

# Cercospora Leaf Spot Inoculum Reduction Trial

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**Introduction:** Cercospora Leaf Spot (CLS) is the most destructive foliar disease to impact sugar beet production in the SMBSC growing area. The increased presence of CLS in fields in recent years has led to a buildup of inoculum from one year to the next. The inoculum overwinters and generally persists in the soil for up to two years. Practicing a crop rotation of 3 to 4 years allows enough time for the inoculum to break down in the soil, but sugar beet fields planted along a common line to last years' sugar beet field could be exposed to high levels of inoculum early in the season.

**Objective:** A reduction in the amount of inoculum along common lines could slow disease development during the next growing season and decrease selection pressure on other methods of controlling the disease. Methods to reduce the amount of inoculum and slow the onset of disease development need to be explored.

**Materials and Methods:** A trial was conducted as a randomized complete block with four replications on a trial site near Renville that was planted to sugar beets in 2019. The beets were defoliated in the fall of 2019, but no tillage or harvest took place in the field. Since the site was previously sugar beets with a high infection of CLS, it was assumed that there were ample levels of inoculum on the soil surface. Four methods for reducing inoculum were tested in this trial using small plots 6 rows wide and 10 feet long (Table 1). Treatment 1 was the untreated check. Treatment 2 used Oxidate 2.0 (peroxyacetic acid) applied through a bike sprayer at 20gpa. The plots in Treatment 3 were tilled with a rotary tiller in the spring prior to planting to a depth of 4 inches to bury the residue. These tilled plots were raked by hand to create a firm seed bed for planting. Treatment 4 used Badge SC (copper product) at a low pH applied through a bike sprayer at 20gpa. Treatment 5 used propane to burn the residue and potentially destroy the overwintering spores. After treatments were applied to the trial area, Crystal RR018 was planted at a high population (109,000 seeds/acre) without any additional tillage on May 12<sup>th</sup>. The trial was maintained weed free using normal best management practices. No fungicides were applied during the season to control CLS. Plots were rated for foliar damage using the KWS (Kleinwanzlebener Saatzucht) (1-9) scale with one being disease free and nine being completely necrotic. Foliar ratings began on July 10 and continued three times per week until the CLS infection overwhelmed the trial and the differences between treatments. Ratings were conducted by multiple raters and the average ratings are reported for each date (Table 2).

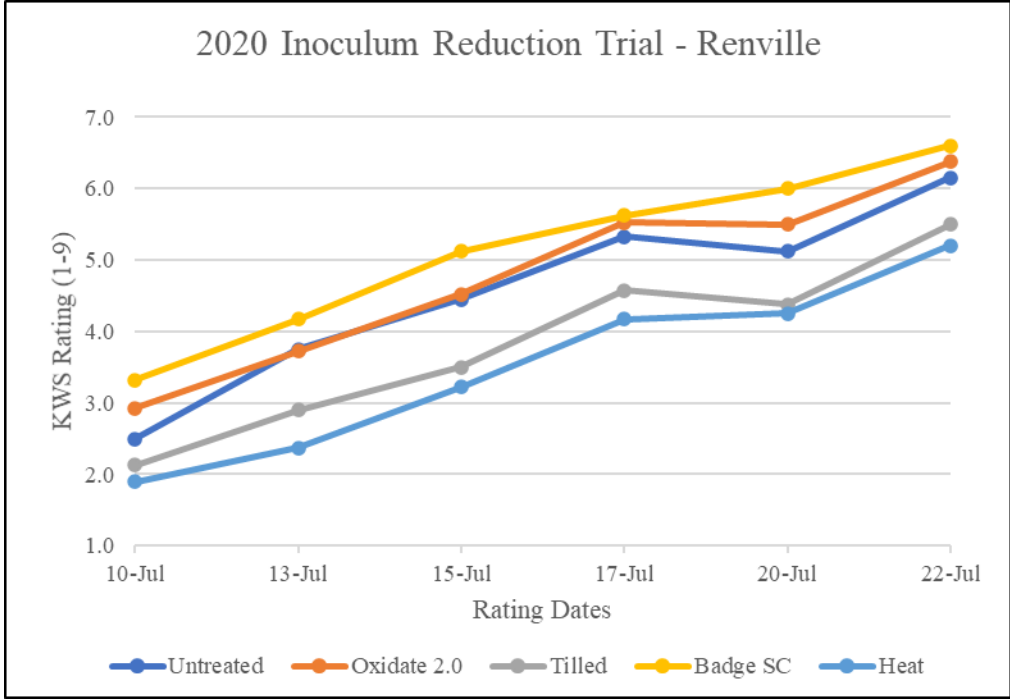
<u>Trt#</u>	<u>Treatment Name</u>
1	Untreated
2	Oxidate 2.0 (2.5% conc.)
3	Tilled (4" deep)
4	Badge SC (4pts.) + N-tense
5	Heat (propane burner)

**Table 1:** Treatments used to reduce the carry-over of CLS inoculum.

**Results and Discussion:** The application of heat/burning of residue and the use of tillage to bury the inoculum delayed the onset of CLS disease development in the 2020 trial (Table 2 and Figure 1). The heat/burn treatment was statistically lower than the untreated check and the tilling treatment was numerically lower than the untreated check. The Oxidate 2.0 and Badge SC treatments did not appear to impact the onset of disease in the 2020 trial. These results are similar to the results from the 2019 Inoculum Reduction Trial. The differences between the treatments would likely be more pronounced if tested across larger areas. In small plots the treatment effects only last for a short period of time before adjacent treatments impact the level of disease. A third year of testing is planned to verify the results of the 2019 and 2020 trials. A site has been established to continue this trial in 2021 to obtain a third year of data.

<u>Treatment</u>	<u>Date of Rating</u>						<u>Ave.</u>
	<u>10-Jul</u>	<u>13-Jul</u>	<u>15-Jul</u>	<u>17-Jul</u>	<u>20-Jul</u>	<u>22-Jul</u>	
Untreated	2.5	3.8	4.5	5.3	5.1	6.2	4.6
Oxidate 2.0	2.9	3.7	4.5	5.5	5.5	6.4	4.8
Tilled	2.1	2.9	3.5	4.6	4.4	5.5	3.8
Badge SC	3.3	4.2	5.1	5.6	6.0	6.6	5.2
Heat	1.9	2.4	3.2	4.2	4.3	5.2	3.6
Mean	2.6	3.4	4.2	5.1	5.1	6.0	4.4
CV	25.2	20.8	17.9	13.2	12.6	11.5	14.7
Pr>F	0.051	0.022	0.020	0.036	0.010	0.063	0.022
lsd (0.05)	NS	1.1	1.2	1.0	1.0	NS	1.0

**Table 2:** Foliar ratings using KWS (1-9) scale. Ratings are an average of all raters for each date.



**Figure 1:** Foliar ratings using KWS (1-9) scale. Ratings are an average of all raters for each date.