

**BEET** (*Beta vulgaris*)  
**Cercospora leaf spot;** *Cercospora beticola*

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### **Evaluation of fungicides to control *Cercospora* leaf spot on table beet - Hancock, 2001**

A field trial was planted June 1 at the Hancock Agricultural Research Station to evaluate fungicide efficacy for control of *Cercospora* leaf spot on beet. Seeds of cultivar Ruby Queen were planted at approximately 10-12 seedballs per foot. The experimental design was a randomized complete block with four replications. Each plot consisted of one, 6-foot-wide bed with four 20-foot-long rows planted in it. Soil type was a Plainfield loamy sand with pH 6.0. Fertilizer consisted of: 6-24-24, 300 lb/A + Cal-Sul, 350 lb/A broadcast May 25, prior to planting and 28% UAN, 30 lb/A applied through irrigation water on July 25, August 9 and August 20. Select 2 EC, 8 fl oz./A + Crop Oil, 1.0 pt/A + Ammonium sulfate, 2.0 lb/A was applied July 19 for weed control. Fungicide treatments were applied with a tractor-mounted boom pressurized with an air compressor. Treatments were applied July 31, August 7, 14, 21 and 28, according to treatment protocol, at a rate equivalent to 35 gal water/A at 40 psi, using Tee Jet D3-23 nozzles (8 nozzles at 8-inch spacing). Disease severity was rated for four 3-ft-long sections of the center two rows of each treatment plot from August 9 to October 1 using the Horsfall-Barratt system. Two 10-foot-long sections of row were hand dug from each plot on October 2 and the yield was graded by hand into three size classes (based on diameter) and culls. Rainfall recorded for this field during the growing season (inches) was June (4.1); July (2.73); August (4.57) and September (4.59). An additional 11.82 inches of water was applied as overhead sprinkler irrigation in 23 applications (June 26 – Sep 14).

Disease progressed slowly in this trial throughout the growing season but from late August through the final rating on October 1, there were significant differences between the untreated control plots and several of the fungicide treatments. Through August, disease severity for all treatments was significantly lower than the untreated control, but there were not significant differences between disease levels for any of the fungicide treatments. By mid-September BAS 500, BAS 516 and the Quadris/Kocide treatments were exhibiting better disease control than Kocide alone and this is reflected in lower AUDPC values for these treatments. On October 1 disease severity for plots treated with BAS 500, BAS 516 and Quadris/Kocide was significantly lower than in the untreated control plots or in plots where Kocide was applied every two weeks. Significant differences in total yield or size distribution were not observed between treatments. A comparison of the amount of fungicide active ingredients (a.i.) applied in a season-long program shows that use of Quadris/Kocide, BAS 500 and BAS 516 represent significant reductions in a.i.

**Table 1. Description of foliar fungicide treatments.**

Treatment chemicals	Rate/Acre		Schedule summary (Application dates: 1 = 7/31, 2 = 8/7, 3 = 8/14, 4 = 8/21, 5 = 8/28 )	Total active ingredient (ai) used during season (lb/A)
	Formulation	a.i.		
1 Untreated Control	---	0		0
2 BAS 500 20% WG	1.0 lb	0.2 lb	Every 2 weeks (Appl 1, 3, 5)	0.6
3 BAS 516 38% WG	0.66 lb	0.25 lb	Every 2 weeks (Appl 1, 3, 5)	0.75
4 Kocide DF	2.0 lb	1.22 lb	Weekly	6.1
5 Kocide DF	2.0 lb	1.22 lb	Every 2 weeks (Appl 1, 3, 5)	3.66
6 Quadris 2.08 SC	0.38 pt	0.1 lb	Appl 1,3,5	1.52
Kocide DF	1.0 lb	0.61 lb	Appl 2,4	

**Table 2. Effect of foliar fungicide treatment on disease development and yield.**

Treatment number	Disease Severity (%) <sup>1</sup>					Relative AUDPC <sup>2</sup>	Total Yield (ton/A)	% of yield			
	8/9	8/22	8/31	9/13	10/1			< 1.2" diam.	1.25 – 2.75" diam.	> 2.75" diam.	Cull
1	3.5	7.0	8.2	25.8	42.6	0.184	14.0	23.9	71.5	0.0	4.6
2	3.1	3.1	4.7	11.7	22.9	0.093	13.1	25.8	70.3	1.6	2.3
3	2.9	2.3	4.4	10.5	16.4	0.076	13.9	28.9	66.0	2.4	2.7
4	3.7	3.5	4.5	18.2	27.0	0.120	12.5	28.2	65.9	1.3	4.6
5	3.8	2.9	4.2	17.0	37.5	0.133	13.4	27.6	70.3	0.0	2.1
6	3.5	2.6	4.1	12.6	19.3	0.088	14.5	26.4	68.2	2.6	2.8
Pr > F <sup>3</sup>	0.88	< 0.01	< 0.01	0.07	< 0.01	< 0.01	0.80	0.95	0.77	0.50	0.75
LSD <sup>3</sup>	NS	1.5	1.4	10.5*	11.3	0.047	NS	NS	NS	NS	NS

1. Severity of leaf blight symptoms was rated on a Horsfall-Barratt scale of 0 (no infection) to 11 (all foliage dead). Ratings were converted to percentages.
2. Relative area under the disease progress curve. Data for each date were plotted on a graph and the area under the line was calculated for each treatment providing a measure of the relative severity of disease throughout the season. A disease rating of 100% for the entire season would produce a value of 1.0. All relative AUDPC values are expressed as the proportion of this value. Either decreased disease severity or later disease development will contribute to lower relative areas under the disease progress curve.
3. Analysis of variance was performed on data, and Fisher's protected least significant difference (LSD) was calculated. NS = not significant at  $P = 0.10$  (\* indicates differences between treatments were significant at  $P = 0.10$ , but not at  $P = 0.05$ ).