

MANAGING CERCOSPORA LEAF SPOT FOR PROFITABILITY

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For the past four growing seasons, wet weather has had a major impact on the duration of the planting season for the sugarbeet crop. In some years, over 40% of the crop has been planted after May 20. In 2002, frost and wind conditions also resulted in a major replant situation. Observations on these later planted sugar beets has raised questions as to whether they develop *Cercospora beticola* later than those early planted, and if fungicide treatments can be reduced or eliminated, especially if the variety has better Cercospora tolerance. In 2002, a trial at the Northwest Research and Outreach Center was initiated to determine the effect of planting date and varietal tolerance on Cercospora control as they affect sugarbeet yield, quality and profitability.

Procedure: Van der Have H66240, Beta 6447 and Beta 6400 sugarbeet seed, which differ in the level of tolerance to Cercospora, were planted on April 26, May 14 and May 28, 2002. The three-year mean Cercospora rating as reported in the 2001 Coded Variety Trial, was 5.13, 4.85 and 4.52 respectively for these varieties. Two fungicide regimes, Eminent/TPTH/Eminent and TPTH/Eminent/TPTH were compared to a control. The fungicide treatments were applied at a pressure of 100 psi and at a volume 20 gpa to the center four rows of a six-row plot on August 2, 16 and September 5. The center two rows were harvested for yield on September 26, 2002 and the quality factors determined at the ACSC Quality Laboratory in East Grand Forks, MN. Final Cercospora rating using the KWS scale were made on September 25. All other cultural and pesticide practices were as recommended.

Results: There was no statistical differences between the two fungicide regimes ([Table 1](#)) and therefore were combined into a single comparison treatment against the control. No differences in initial disease onset were noted between varieties at a given planting date even though they differed in KWS Cercospora ratings. Onset in the May 14 planting was approximately 7 days after the April 26 planting and 17 days for the May 28 planting. Row closure was equal between the April 26 and May 14 plantings and was 7 days later for the May 28 planting. At harvest the May 28 planting had the greatest amount of canopy area and closure.

At harvest, under natural Cercospora infection (non-inoculated) there were significant differences in the degree of Cercospora infection between varieties, planting dates, and planting dates within a given variety if no fungicide treatments were applied ([Table 2](#)). Within all varieties the level of leaf spot significantly decreased with later plantings. Application of fungicide significantly reduced the severity of Cercospora leafspot ([Table 3](#)). The benefit (gain or loss) of fungicide application at each planting date for each variety is shown in [Table 4](#). Increases in yield and quality factors from fungicide application decreased as planting date becomes later. Only with the variety H66240 was a significant increase in recoverable sucrose per acre realized from fungicide application on the May 28 planting. **GROSS** dollar return from fungicide application with the different varieties and planting dates is shown in [Table 5](#). If a conservative estimate of \$15/A application cost (chemical + application) is calculated, then total application cost for this trial would be \$45/A. All three varieties planted early (4/26) benefitted from three fungicide applications. Only H66240 which had the highest KWS Cercospora rating (5.13) planted late (5/28) would have given a **NET** return on fungicide investment. B6400, which had the lowest KWS Cercospora rating (4.52) would have given no **NET** return on the May 14 and May 28 plantings ([Table 6](#)).

Discussion: The sugarbeet varieties used in this trial were selected only for differences in KWS Cercospora ratings. No other inferences should be drawn relative to yield or quality factors, as they vary considerably in these regards.

The KWS Cercospora ratings the producer looks at in making varietal selections many times are extremely small and are not well understood. The published ratings are from inoculated trials and represent a mean score of several Cercospora readings after inoculation. In this trial, the published KWS Cercospora rating for the varieties chosen, ranged from a high of 5.13 to a low of 4.52. Cercospora ratings for the April 26 planting in this trial ranged from 8.00 to 4.38. These ratings represent a real world situation, at harvest, under a non-inoculated condition. The differences and magnitude of the effects of Cercospora leaf spot are evident from the data.

A general guideline for leafspot damage is that a KWS rating of less than 4.0 will not result in an economic loss of yield or quality (in most cases). This guideline, however, does not take into consideration the amount of time a variety may have a given level of leafspot. Analysis of the data from this trial showed no economic loss from a KWS rating below 3.25.

Canopy closure has been associated by some to be the trigger feature for the onset of Cercospora. This trial would suggest age of the plant rather than canopy closure to be the more important factor, as canopy closure for the April 26 and May 14 plantings were identical and only a week later for the May 28 planting. Cercospora ratings for the various planting dates significantly decreased as the planting date became later. B6400 gave a positive response to fungicide application only on the April 26 planting, whereas H66240 gave positive responses to all three planting dates. Small differences in published Cercospora ratings can have a significant effect on the severity of Cercospora on a given variety under natural infection and the cost of control.

Calendar application or application of fungicides when Cercospora is first reported in a factory district, regardless of date of planting or Cercospora tolerance of the planted variety can add unneeded cost to the producer's bottom line. "All things are not created equal" definitely applies to Cercospora leaf spot management and Net return on your fungicide investment.

Table 1. Main fungicide combination effects on yield, quality and Cercospora control.

Fungicide Combination	Rate (product/A)	Recoverable sucrose (lb/A) (lb/T)		Yield (T/A)	Sucrose (%)	LM (%)	Cercospora Rating (KWS 1-9) ¹
Eminent/TPTH/Eminent	9oz/5oz/9oz	6947	313.1	22.2	16.94	1.29	2.17
TPTH/Eminent/TPTH	5oz/9oz/5oz	6822	311.1	21.9	16.85	1.29	1.89
Stat Sign.		NS ²	NS	NS	NS	NS	NS

¹ Cercospora leaf spot measured on KWS Scale 1-9 (no leafspot - dead outer leaves, inner leaves severely damaged, regrowth of new leaves).

² Statistically non significant.

Table 2. Planting date effects on Cercospora KWS disease ratings within varieties with no disease control measures applied.

Planting Date	<u>Variety</u>		
	H66240 (5.13) ¹	B6447 (4.85) ¹	B6400 (4.52) ¹
4/26	8.00	6.50	4.38
5/14	7.00	5.38	3.13
5/28	4.38	3.25	2.75

¹ 3-year mean Cercospora KWS rating (2001 Coded Varietal Trials)

Table 3. Planting date effects on Cercospora KWS disease ratings within varieties with fungicide measures applied.

Planting Date	<u>Variety</u>		
	H66240 (5.13)	B6447 (4.85)	B6400 (4.52)
4/26	3.38	2.13	1.88
5/14	2.56	1.94	1.69
5/28	1.94	1.44	1.35

Table 4. Gain or (loss) in yield, quality and Cercospora rating from fungicide application at different planting dates.

Variety	Planting Date	Recoverable Sucrose (lb/A) (lb/T)		Yield (T/A)	Sucrose (%)	LM (%)	Cercospora Rating (KWS 1-9)
H66240	4/26	1399	25.25	2.67	1.01	0.25	4.62
	5/14	1172	9.50	3.19	0.52	0.15	4.44
	5/28	542	5.75	1.46	0.09	0.20	2.44
B6447	4/26	1237	9.00	3.37	0.33	0.13	4.37
	5/14	696	17.0	1.07	0.86	0.01	3.44

	5/28	242	1.25	0.70	0.03	0.03	1.81
B6400	4/26	923	14.25	2.02	0.53	0.17	2.5
	5/14	359	0.00	1.13	(0.03)	0.02	1.4
	5/28	166	(5.00)	0.87	(0.20)	(0.05)	1.4

Table 5. Gross return ¹ on fungicide application at different planting dates and Cercospora tolerance levels.

Planting Date	<u>Variety.</u>		
	H66240	B6447	B6400
4/26	\$229	\$168	\$142
5/14	\$160	\$123	\$ 44
5/28	\$ 75	\$ 32	\$ 8

¹ Basis ACSC November 15, 2002 payment schedule.

Table 6. Net return on fungicide application at different planting dates and Cercospora tolerance levels.

Planting Date	<u>Variety.</u>		
	H66240	B6447	B6400
4/26	\$184	\$123	\$97
5/14	\$115	\$ 78	\$ (1)
5/28	\$ 30	\$ (12)	\$ (37)