

# Cercospora Leaf Spot Fungicide Screening Trial

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Cercospora leaf spot (CLS) is the most destructive foliar disease to impact sugar beet production in the SMBSC growing area. Without effective new fungicides, controlling the disease has become more difficult. Despite advancements in variety tolerance to CLS the key to control is still utilizing best management practices that include an appropriately timed fungicide program that incorporates multiple modes of action along with planting sugar beet varieties with higher levels of genetic tolerance to CLS.

## Research Objective

- An effective fungicide program paired with genetic tolerance is necessary to grow a profitable crop. Trials need to be conducted to evaluate individual fungicides to determine if there is a benefit to using a particular fungicide in the recommended CLS program.

## Methodology

In 2023 the Fungicide Screening Trial was conducted as randomized complete block with four replications and was located near Clara City, MN. This trial evaluated fungicides individually, and in combinations to look at possible synergies. The site was planted on May 24<sup>th</sup> using Crystal M977. Dual Magnum was applied preemergence and other standard practices were used post emergence to keep the site weed free. The site was inoculated with pulverized leaves from the previous year that were infected with CLS. The inoculum was spread evenly across the site with a Gandy Orbit-Air applicator on July 11<sup>th</sup>. Five fungicide applications were made in the Fungicide Screening Trial beginning July 13<sup>th</sup> and continuing on a ten to twelve-day spray interval.

Applications were made using a custom-made tractor mounted sprayer traveling 3.1mph with a spray volume of 20gpa and 60psi, utilizing XR11002 spray nozzles (Photo 1). Each plot consisted of six rows that were 35ft in length. The sprayer used CO<sup>2</sup> as a propellant and was designed to apply the treatment to the center four rows, leaving rows one and six untreated. Plots were rated for foliar damage using the (1-9) KWS (Kleinwanzlebener Saatucht) scale with one being disease free and nine being completely necrotic. The center two rows of each six-row plot were harvested on September 19<sup>th</sup> using a six-row defoliator and a two-row research harvester. The beets harvested from the center two rows were weighed on the harvester and a sample of those beets were used for a quality analysis at the SMBSC tare lab. The data was analyzed for significance using SAS version 9.4.

**Photo 1.** Tractor mounted sprayer used for fungicide applications.



## Results

In the Fungicide Screening Trial there were significant differences in overall yield and in foliar disease ratings. The unsprayed control had significantly lower yield than any of the other treatments. There was very little difference between the rest of the treatments (Table 1). The control had the highest foliar disease rating, followed by Proline alone and Manzate Prostick alone (Table 2). Most of the tank mixed treatments had similar foliar disease ratings with the Proline plus Manzate Prostick treatment having the lowest rating overall.

**Table 1.** Yield parameter results for the Fungicide Screening Trial. Values with different letters are significantly different. Table 3 contains a full description of each treatment.

Entry	Entry Description	Percent Sugar	Root Yield Tons/Acre	Percent Extractable Sugar	Extractable Sugar per Ton (lbs.)	Extractable Sugar per Acre (lbs.)	Percent Purity
1	Control	15.2 a	27.1 a	12.6 a	251.9 a	6809.6 a	89.8
2	Manzate Prostick	16.8 bc	33.3 bcd	14.3 bc	285.9 bcd	9511.3 bcd	91.1
3	Proline	17.1 bc	31.4 bc	14.4 bc	286.9 bcd	9003.0 b	90.4
4	Proline+Manzate Prostick	17.0 bc	33.9 de	14.4 bc	287.9 bcd	9765.3 cd	90.9
5	Minerva+Manzate Prostick	17.1 bc	32.6 bcd	14.4 bc	288.3 bcd	9380.9 bcd	90.6
6	Inspire XT+Manzate Prostick	17.3 c	32.7 bcd	14.8 c	294.9 d	9627.4 bcd	91.1
7	Enable+Manzate Prostick	17.1 bc	31.1 b	14.5 bc	288.7 bcd	8993.8 b	90.6
8	Provysol+Manzate Prostick	17.1 bc	31.6 bcd	14.5 bc	290.5 cd	9195.5 bc	91.0
9	Lucento+Manzate Prostick	16.9 bc	33.7 cd	14.2 b	284.5 bcd	9580.8 bcd	90.4
11	Topguard+Manzate Prostick	17.0 bc	32.0 bcd	14.3 bc	286.5 bcd	9144.2 bc	90.7
12	SuperTin+Manzate Prostick	16.9 bc	33.2 bcd	14.3 bc	286.1 bcd	9484.7 bcd	90.6
16	Luna Flex+Manzate Prostick	16.7 b	33.9 de	14.1 b	281.1 bc	9454.0 bcd	90.7
	Mean	16.8	32.5	14.2	284.2	9236.2	90.6
	CV%	2.3	5.2	2.7	2.6	4.9	0.6
	Pr>F	<.0001	0.0001	<.0001	<.0001	<.0001	0.2
	lsd (0.05)	0.55	2.4	0.54	10.7	644.9	ns

**Table 2.** Foliar ratings for the Fungicide Screening Trial using the KWS (1-9) rating system with 1 being disease free and 9 being completely necrotic. Ratings with different letters are significantly different. Table 3 contains a full description of each treatment.

Entry	Entry Description	21-Aug	31-Aug	7-Sep	15-Sep
1	Control	5.8 a	8.3 a	8.9 a	9.0 a
2	Manzate Prostick	1.2 c	2.4 c	3.8 c	4.1 c
3	Proline	1.7 b	3.7 b	4.9 b	5.1 b
4	Proline+Manzate Prostick	1.1 c	1.3 e	2.0 efg	2.0 g
5	Minerva+Manzate Prostick	1.1 c	1.3 e	2.0 efg	2.6 defg
6	Inspire XT+Manzate Prostick	1.1 c	1.5 de	2.1 defg	2.4 efg
7	Enable+Manzate Prostick	1.1 c	1.6 de	2.6 def	3.2 d
8	Provysol+Manzate Prostick	1.1 c	1.5 de	2.3 defg	2.8 def
9	Lucento+Manzate Prostick	1.2 c	1.4 e	1.9 g	2.5 efg
11	Topguard+Manzate Prostick	1.1 c	1.5 de	2.1 defg	2.5 efg
12	SuperTin+Manzate Prostick	1.2 c	1.5 de	2.1 defg	2.7 def
16	Luna Flex+Manzate Prostick	1.1 c	1.3 e	1.9 fg	2.2 fg
	Mean	1.5	2.2	3.1	3.4
	CV%	7.9	15.6	16.2	13.0
	Pr>F	<.0001	<.0001	<.0001	<.0001
	lsd (0.05)	0.2	0.5	0.7	0.6

## Conclusions

Despite a low infection year, significant differences still occurred in yield and foliar disease ratings. Treatments that contained only one product had a lower yield and higher foliar disease rating highlighting the importance of tank-mix partners. As in previous years, the tank-mix of Manzate Prostick plus Proline continued to perform very well. In the Fungicide Screening trial most of the triazole products combined with Manzate Prostick had very similar foliar disease ratings. Rotation of these triazole products remains important for resistance management. The results of this trial indicate that all of the triazole products tested are viable options to use in a CLS fungicide program. However, these triazoles should never be applied alone but should be tank-mixed with another fungicide such as mancozeb or copper.

**Table 3.** Fungicide Screening Trial treatment list.

Entry	Entry Description	Rate/A
1	Control	n/a
2	Manzate Prostick	2 lbs
	Masterlock	6.4 oz
3	Proline	5.7 oz
	Masterlock	6.4 oz
4	Proline	5.7 oz
	Manzate Prostick	2 lbs
	Masterlock	6.4 oz
5	Minerva	13 oz
	Manzate Prostick	2 lbs
	Masterlock	6.4 oz
6	Inspire XT	7 oz
	Manzate Prostick	2 lbs
	Masterlock	6.4 oz
7	Enable	8 oz
	Manzate Prostick	2 lbs
	Masterlock	6.4 oz
8	Provysol	4 oz
	Manzate Prostick	2 lbs
	Masterlock	6.4 oz
9	Lucento	5.5 oz
	Manzate Prostick	2 lbs
	Masterlock	6.4 oz
11	Topguard	14 oz
	Manzate Prostick	2 lbs
	Masterlock	6.4 oz
12	SuperTin	8 oz
	Manzate Prostick	2 lbs
	Masterlock	6.4 oz
16	Luna Flex	13.6 oz
	Manzate Prostick	2 lbs
	Masterlock	6.4 oz

