

**2001**  
**INSECT AND DISEASE**  
**MANAGEMENT**  
**SUGARBEETS**

**RIDGETOWN COLLEGE**  
**UNIVERSITY OF GUELPH**  
**Ridgetown, Ontario**  
**Dr. R.E. Pitblado**

**Trial Results may be seen on the Ridgetown College website:**

[www.ridgetownc.on.ca](http://www.ridgetownc.on.ca)

December, 2001

To Those Interested in Insect and Plant Disease Controls in Sugarbeets:

We appreciate the cooperation and assistance provided by the chemical companies and their representatives, their ideas and the chemical samples they have provided for the research work carried out at Ridgetown College, University of Guelph.

We also appreciate the cooperation of our farmer cooperators who have provided land and assist in working the land, applying fertilizer, herbicides and planting the crop.

We are indebted to the Ontario Sugarbeet Growers' Association and to Michigan Sugar Company who feel this type of research program is desirable and are prepared to financially support this endeavour.

Technical assistance was expertly directed by Ms. Phyllis May of our college staff, and aided by Petra Biondi, Jennifer Martens and Joal Sikkema. I wish to thank them.

We trust that the information provided by this research will further the science of insect and plant disease control, and to assist companies in furthering their registrations of agricultural chemicals that will prove beneficial to our Ontario farmers.

Permission to reproduce any or all parts of this booklet must be approved by the author.

Yours truly,

Dr. R.E. Pitblado  
Ridgetown College, University of Guelph  
Ridgetown, Ontario  
NOP 2C0  
Tel: (519) 674-1605  
Fax: (519) 674-1600  
E-mail [rpitblad@ridgetownc.uoguelph.ca](mailto:rpitblad@ridgetownc.uoguelph.ca)

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# **ONTARIO SUGAR BEET GROWERS' ASSOCIATION**

## **RESEARCH SUMMARY RESULTS**

### **THE DEVELOPMENT OF PEST MANAGEMENT STRATEGIES FOR INSECTS AND PLANT DISEASES IN SUGARBEETS - 2001**

**Dr. Ron Pitblado**  
**Ridgetown College University of Guelph**

#### **RHIZOCTONIA CROWN ROT**

##### **CONTROL OF EARLY RHIZOCTONIA CROWN ROT IN SUGARBEETS**

BAS 500 and QUADRIS 250SC applied at the 8 leaf stage reduced the number of plants dying from Rhizoctonia crown rot infections. Only BAS 500 applied later at row closure maintained the plant population while plant losses were recorded at that time of application in the QUADRIS 250SC and the control plots. Application of both BAS 500 and QUADRIS 250SC applied both at the 8 leaf and at row closure provided significant control of Cercospora leaf spot well after the application observed into September. The level of Cercospora leaf spot control was higher with BAS 500.

##### **COMMERCIAL FIELD EVALUATION FOR THE CONTROL OF RHIZOCTONIA CROWN ROT IN SUGARBEETS**

The level of Rhizoctonia crown rot was extremely low in all eleven sugarbeet fields surveyed. As a consequence there were no treatment effects. Cercospora leaf spot incidence at the time of evaluations were low also in many fields however those fields that had any sort of foliage disease pressure showed treatment effects. In field #8, where Cercospora disease pressure was the highest, both HEADLINE 250EC and QUADRIS applied at row closure provide a level of control greater than the earlier fungicide applications at the 8 leaf stage. A similar trend, that being a reduction of Cercospora leaf spot when fungicides were applied at row closure, especially with HEADLINE 250EC, was observed in fields 2, 4, 5 and 6.

#### **CERCOSPORA LEAF SPOT**

##### **REGISTERED FUNGICIDES FOR THE CONTROL OF CERCOSPORA LEAFSPOT IN SUGAR BEETS**

The most effective and consistent treatments for the control of Cercospora leafspot in sugarbeets were the spray combination of SENATOR 70WP + DITHANE DG 75%NT and using PENNCOZEB 75DF alone. There were a number of other effective fungicides including KOCIDE 101, CUPRIFIX DF20% and DITHANE M-45. The remaining treatments including the wettable formulation of PENNCOZEB 80WP, DITHANE DG 75%NT and KOCIDE 101 with the surfactant ASSIST were less effective with MANZATE 200DF the least effective in controlling Cercospora leafspot in sugarbeets this year.

## **EVALUATION OF CANDIDATE FUNGICIDES FOR THE CONTROL OF CERCOSPORA LEAFSPOT IN SUGARBEETS**

Outstanding control of Cercospora leafspot in sugarbeets was observed with alternate sprays of EMINENT 125 SL and HEADLINE 250 EC, EMINENT 125 SL alternated with a tank mix combination of SENATOR 70WSB + DITHANE DF 75% NT, and both of HEADLINE 250EC and FLINT 50WG applied alone. The addition of the surfactant ASSIST did not seem to make any significant improvement for the control of Cercospora leafspot nor differences in the rates of HEADLINE. Apparently even the lowest rate proved to be very effective. Products that were less effective, although significantly better than the control, were QUADRIS 250SC, BRAVO ULTREX 82.5 DG and FOLICUR 3.6 F.

## **INITIAL SPRAY APPLICATION TIMING FOR CERCOSPORA LEAFSPOT CONTROL IN SUGARBEETS**

Under dry summer conditions the initial spray applications could have been delayed until August 2, when the Disease Severity Values had accumulated a value of 70. Initiating sprays earlier, such as on July 2, or 16 or when first symptom appeared this year on July 11, provided excellent control of Cercospora leafspot however additional sprays were applied that were unnecessary. Delaying the initial spray application until August 15 or as calculated by TomCast a disease severity value of 86, resulted in higher levels of Cercospora disease on the sugarbeet foliage.

Growers would do well to use the weather timed spray program modified for use in sugarbeets using the initial spray criteria of between 55 and 70 Disease Severity Values.

## **TIMING OF SUBSEQUENT SPRAY APPLICATIONS FOR CERCOSPORA LEAFSPOT CONTROL IN SUGARBEETS**

The most critical spray date of application was on 55 Disease Severity Values on July 20 with the combination spray of SENATOR 70 WSB + DITHANE DF 75% NT. This single application was as effective as multiple spray applications. The growing season was dry however Cercospora Leafspot did increase later on in the season yet with this one application of a very effective combination fungicide outstanding control was achieved. It is critical to note that control was not achieved using this single spray date using the less effective Cercospora fungicide DITHANE DF 75% NT. Considerably more applications of DITHANE DF 75% NT would be necessary beyond the two applied in this trial to effectively keep Cercospora Leafspot under control even in a low disease pressure situation. The combination SENATOR 70 WSB + DITHANE DF 75% NT is an extremely effective fungicide treatment for the control of Cercospora Leafspot and using the weather timed models the number of applications can be reduced significantly depending on the weather.

**PMR REPORT # SECTION J: DISEASES OF VEGETABLES AND SPECIAL CROPS**  
**ICAR: 61006536**

**CROP:** Sugar beet (*Beta vulgaris L.*) cv. E17  
**PEST:** Cercospora leafspot, *Cercospora beticola*, Sacc.  
Rhizoctonia Crown Rot

**NAME AND AGENCY:**

PITBLADO, R E

Ridgetown College, University of Guelph, Ridgetown, Ontario, N0P 2C0

**Tel:** (519) 674-1605

**Fax:** (519) 674-1600

**E-mail:**

rpitblad@ridgetownc.uoguelph.ca

**TITLE: CONTROL OF EARLY RHIZOCTONIA CROWN ROT IN SUGARBEETS**

**MATERIALS:** BAS 500 (experimental), QUADRIS 250SC (azoxystrobin).

**METHODS:** Sugar beets were planted on April 30, 2001 at Ridgetown. Plots were 3 rows, 7 m in length spaced 0.75 m apart, replicated four times in a randomized complete block design. Spray applications were directed towards the crown of the plants using a specialized small plot research CO<sub>2</sub> sprayer with a three nozzled hand-held boom applying 200L/ha of spray mixture. Applications were timed at the 8 leaf stage on June 14 and row closure on July 16. Assessments were conducted by taking plant stand counts on July 16 and Aug. 28, number of dead plants per plot caused by Rhizoctonia crown rot on July 6, 20, Aug. 2 and 16, reporting only the August 2 evaluation and Cercospora leaf spot disease ratings on August 1 and 15. Cercospora leaf spot was evaluated by counting the number of clusters of leaf spot lesions observed on the sugarbeet foliage per plot. Each plant was examined along the length of the plot row, accumulating the number of fungal disease symptoms per plot. The number of Cercospora leaf spot disease sites counted reflects on the level of control of the treatment. Treatments with lower numbers are more effective than those with higher disease counts. Results were analysed using the Duncan's multiple range test (P# 0.05).

**RESULTS:** Data are presented in Table 1.

**CONCLUSIONS:** BAS 500 and QUADRIS 250SC applied at the 8 leaf stage reduced the number of plants dying from Rhizoctonia crown rot infections. Only BAS 500 applied later at row closure maintained the plant population while plant losses were recorded at that time of application in the QUADRIS 250SC and the control plots. Application of both BAS 500 and QUADRIS 250SC applied both at the 8 leaf and at row closure provided significant control of Cercospora leaf spot well after the application observed into September. The level of Cercospora leaf spot control was higher with BAS 500.

**Table 1.** Effect of fungicides on plant stand counts, Rhizoctonia infected plants and level of Cercospora leaf spot control in sugarbeets.

Treatments	Rate Product/ha	Application	Plant Stand Cts per plot		Rhizoctonia # dead plants per plot	Cercospora leaf spot Foliar Disease Cluster Counts <sup>1/</sup> Disease Ratings (0-10) <sup>2/</sup>	
			July 16	Aug. 28	Aug. 2	Sept. 1	Sept. 15
			BAS 500	0.64 L	8 leaf	101 a*	104.5 ab
QUADRIS 250SC	0.43 L	8 leaf	108 a	109.0 a	1.0 a	15.3 b	5.3 c
BAS 500	0.64 L	row closure	106 a	104.3 ab	0.8 a	4.3 c	8.5 a
QUADRIS 250SC	0.43 L	row closure	90 a	85.8 c	1.3 a	7.5 bc	6.8 b
Control			91 a	90.0 bc	2.5 a	38.8 a	3.3 d
ANOVA P#0.05			s	s	s	s	s
Coefficient of Variation (%)			10.8	10.1	194.1	40.3	13.1

\*These values are the means of four replications. Numbers within a column followed by the same small letter are not significantly different according to a Duncan's Multiple Range Test (P#0.05).

<sup>1/</sup> Disease Cluster Counts - the number of fungal disease clusters counted per length of row. The higher the number the greater numbers of disease sites, lower numbers indicate higher levels of Cercospora leaf spot disease control.

<sup>2/</sup> Foliar Disease Ratings (0-10); 0 - severe leaf spot disease, plants blackened, defoliated, 10- no disease symptoms, foliage green and healthy.

**PMR REPORT #**      **SECTION J: DISEASES OF VEGETABLES AND SPECIAL CROPS**  
**ICAR:**                      61006536

**CROP:**                      Sugar beet (*Beta vulgaris L.*) cv. E17  
**PEST:**                      Cercospora leafspot, *Cercospora beticola*, Sacc.  
Rhizoctonia Crown Rot

**NAME AND AGENCY:**

PITBLADO, R E

Ridgetown College, University of Guelph, Ridgetown, Ontario, N0P 2C0

**Tel:** (519) 674-1605    **Fax:** (519) 674-1600    **E-mail:** rpitblad@ridgetownc.uoguelph.ca

**TITLE:**                      **COMMERCIAL FIELD EVALUATION FOR THE CONTROL OF  
RHIZOCTONIA CROWN ROT IN SUGARBEETS**

**MATERIALS:** HEADLINE 250EC (BAS 500), QUADRIS 250SC (azoxystrobin).

**METHODS:** The trial was designed to determine the effectiveness of fungicides applied at the 8 leaf and at row closure for the control of crown rot caused by Rhizoctonia sp. and to determine whether this timing of fungicide application would have any additional benefits in controlling Cercospora leaf spot in sugarbeets. Eleven commercial fields were selected at random within Kent county in the spring of 2001. Plots were single rows 20 m in length, replicated four times within a 50m area. Spray applications were directed towards the crown of the plants using a specialized small plot research CO<sub>2</sub> sprayer with a three nozzled hand-held boom applying 200L/ha of spray mixture. Applications were timed at the 8 leaf stage between June 11 and 13 and row closure between July 9-13. Assessments were conducted by taking plant stand counts on June 25 and Aug. 30, counting the number of dead plants per plot on July 6, 19, Aug. 3, and 17, and counting the number of disease cluster symptoms of Cercospora leaf spot on Sept. 14. Cercospora leaf spot was evaluated by counting the number of clusters of leaf spot lesions observed on the sugarbeet foliage per 7m of plot. Each plant was examined along the length of the plot row, accumulating the number of fungal disease symptoms per plot. The number of Cercospora leaf spot disease sites counted reflects on the level of control of the treatment. Treatments with lower numbers are more effective than those with higher disease counts. Results were analysed using the Duncan's multiple range test (P# 0.05).

**RESULTS:**      Data are presented in Tables 1, 11 field locations.

**CONCLUSIONS:** The level of Rhizoctonia crown rot was extremely low in all eleven sugarbeet fields surveyed. As a consequence there were no treatment effects. Cercospora leaf spot incidence at the time of evaluations were low also in many fields however those fields that had any sort of foliage disease pressure showed treatment effects. In field #8, where Cercospora disease pressure was the highest, both HEADLINE 250EC and QUADRIS applied at row closure provide a level of control greater than the earlier fungicide applications at the 8 leaf stage. A similar trend, that being a reduction of Cercospora leaf spot when fungicides were applied at row closure, especially with HEADLINE 250EC, was observed in fields 2, 4, 5 and 6.



**Table 1.** Effect of fungicides on plant stand counts, Rhizoctonia infected plants and level of Cercospora leaf spot control in sugarbeets.

**Field location #1 - Don Ardis - left**

Treatments	Rate Product /ha	Application	Plant Stand Cts per plot		% Plant Survival	Rhizoctonia Crown Rot # dead plants per plot		Cercospora leaf spot Disease Cluster Counts <sup>1/</sup>
			June 25	Aug. 30		Aug. 30	July 19	
HEADLINE 250EC	0.64 L	8 leaf	109.0 a*	114.8 a	108 a	0.0 a	0.8 a	4.3 a
QUADRI 250SC	0.43 L	8 leaf	125.5 a	122.5 a	98 a	0.0 a	0.0 a	1.5 a
HEADLINE 250EC	0.64 L	row closure	122.0 a	114.3 a	93 a	0.0 a	0.0 a	1.5 a
QUADRI 250SC	0.43 L	row closure	130.8 a	122.8 a	94 a	0.5 a	0.0 a	6.3 a
Control			128.0 a	117.0 a	98 a	0.0	0.0 a	8.5 a
ANOVA P#0.05			ns	ns	ns	ns	ns	ns
Coefficient of Variation (%)								

\*These values are the means of four replications. Numbers within a column followed by the same small letter are not significantly different according to a Duncan's Multiple Range Test (P#0.05).

<sup>1/</sup> Disease Cluster Counts - the number of fungal disease clusters counted per length of row. The higher the number the greater numbers of disease sites, lower numbers indicate higher levels of Cercospora leaf spot disease control.

**Field location #2 - Don Ardis - right**

Treatments	Rate Product /ha	Application	Plant Stand Cts per plot		% Plant Survival	Rhizoctonia Crown Rot # dead plants per plot		Cercospora leaf spot Disease Cluster Counts <sup>1/</sup>
			June 25	Aug. 30		Aug. 30	July 19	
HEADLINE 250EC	0.64 L	8 leaf	140.5 a	122.8 a	88 a	0.5 a	0.5 ab	13.0 b
QUADRI 250SC	0.43 L	8 leaf	133.5 a	119.5 a	92 a	0.3 a	0.0 b	20.0 a
HEADLINE 250EC	0.64 L	row closure	127.5 a	116.3 a	91 a	0.3 a	0.0 b	8.8 b
QUADRI 250SC	0.43 L	row closure	142.3 a	121.8 a	86 a	1.0 a	0.8 ab	12.0 b
Control			129.5 a	117.3 a	93 a	3.5 a	2.8 a	22.5 a
ANOVA P#0.05			ns	ns	ns	ns	s	s
Coefficient of Variation (%)							201.9	34.0

\*These values are the means of four replications. Numbers within a column followed by the same small letter are not significantly different according to a Duncan's Multiple Range Test (P#0.05).

<sup>1/</sup> Disease Cluster Counts - the number of fungal disease clusters counted per length of row. The higher the number the greater numbers of disease sites, lower numbers indicate higher levels of Cercospora leaf spot disease control.

**Field location #3 - Glenn Jack - right**

Treatments	Rate Product /ha	Application	Plant Stand Cts per plot		% Plant Survival	Rhizoctonia Crown Rot # dead plants per plot		Cercospora leaf spot Disease Cluster Counts <sup>1/</sup>
			June 25	Aug. 30		Aug. 30	July 19	
HEADLINE 250EC	0.64 L	8 leaf	158.8 a	124.8 a	79 a	0.5 a	1.8 a	5.8 a
QUADRI 250SC	0.43 L	8 leaf	147.3 a	124.5 a	85 a	0.0 a	0.5 a	3.0 a
HEADLINE 250EC	0.64 L	row closure	150.8 a	123.5 a	83 a	0.3 a	0.3 a	2.3 a
QUADRI 250SC	0.43 L	row closure	151.8 a	133.5 a	88 a	0.8 a	0.0 a	3.5 a
Control			149.8 a	126.3 a	86 a	0.8 a	1.5 a	3.5 a
ANOVA P#0.05			ns	ns	ns	ns	ns	ns
Coefficient of Variation (%)								

\*These values are the means of four replications. Numbers within a column followed by the same small letter are not significantly different according to a Duncan's Multiple Range Test (P#0.05).

<sup>1/</sup> Disease Cluster Counts - the number of fungal disease clusters counted per length of row. The higher the number the greater numbers of disease sites, lower numbers indicate higher levels of Cercospora leaf spot disease control.

**Field location #4 - Glenn Jack - left**

Treatments	Rate Product /ha	Application	Plant Stand Cts per plot		% Plant Survival	Rhizoctonia Crown Rot # dead plants per plot		Cercospora leaf spot Disease Cluster Counts <sup>1/</sup>
			June 25	Aug. 30		Aug. 30	July 19	
HEADLINE 250EC	0.64 L	8 leaf	141.5 a	133.5 a	95 a	3.0 a	3.5 a	3.3 a
QUADRI 250SC	0.43 L	8 leaf	149.5 a	125.0 a	83 a	0.5 a	0.8 a	3.0 a
HEADLINE 250EC	0.64 L	row closure	143.8 a	132.0 a	93 a	1.0 a	2.0 a	1.3 a
QUADRI 250SC	0.43 L	row closure	151.5 a	129.0 a	86 a	0.3 a	0.0 a	2.5 a
Control			150.3 a	128.3 a	87 a	1.0 a	1.8 a	3.0 a
ANOVA P#0.05			ns	ns	ns	ns	ns	ns
Coefficient of Variation (%)								

\*These values are the means of four replications. Numbers within a column followed by the same small letter are not significantly different according to a Duncan's Multiple Range Test (P#0.05).

<sup>1/</sup> Disease Cluster Counts - the number of fungal disease clusters counted per length of row. The higher the number the greater numbers of disease sites, lower numbers indicate higher levels of Cercospora leaf spot disease control.

**Field location #5 - Piling Station**

Treatments	Rate Product /ha	Application	Plant Stand Cts per plot		% Plant Survival	Rhizoctonia Crown Rot # dead plants per plot		Cercospora leaf spot Disease Cluster Counts <sup>1/</sup>
			June 25	Aug. 30		Aug. 30	July 19	
HEADLINE 250EC	0.64 L	8 leaf	141.5 a	119.3 a	85 a	0.0 a	0.8 ab	8.3 a
QUADRI 250SC	0.43 L	8 leaf	141.0 a	125.3 a	91 a	1.3 a	1.3 ab	8.8 a
HEADLINE 250EC	0.64 L	row closure	129.3 a	128.5 a	100 a	1.0 a	2.0 a	4.3 b
QUADRI 250SC	0.43 L	row closure	130.5 a	126.5 a	97 a	0.3 a	0.5 b	2.3 b
Control			141.0 a	125.8 a	90 a	0.5 a	0.5 b	8.3 a
ANOVA P#0.05			ns	ns	ns	ns	s	s
Coefficient of Variation (%)							83.2	8.6

\*These values are the means of four replications. Numbers within a column followed by the same small letter are not significantly different according to a Duncan's Multiple Range Test (P#0.05).

<sup>1/</sup> Disease Cluster Counts - the number of fungal disease clusters counted per length of row. The higher the number the greater numbers of disease sites, lower numbers indicate higher levels of Cercospora leaf spot disease control.

**Field location #6 - Todd Suitor - left**

Treatments	Rate Product /ha	Application	Plant Stand Cts per plot		% Plant Survival	Rhizoctonia Crown Rot # dead plants per plot		Cercospora leaf spot Disease Cluster Counts <sup>1/</sup>
			June 25	Aug. 30		Aug. 30	July 19	
HEADLINE 250EC	0.64 L	8 leaf	106.0 ab	116.5 a	113 a	0.0 a	0.5 a	0.8 a
QUADRI 250SC	0.43 L	8 leaf	116.5 a	103.3 a	89 a	0.3 a	1.0 a	1.5 a
HEADLINE 250EC	0.64 L	row closure	86.3 b	102.5 a	119 a	1.0 a	2.3 a	0.3 a
QUADRI 250SC	0.43 L	row closure	110.5 a	99.8 a	91 a	0.0 a	0.0 a	0.8 a
Control			108.0 ab	102.3 a	98 a	0.0 a	0.3 a	0.8 a
ANOVA P#0.05			s	ns	ns	ns	ns	ns
Coefficient of Variation (%)			13.5					

\*These values are the means of four replications. Numbers within a column followed by the same small letter are not significantly different according to a Duncan's Multiple Range Test (P#0.05).

<sup>1/</sup> Disease Cluster Counts - the number of fungal disease clusters counted per length of row. The higher the number the greater numbers of disease sites, lower numbers indicate higher levels of Cercospora leaf spot disease control.

**Field location #7 -Todd Suitor - right**

Treatments	Rate Product /ha	Application	Plant Stand Cts per plot		% Plant Survival	Rhizoctonia Crown Rot # dead plants per plot		Cercospora leaf spot Disease Cluster Counts <sup>1/</sup>
			June 25	Aug. 30		Aug. 30	July 19	
HEADLINE 250EC	0.64 L	8 leaf	134.5 a	109.8 ab	82 ab	1.0 a	0.0 a	1.3 a
QUADRIS 250SC	0.43 L	8 leaf	142.5 a	121.0 a	86 ab	0.5 a	0.0 a	2.3 a
HEADLINE 250EC	0.64 L	row closure	130.0 a	112.3 ab	87 ab	0.8 a	0.8 a	1.8 a
QUADRIS 250SC	0.43 L	row closure	124.8 a	118.3 ab	96 a	2.0 a	3.0 a	0.8 a
Control			143.3 a	102.0 b	73 b	2.3 a	2.5 a	2.5 a
ANOVA P#0.05			ns	s	s	ns	ns	ns
Coefficient of Variation (%)				9.7	12.8			

\*These values are the means of four replications. Numbers within a column followed by the same small letter are not significantly different according to a Duncan's Multiple Range Test (P#0.05).

<sup>1/</sup> Disease Cluster Counts - the number of fungal disease clusters counted per length of row. The higher the number the greater numbers of disease sites, lower numbers indicate higher levels of Cercospora leaf spot disease control.

**Field location #8 - Thompson's**

Treatments	Rate Product /ha	Application	Plant Stand Cts per plot		% Plant Survival	Rhizoctonia Crown Rot # dead plants per plot		Cercospora leaf spot Disease Cluster Counts <sup>1/</sup>
			June 25	Aug. 30		Aug. 30	July 19	
HEADLINE 250EC	0.64 L	8 leaf	138.3 a	138.0 ab	101 a	0.5 a	1.3 a	70.5 ab
QUADRIS 250SC	0.43 L	8 leaf	136.0 a	128.3 b	96 a	0.3 a	0.0 a	78.8 a
HEADLINE 250EC	0.64 L	row closure	157.3 a	147.0 a	94 a	0.0 a	0.3 a	59.0 b
QUADRIS 250SC	0.43 L	row closure	141.0 a	130.0 ab	94 a	1.0 a	0.8 a	57.5 b
Control			141.3 a	135.0 ab	96 a	0.8 a	2.8 a	82.5 a
ANOVA P#0.05			ns	s	ns	ns	ns	s
Coefficient of Variation (%)				8.0				15.1

\*These values are the means of four replications. Numbers within a column followed by the same small letter are not significantly different according to a Duncan's Multiple Range Test (P#0.05).

<sup>1/</sup> Disease Cluster Counts - the number of fungal disease clusters counted per length of row. The higher the number the greater numbers of disease sites, lower numbers indicate higher levels of Cercospora leaf spot disease control.

**Field location #9 - Parrot Line**

Treatments	Rate Product /ha	Application	Plant Stand Cts per plot		% Plant Survival	Rhizoctonia Crown Rot # dead plants per plot		Cercospora leaf spot Disease Cluster Counts <sup>1/</sup>
			June 25	Aug. 30		Aug. 30	July 19	
HEADLINE 250EC	0.64 L	8 leaf	145.5 a			0.0 a	0.0 a	3.8 a
QUADRIS 250SC	0.43 L	8 leaf	157.0 a			0.0 a	0.0 a	0.8 a
HEADLINE 250EC	0.64 L	row closure	145.3 a			0.0 a	0.0 a	0.8 a
QUADRIS 250SC	0.43 L	row closure	129.3 a			0.0 a	0.0 a	2.8 a
Control			160.3 a			0.0 a	0.0 a	1.5 a
ANOVA P#0.05			ns	ns	ns	ns	ns	ns
Coefficient of Variation (%)								

\*These values are the means of four replications. Numbers within a column followed by the same small letter are not significantly different according to a Duncan's Multiple Range Test (P#0.05).

<sup>1/</sup> Disease Cluster Counts - the number of fungal disease clusters counted per length of row. The higher the number the greater numbers of disease sites, lower numbers indicate higher levels of Cercospora leaf spot disease control.

**Field location #10 - Glasgow (Bete 5400)**

Treatments	Rate Product /ha	Application	Plant Stand Cts per plot		% Plant Survival	Rhizoctonia Crown Rot # dead plants per plot		Cercospora leaf spot Disease Cluster Counts <sup>1/</sup>
			June 25	Aug. 30		Aug. 30	July 19	
HEADLINE 250EC	0.64 L	8 leaf	87.5 a	75.0 a	85 ab	1.0 a	0.0 a	
QUADRIS 250SC	0.43 L	8 leaf	114.5 a	99.5 a	87 a	0.0 a	0.5 a	
HEADLINE 250EC	0.64 L	row closure	98.5 a	91.0 a	93 a	0.0 a	0.0 a	
QUADRIS 250SC	0.43 L	row closure	114.0 a	80.5 a	71 b	0.0 a	1.5 a	
Control			99.5 a	87.5 a	88 a	0.0 a	1.0 a	
ANOVA P#0.05			ns	ns	s	ns	ns	ns
Coefficient of Variation (%)					6.8			

\*These values are the means of four replications. Numbers within a column followed by the same small letter are not significantly different according to a Duncan's Multiple Range Test (P#0.05).

<sup>1/</sup> Disease Cluster Counts - the number of fungal disease clusters counted per length of row. The higher the number the greater numbers of disease sites, lower numbers indicate higher levels of Cercospora leaf spot disease control.

**Field location #11 - Glasgow (Beta 573)**

Treatments	Rate Product /ha	Application	Plant Stand Cts per plot		% Plant Survival	Rhizoctonia Crown Rot # dead plants per plot		Cercospor a leaf spot Disease Cluster Counts <sup>1/</sup>
			June 25	Aug. 30		Aug. 30	July 19	
HEADLINE 250EC	0.64 L	8 leaf	123.5 ab	84.0 a	69 a	0.0 a	0.0 a	
QUADRIS 250SC	0.43 L	8 leaf	130.5 a	84.5 a	65 a	0.0 a	0.0 a	
HEADLINE 250EC	0.64 L	row closure	128.5 a	86.0 a	67 a	0.0 a	0.0 a	
QUADRIS 250SC	0.43 L	row closure	109.0 ab	87.0 a	81 a	0.0 a	0.0 a	
Control			99.5 b	86.0 a	87 a	0.0 a	0.0 a	
ANOVA P#0.05			s	ns	ns	ns	ns	ns
Coefficient of Variation (%)			7.7					

\*These values are the means of four replications. Numbers within a column followed by the same small letter are not significantly different according to a Duncan's Multiple Range Test (P#0.05).

<sup>1/</sup> Disease Cluster Counts - the number of fungal disease clusters counted per length of row. The higher the number the greater numbers of disease sites, lower numbers indicate higher levels of Cercospora leaf spot disease control.

**PMR REPORT #**      **SECTION J: DISEASES OF VEGETABLES AND SPECIAL CROPS**  
**ICAR:**                      61006536

**CROP:**                      Sugar beet (*Beta vulgaris L.*) cv. E17  
**PEST:**                      Cercospora leafspot, *Cercospora beticola*, Sacc.

**NAME AND AGENCY:**

PITBLADO, R E

Ridgetown College, University of Guelph, Ridgetown, Ontario, N0P 2C0

**Tel:** (519) 674-1605    **Fax:** (519) 674-1600    **E-mail:** rpitblad@ridgetownc.uoguelph.ca

**TITLE:                      REGISTERED FUNGICIDES FOR THE CONTROL OF CERCOSPORA  
LEAFSPOT IN SUGAR BEETS - 2001**

**MATERIALS:** DITHANE M-45 (80% mancozeb), DITHANE DF 75% NT (75% mancozeb), MANZATE 200DF (80% mancozeb), PENNCOZEB 80WP (80% mancozeb), PENNCOZEB 75DF (75% mancozeb), KOCIDE 101 (50% copper hydroxide), ASSIST (surfactant), CUPROFIX DF20% (TD 2389-01), SENATOR 70 WP (thiophanate-methyl).

**METHODS:** Sugar beets were planted at the research station in Ridgetown on April 30, 2001. Three row plots were established, 7m in length with rows spaced 0.75m apart, replicated four times in a randomized complete block design. The foliar applications were applied using a specialized small plot research CO<sub>2</sub> sprayer with a three nozzled hand-held boom applying 200L/ha of spray mixture. Two rows per treatment were sprayed with an unsprayed row between plots. Spray applications were applied on July 16, 30, Aug. 13, 27, September 6 and 14. Foliar disease assessments were made on September 1, counting the number of clusters of Cercospora fungal disease spots observed on the sugarbeet foliage. Each plant was examined along the length of the plot row, accumulating the number of disease symptom clusters per plot. The number of disease sites reflects the level of fungicide control. Treatments with lower numbers are more effective than those with higher disease counts. Further disease assessments were made on September 15 and 29, rating the overall plot on a scale of 0-10, with 0 equating to poorest control with considerable disease lesions and foliage “firing” while a rating of 10 equated to excellent control with no disease lesions observed. Results were analysed using the Duncan’s multiple range test (P# 0.05).

**RESULTS:**      Data are presented in Table 1.

**CONCLUSIONS:** The most effective and consistent treatments for the control of Cercospora leafspot in sugarbeets were the spray combination of SENATOR 70WP + DITHANE DG 75%NT and using PENNCOZEB 75DF alone. There were a number of other effective fungicides including KOCIDE 101, CUPRIFIX DF20% and DITHANE M-45. The remaining treatments including the wettable formulation of PENNCOZEB 80WP, DITHANE DG 75%NT and KOCIDE 101 with the surfactant ASSIST were less effective with MANZATE 200DF the least effective in controlling Cercospora leafspot in sugarbeets this year.

**Table 1.** Foliar disease control ratings for Cercospora Leafspot in Sugarbeets.

#	Treatments	Rate Product/ha	Disease Cluster Counts <sup>1/</sup>			Foliar Damage Ratings (0-10) <sup>2/</sup>		
			Sept. 1	Sept. 15	Sept. 29	Sept. 1	Sept. 15	Sept. 29
1	DITHANE M-45	2.25 kg	7.0 b*	7.0 cd	8.8 bc			
2	DITHANE DG 75% NT	2.25 kg	4.3 b	7.0 cd	7.9 c			
3	MANZATE 200 DF	2.25 kg	32.5 a	2.3 e	5.3 d			
4	PENNZOZEB 75 DF	2.25 kg	3.3 b	9.0 ab	8.8 bc			
5	PENNZOZEB 80WP	2.25 kg	8.3 b	6.8 cd	8.3 bc			
6	KOCIDE 101	2.25 kg	5.0 b	7.3 cd	9.0 ab			
7	KOCIDE 101 + ASSIST	2.25 kg 1.0 % v/v	10.5 b	6.3 d	8.0 c			
8	CUPROFIX DF20%	7.37 kg	7.5 b	8.0 bc	8.1 bc			
9	SENATOR 70 WP + DITHANE DG 75% NT	0.5 kg 2.25 kg	1.3 b	10.0 a	9.8 a			
10	CONTROL		40.3 a	1.8 e	4.8 d			
ANOVA P#0.05			s	s	s			
Coefficient of Variation (%)			59.5	14.6	7.2			

\*These values are the means of four replications. Numbers within a column followed by the same small letter are not significantly different according to a Duncan's Multiple Range Test (P#0.05).

<sup>1/</sup> Disease Cluster counts; the number of clusters of Cercospora fungal disease spots observed on the sugarbeet foliage. The number of disease sites reflects the level of fungicide control. Treatments with lower numbers are more effective than those with higher disease counts.

<sup>2/</sup> Foliar Damage Ratings (0-10) - 0, no control, foliage severely damaged; 10, complete control.



**PMR REPORT #**      **SECTION J: DISEASES OF VEGETABLES AND SPECIAL CROPS**  
**ICAR:**                      61006536

**CROP:**                      Sugar beet (*Beta vulgaris L.*) cv. E17  
**PEST:**                      Cercospora leafspot, *Cercospora beticola*, Sacc.

**NAME AND AGENCY:**

PITBLADO, R E

Ridgetown College, University of Guelph, Ridgetown, Ontario, N0P 2C0

**Tel:** (519) 674-1605    **Fax:** (519) 674-1600    **E-mail:** rpitblad@ridgetownc.uoguelph.ca

**TITLE:                      EVALUATION OF CANDIDATE FUNGICIDES FOR THE CONTROL OF  
CERCOSPORA LEAFSPOT IN SUGARBEETS**

**MATERIALS:** HEADLINE 250EC (BAS 500), FLINT 50WG (azoxystrobin), QUADRI 250SC (azoxystrobin), EMINENT 125 SL (tetraconazole), SENATOR 70 WP (thiophanate-methyl), DITHANE DF 75% NT (75% mancozeb), BRAVO ULTREX 82.5DG (chlorothalonil), FOLICUR 3.6F (hexaconazole), ASSIST (surfactant).

**METHODS:** Sugar beets were planted at the research station in Ridgetown on April 30, 2001. Three row plots were established, 7m in length with rows spaced 0.75m apart, replicated four times in a randomized complete block design. The foliar applications were applied using a specialized small plot research CO<sub>2</sub> sprayer with a three nozzled hand-held boom applying 200L/ha of spray mixture. Two rows per treatment were sprayed with an unsprayed row between plots. Spray applications were applied on July 16, 30, Aug. 13, 27, September 6 and 14. Foliar disease assessments were made on September 1, counting the number of clusters of Cercospora fungal disease spots observed on the sugarbeet foliage. Each plant was examined along the length of the plot row, accumulating the number of disease symptom clusters per plot. The number of disease sites reflects the level of fungicide control. Treatments with lower numbers are more effective than those with higher disease counts. Further disease assessments were made on September 15 and 29, rating the overall plot on a scale of 0-10, with 0 equating to poorest control with considerable disease lesions and foliage "firing" while a rating of 10 equated to excellent control with no disease lesions observed. Results were analysed using the Duncan's multiple range test (P# 0.05).

**RESULTS:**      Data are presented in Table 1.

**CONCLUSIONS:** Outstanding control of Cercospora leafspot in sugarbeets was observed with alternate sprays of EMINENT 125 SL and HEADLINE 250 EC, EMINENT 125 SL alternated with a tank mix combination of SENATOR 70WSB + DITHANE DF 75% NT, and both of HEADLINE 250EC and FLINT 50WG applied alone. The addition of the surfactant ASSIST did not seem to make any significant improvement for the control of Cercospora leafspot nor differences in the rates of HEADLINE. Apparently even the lowest rate proved to be very effective. Products that were less effective, although significantly better than the control, were QUADRI 250SC, BRAVO ULTREX 82.5 DG and FOLICUR 3.6 F.

**Table 1.** Foliar disease control ratings for Cercospora Leafspot in Sugarbeets.

Treatments	Rate Product/ha	Disease Cluster Counts <sup>1/</sup>			Foliar Damage Ratings (0-10) <sup>2/</sup>		
		Sept. 1	Sept. 15	Sept. 29			
HEADLINE 250EC + ASSIST	0.4 L 1.0% v/v	1.5 c*	9.0 b	9.4 b			
HEADLINE 250EC	0.4 L	5.0 bc	8.3 c	9.3 b			
HEADLINE 250EC	0.6 L	2.0 c	9.0 b	9.3 b			
FLINT 50WG	0.28 kg	1.3 c	9.8 a	9.3 b			
QUADRIS 250 SC	0.3 L	1.3 c	6.3 d	7.3 c			
EMINENT 125 SL; HEADLINE 250 EC	1.0 L 0.7 L	1.0 c	9.8 a	9.6 ab			
EMINENT 125 SL; SENATOR 70 WSB+ DITHANE DF 75% NT	0.369 L 0.56 kg 2.25 kg	1.0 c	9.5 ab	10.0 a			
BRAVO ULTREX 82.5 DG	1.5 kg	3.8 c	6.3 d	7.1 c			
FOLICUR 3.6 F	0.292 L	9.3 b	6.8 d	7.3 c			
CONTROL		27.5 a	1.8 e	4.0 d			
ANOVA P#0.05		s	s	s			
Coefficient of Variation (%)		61.1	6.1	4.9			

\*These values are the means of four replications. Numbers within a column followed by the same small letter are not significantly different according to a Duncan's Multiple Range Test (P#0.05).

<sup>1/</sup> Disease Cluster counts; the number of clusters of Cercospora fungal disease spots observed on the sugarbeet foliage. The number of disease sites reflects the level of fungicide control. Treatments with lower numbers are more effective than those with higher disease counts.

<sup>2/</sup> Foliar Damage Ratings (0-10) - 0, no control, foliage severely damaged; 10, complete control. Treatments; applications are tank mixed where treatments are connected by a + sign, while sprays separated by a ; are applied after one another.

**PMR REPORT #      SECTION J: DISEASES OF VEGETABLES AND SPECIAL CROPS**

**ICAR:**            61006536

**CROP:**            Sugar beet (*Beta vulgaris L.*) cv. E17

**PEST:**            Cercospora leafspot, *Cercospora beticola*, Sacc.

**NAME AND AGENCY:**

PITBLADO, R E

Ridgetown College, University of Guelph, Ridgetown, Ontario, N0P 2C0

**Tel:** (519) 674-1605    **Fax:** (519) 674-1600    **E-mail:** rpitblad@ridgetownc.uoguelph.ca

**TITLE:            INITIAL SPRAY APPLICATION TIMING FOR CERCOSPORA LEAFSPOT CONTROL IN SUGARBEETS - 2001**

**MATERIALS:** DITHANE DF 75% NT (75% mancozeb), SENATOR 70 WP (thiophanate-methyl)

**METHODS:** Sugar beets were planted at the research station in Ridgetown on April 30, 2001. Three row plots were established, 7m in length with rows spaced 0.75m apart, replicated four times in a randomized complete block design. The foliar applications were applied using a specialized small plot research CO<sub>2</sub> sprayer with a three nozzled hand-held boom applying 200L/ha of spray mixture. Spray applications were applied on the following days: Trt.#1- July 2, 13, 23, Aug. 2, 13, 23, Sept. 4 and 14; Trt.#2 - July 16, 26, Aug. 7, 16, 29, Sept 7 and 14; Trt.#3 - Aug.2, 13, 23, Sept 4 and 14; Trt.#4 - Aug 15, 29, Sept. 7 and 14; Trt.#5 - July 20 (55 DSV), 30, Aug. 10, 16, 20, 29, Sept 7 and 14; Trt.#6 - Aug 2 (70 DSV), 13, 23, Sept. 4 and 14; Trt.#7 - July 11, first symptoms (46 DSV), 20, 30, Aug. 10, 20, 29, Sept 7 and 14. The Disease Severity Values were calculated using the TomCast disease forecasting model. Two rows per treatment were sprayed with an unsprayed row between plots. Foliar disease assessments were made on September 1, counting the number of clusters of *Cercospora* fungal disease spots observed on the sugarbeet foliage. Each plant was examined along the length of the plot row, accumulating the number of disease symptom clusters per plot. The number of disease sites reflects the level of fungicide control. Treatments with lower numbers are more effective than those with higher disease counts. Further disease assessments were made on September 15 and 29, rating the overall plot on a scale of 0-10, with 0 equating to poorest control with considerable disease lesions and foliage "firing" while a rating of 10 equated to excellent control with no disease lesions observed. Results were analysed using the Duncan's multiple range test (P# 0.05).

**RESULTS:**      Data are presented in Table 1.

The season was very dry resulting in presumably the initial spray applications not being needed as scheduled. Additional spray applications were made long into the season until disease incidence resumed.

**CONCLUSIONS:** Under dry summer conditions the initial spray applications could have been delayed until August 2, when the Disease Severity Values had accumulated a value of 70. Initiating sprays earlier, such as on July 2, or 16 or when first symptom appeared this year on July 11, provided excellent control of *Cercospora* leafspot however additional sprays were applied that were unnecessary. Delaying the initial spray application until August 15 or as calculated by TomCast a disease severity value of 86, resulted in higher levels of *Cercospora* disease on the sugarbeet foliage.

Growers would do well to use the weather timed spray program modified for use in sugarbeets using the initial spray criteria of between 55 and 70 Disease Severity Values.

**Table 1.** Foliar disease control ratings.

#	Treatments	Rate Product/ha	Timing of Application <sup>1/</sup>		Disease Cluster Counts <sup>2/</sup>	Foliar Damage Ratings (0-10) <sup>3/</sup>		
			Initial	Subsequent		Sept.1	Sept.15	Sept. 29
1	SENATOR 70 WSB + DITHANE DF 75% NT	0.56 kg 2.25 kg	July 2	7	1.3 b*	10.0 a	10.0 a	
2	SENATOR 70 WSB + DITHANE DF 75% NT	0.56 kg 2.25 kg	July 16	6	1.0 b	9.3 ab	10.0 a	
3	SENATOR 70 WSB + DITHANE DF 75% NT	0.56 kg 2.25 kg	Aug. 2	4	1.0 b	8.8 b	9.0 b	
4	SENATOR 70 WSB + DITHANE DF 75% NT	0.56 kg 2.25 kg	Aug. 15	3	10.8 a	6.5 c	7.3 c	
5	SENATOR 70 WSB + DITHANE DF 75% NT	0.56 kg 2.25 kg	55 DSV July 20	7	2.0 b	9.3 ab	10.0 a	
6	SENATOR 70 WSB + DITHANE DF 75% NT	0.56 kg 2.25 kg	70 DSV Aug 2	4	2.0 b	9.0 b	9.0 b	
7	SENATOR 70 WSB + DITHANE DF 75% NT	0.56 kg 2.25 kg	1 <sup>st</sup> sign July 11	7	1.0 b	9.0 b	9.3 b	
10	CONTROL			0	14.0 a	4.5 d	4.0 d	
ANOVA P#0.05					s	s	s	
Coefficient of Variation (%)					96.6	6.5	2.5	

\*These values are the means of four replications. Numbers within a column followed by the same small letter are not significantly different according to a Duncan's Multiple Range Test (P#0.05).

<sup>1/</sup> Timing (#) of Applications; DSV calculated using TomCast model

<sup>2/</sup> Disease Cluster counts; the number of clusters of Cercospora fungal disease spots observed on the sugarbeet foliage. The number of disease sites reflects the level of fungicide control. Treatments with lower numbers are more effective than those with higher disease counts.

<sup>3/</sup> Foliar Damage Ratings (0-10) - 0, no control, foliage severely damaged; 10, complete control.

**PMR REPORT #      SECTION J: DISEASES OF VEGETABLES AND SPECIAL CROPS**

**ICAR:**            61006536

**CROP:**          Sugar beet (*Beta vulgaris L.*) cv. E17

**PEST:**          Cercospora leafspot, *Cercospora beticola*, Sacc.

**NAME AND AGENCY:**

PITBLADO, R E

Ridgetown College, University of Guelph, Ridgetown, Ontario, N0P 2C0

**Tel:** (519) 674-1605    **Fax:** (519) 674-1600    **E-mail:** rpitblad@ridgetownc.uoguelph.ca

**TITLE:            TIMING OF SUBSEQUENT SPRAY APPLICATIONS FOR CERCOSPORA  
LEAFSPOT CONTROL IN SUGARBEETS - 2001**

**MATERIALS:** DITHANE DF 75% NT (75% mancozeb), SENATOR 70 WP (thiophanate-methyl).

**METHODS:** Sugar beets were planted at the research station in Ridgetown on April 30, 2001. Three row plots were established, 7m in length with rows spaced 0.75m apart, replicated four times in a randomized complete block design. The initial spray applications were either applied at 55 (July 20) or 70 (Aug. 2) Disease Severity Values (DSV), using the TomCast disease forecasting model. Subsequent spray timing of treatments were applied on a cumulative Disease Severity Value of either 35 or 70. The foliar applications were applied using a specialized small plot research CO<sub>2</sub> sprayer with a three nozzled hand-held boom applying 200L/ha of spray mixture on the following days: Trt. #1 - July 20, and Aug. 15; Trt. #2 - July 20; Trt. #3 Aug. 2 and 29; Trt. #4 - July 20 and Aug. 15; Trt. #5 - July 5; and Trt. #6 Aug. 2 and 29. Two rows per treatment were sprayed with an unsprayed row between plots. Foliar disease assessments were made on September 1, counting the number of clusters of Cercospora fungal disease spots observed on the sugarbeet foliage. Each plant was examined along the length of the plot row, accumulating the number of disease symptom clusters per plot. The number of disease sites reflects the level of fungicide control. Treatments with lower numbers are more effective than those with higher disease counts. Further disease assessments were made on September 15 and 29, rating the overall plot on a scale of 0-10, with 0 equating to poorest control with considerable disease lesions and foliage "firing" while a rating of 10 equated to excellent control with no disease lesions observed. Results were analysed using the Duncan's multiple range test (P# 0.05).

**RESULTS:**      Data are presented in Table 1.

**CONCLUSIONS:** The most critical spray date of application was on 55 Disease Severity Values on July 20 with the combination spray of SENATOR 70 WSB + DITHANE DF 75% NT. This single application was as effective as multiple spray applications. The growing season was dry however Cercospora Leafspot did increase later on in the season yet with this one application of a very effective combination fungicide outstanding control was achieved. It is critical to note that control was not achieved using this single spray date using the less effective Cercospora fungicide DITHANE DF 75% NT. Considerably more applications of DITHANE DF 75% NT would be necessary beyond the two applied in this trial to effectively keep Cercospora Leafspot under control even in a low disease pressure situation. The combination SENATOR 70 WSB + DITHANE DF 75% NT is an extremely effective fungicide treatment for the control of Cercospora Leafspot and using the weather timed models the number of applications can be reduced significantly depending on the weather.

**Table 1.** Foliar disease control ratings for Cercospora Leafspot in Sugarbeets.

#	Treatments	Rate Product /ha	Timing of Application <sup>1/</sup>		Total # of Sprays	Disease Cluster Counts <sup>2/</sup>	Foliar Damage Ratings (0-10) <sup>3/</sup>	
			Initial	Subsequent		Sept. 1	Sept. 15	Sept. 29
1	SENATOR 70 WSB + DITHANE DF 75% NT	0.56 kg 2.25 kg	July 20 DSV (55 DSV)	35	2	1.0 c*	8.0 b	8.8 a
2	SENATOR 70 WSB + DITHANE DF 75% NT	0.56 kg 2.25 kg	July 20 DSV (55 DSV)	70	1	1.0 c	10.0 a	8.3 a
3	SENATOR 70 WSB + DITHANE DF 75% NT	0.56 kg 2.25 kg	Aug. 2 DSV (70 DSV)	35	2	17.0 b	6.5 c	8.3 a
4	DITHANE DF 75%NT	2.25 kg	July 20 DSV (55 DSV)	35	2	15.3 bc	3.8 de	6.6 b
5	DITHANE DF 75%NT	2.25 kg	July 20 DSV (55 DSV)	70	1	17.5 b	5.0 d	5.9 b
6	DITHANE DF 75%NT	2.25 kg	Aug. 2 DSV (70DSV)	35	2	18.8 b	3.3 e	5.8 b
7	Control				0	36.3 a	2.8 e	4.0 c
ANOVA P#0.05						s	s	s
Coefficient of Variation (%)						63.2	15.9	8.5

\*These values are the means of four replications. Numbers within a column followed by the same small letter are not significantly different according to a Duncan's Multiple Range Test (P#0.05).

<sup>1/</sup> Timing (#) of Applications: DSV calculated using TomCast model.

<sup>2/</sup> Disease Cluster counts; the number of clusters of Cercospora fungal disease spots observed on the sugarbeet foliage. The number of disease sites reflects the level of fungicide control. Treatments with lower numbers are more effective than those with higher disease counts.

<sup>3/</sup> Foliar Damage Ratings (0-10) - 0, no control, foliage severely damaged; 10, complete control.