 jk	18.6	17.8	226.6
24	Inspire XT (7 fl oz) A + Manzate Max (1.6 qt) ACD + Super Tin (8 fl oz) BCD + Dexter Max (2.1 lb) B	26.8 ijk	15.4	18.0	231.1
12	Manzate Max (1.6 qt) ABCD + Proline (5.7 fl oz) B + Super Tin (8 fl oz) C + Flint Extra (3.6 fl oz) D + Topsin (20 fl oz) D	28.5 h-k	19.3	18.1	232.1
10	Manzate Max (1.6 qt) ABD + Provysol (5 fl oz) B + Serifel (4 oz) C + Super Tin (8 fl oz) C + Priaxor (8 fl oz) D + Topsin (20 fl oz) D	30.3 h-k	15.7	17.5	224.5
27	Exp 3 (58 fl oz) A + Topsin (20 fl oz) A + Super Tin (8 fl oz) BCD + Dexter Max (2.1 lb) B + Manzate Max (1.6 qt) CD	32.0 f-k	19.3	17.8	227.1
2	Manzate Max (1.6 qt) ABCD + Inspire XT (7 fl oz) BD + Super Tin (8 fl oz) C	32.1 f-k	18.7	17.6	225.8
21	Minerva Duo (16 fl oz) ACD + Exp 2 (8 fl oz) AD + Super Tin (8 fl oz) B + Koverall (1.5 lb) B	32.1 f-k	15.1	17.6	224.9
23	Manzate Max (1.6 qt) ABCD + Inspire XT (7 fl oz) A + Super Tin (8 fl oz) BCD	33.8 f-k	17.9	17.8	229.2
7	Propulse (13.6 fl oz) ABCD	34.6 e-k	19.9	18.3	236.6
17	Minerva Duo (16 fl oz) AD + Super Tin (8 fl oz) BC + Koverall (1.5 lb) B + Brixen (21 fl oz) C	34.6 e-k	17.4	17.6	225.9
20	Minerva Duo (16 fl oz) ACD + Super Tin (8 fl oz) B + Koverall (1.5 lb) B	35.5 e-k	14.9	17.3	220.7
18	Exp 1 (32 fl oz) AD + Super Tin (8 fl oz) B + Koverall (1.5 lb) B + Minerva Duo (16 fl oz) C	35.6 e-k	17.4	18.3	236.4
6	Manzate Max (1.6 qt) ABCD + Aqueus (1.28 fl oz/gal) ABCD + Inspire XT (7 fl oz) BD	40.0 e-j	18.6	18.0	229.9
14	Manzate Max (1.6 qt) ABCD + Eminent (13 fl oz) B + Super Tin (8 fl oz) C + Provysol (5 fl oz) D	41.0 d-j	18.3	17.7	226.1
22	Brixen (21 fl oz) AD + Spinnaker (1.5 lb) AD + Super Tin (8 fl oz) B + Koverall (1.5 lb) B + Minerva Duo (16 fl oz) C	41.9 d-j	18.8	18.3	235.9
16	Koverall (1.5 lb) ABD + Minerva (13 fl oz) AD + Super Tin (8 fl oz) B + Minerva Duo (16 fl oz) C	43.8 d-i	20.5	17.6	226.0
8	Proline (5.7 fl oz) ABCD	44.6 d-h	19.2	17.8	227.6
15	Brixen (21 fl oz) AD + Super Tin (8 fl oz) B + Koverall (1.5 lb) B + Minerva Duo (16 fl oz) C	48.9 def	16.3	17.7	225.9
5	Headline (12 fl oz) AC + Manzate Max (1.6 qt) ABCD	49.3 def	19.1	17.7	226.5
19	Koverall (1.5 lb) AD + Super Tin (8 fl oz) AD + Exp 1 (32 fl oz) B + Minerva Duo (16 fl oz) C	49.3 def	13.9	17.8	230.1
9	Delaro (11 fl oz) ABCD + Proline (1.71 fl oz) ABCD	51.9 de	18.2	17.9	230.0
13	Badge (2 pt) ABCD + Eminent (13 fl oz) B + Super Tin (8 fl oz) C + Provysol (5 fl oz) D	58.0 cd	15.5	17.6	225.8
4	Manzate Max (1.6 qt) ABD + Headline (12 fl oz) C	69.8 bc	16.7	17.7	226.6
3	Headline (12 fl oz) AC + Manzate Max (1.6 qt) BD	85.9 b	16.3	17.6	224.8
1	Non-Treated Control	141.1 a	16.6	17.9	229.7

^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: A=29 Jun, B=13 Jul, C=21 Jul, D=20 Aug.

^x Area under the disease progress curve was calculated using disease severity (0-10 scale).

^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.

^u Exp=experimental compound.