TRIAL REPORT

An evaluation of various fungicides for the control of early blight in potatoes Pukekawa, New Zealand, 2024

Protocol Number:
2024 Potatoes NZ
Kalyx Trial Number:
KA24-0581
Client:
Potatoes New Zealand Inc.
Author:
Bradley Blackbourn
Researcher:
Bradley Blackbourn
Report Date:
31 July 2024

Kalyx New Zealand Ltd
e info@kalyx.com.au
o 46 Aka Aka Road, Pukekohe 2678, New Zealand
www.kalyx.com.au

TABLE OF CONTENTS

SUMMARY

A field trial was conducted to evaluate the efficacy of various fungicide programmes for the control of early blight (*Alternaria solani*) and crop safety in potatoes. The trial was conducted in a commercially grown potato crop in the Pukekawa region during the 2024 growing season.

There were a total of eight treatment applications made at intervals of 6-10 days. The first treatment application was made at the mid-vegetative stage when 50% of plants met between rows (BBCH 35). DITHANE™ RAINSHIELD™ NEO TEC™ was applied alone at 2100 g/ha. Dithane was also applied in various programmes as follows; with SCORE® 250 EC at 500 mL/ha, with Score and CONCORD® at 380 mL/ha, with Score and SUMISCLEX® at 500 mL/ha, with GEM® at 200 mL/ha, Score and Sumisclex, with Score, Concord and Sumisclex, and finally with Gem, CODED (rate withheld), Score and Sumisclex. BRAVO® WEATHERSTIK® was also applied at 1100 mL/ha in programme with Gem, Coded , Score and Sumisclex. All treatments were applied with CONTACT™ XCEL at 25 mL/100L and all applications were made at a 400 L/ha water rate.

All fungicide programmes significantly reduced AUDPC compared to untreated plots by 6 DA-G.

Plots treated with Dithane in programme with Score and Sumisclex, Dithane in programme with Score, Concord and Sumisclex and Bravo in programme with Gem, Coded, Score and Sumisclex significantly reduced AUDPC compared to Dithane alone and Dithane in programme with Score.

Plots treated with Dithane in programme with Gem, Coded, Score and Sumisclex had the lowest AUDPC in the trial, significantly lower compared to all remaining fungicides except Bravo in programme with Gem, Coded, Score and Sumisclex.

At 7 DA-B, all treatments except Dithane in programme with Score and Concord (treatments 4 and 7) and Dithane in programme with Gem (treatment 6) significantly reduced early blight incidence compared to untreated plots.

At 10 DA-C, all fungicide treatments significantly reduced average early blight incidence compared to untreated plots.

At 8 DA-D, Dithane in programme with Score and Concord (treatment 4) as well as Dithane in programme with Gem, Coded and Score (treatment 8) significantly reduced early blight incidence when compared to untreated plots.

At 6 DA-E, Dithane in programme with Gem, Coded and Score (treatment 8) and Bravo in programme with Gem, Coded and Score (treatment 9) significantly reduced early blight incidence compared to untreated plots.

Dithane in programme with Gem, Coded, Score and Sumisclex had the lowest early blight incidence at 7 DA-B, 8 DA-D and 6 DA-E.

At harvest all treatments were statistically equivalent for total yield and weight at all grade sizes.

At harvest all treatments were statistically equivalent for total tuber count and count at all grade sizes.

At all assessment timings, no symptoms of crop phytotoxicity were observed in any fungicide treatments under the conditions of the trial.

INTRODUCTION

Aims

1. To evaluate various fungicides in programmes for early blight control in potatoes.

Chronology of events

Date	Days after application A & B (DA-A/DA-B)	Crop stage		Event
		BBCH scale	Description	
5-Feb-2024	-	35	50% of plants meet between rows	Treatment application (timing A)
12-Feb-2024	7 DA-A	62	20% of flowers in the first inflorescence open	Treatment application (timing B) Crop phytotoxicity and disease assessments
19-Feb-2024	7 DA-B	65	Full flowering: 50% of flowers in the first inflorescence open	Treatment application (timing C) Crop phytotoxicity and disease assessments
29-Feb-2024	10 DA-C	69	End of flowering in the first inflorescence	Treatment application (timing D) Crop phytotoxicity and disease assessments
8-Mar-2024	8 DA-D	46	60% of total final tuber mass reached	Treatment application (timing E) Crop phytotoxicity and disease assessments
14-Mar-2024	6 DA-E	47	70% of total final tuber mass reached	Treatment application (timing F) Crop phytotoxicity and disease assessments
21-Mar-2024	7 DA-F	48	Maximum of total tuber mass reached	Treatment application (timing G) Crop phytotoxicity and disease assessments
27-Mar-2024	6 DA-G	48	Maximum of total tuber mass reached	Crop phytotoxicity and disease assessments AUDPC
28-Mar-2024	7 DA-G	48	Maximum of total tuber mass reached	Treatment application (timing H)
18-Apr-2024	21 DA-H	49	Skin set complete: 95% of tubers in this stage	Hand harvest trial plots
3-May-2024	36 DA-H	49	Skin set complete: 95% of tubers in this stage	Yield assessments

Products

Product	Active ingredient	Active ingredient concentration	Form type	Batch no.
Dithane Rainshield Neo Tec	mancozeb	750g/kg	WG	199288
Score	difenoconazole	250g/L	EC	AAC1D39593
Concord	cymoxanil	300g/L	SC	20210507
Sumisclex	procymidone	500g/L	SC	AAC3G43339
Gem	fluazinam	500g/L	SC	941104032
Coded	withheld	withheld	-	withheld
Contact Xcel	linear alcohol ethoxylate	980g/L	EC	465022
Bravo	chlorothalonil	720g/L	SC	AAC6DCA1C

Treatments

Trt No.	Treatment Name	Rate	Rate Unit	Other Rate	Other Rate Unit	Appl Code
1	Untreated Control					
2	Dithane Rainshield Neo Tec	2100	g/ha	1575	g ai/ha	A-H
3	Dithane Rainshield Neo Tec	2100	g/ha	1575	g ai/ha	A-H
	Score	500	ml/ha	125	g ai/ha	ACE
4	Dithane Rainshield Neo Tec	2100	g/ha	1575	g ai/ha	A-H
	Score	500	ml/ha	125	g ai/ha	ACE
	Concord	380	ml/ha	114	g ai/ha	BDF-H
5	Dithane Rainshield Neo Tec	2100	g/ha	1575	g ai/ha	A-H
	Score	500	ml/ha	125	g ai/ha	ACE
	Sumisclex	500	ml/ha	250	g ai/ha	BDF
6	Dithane Rainshield Neo Tec	2100	g/ha	1575	g ai/ha	A-H
	Gem	200	ml/ha	100	g ai/ha	AB
	Score	500	ml/ha	125	g ai/ha	CEG
	Sumisclex	500	ml/ha	250	g ai/ha	DFH
7	Dithane Rainshield Neo Tec	2100	g/ha	1575	g ai/ha	A-H
	Score	500	ml/ha	125	g ai/ha	AFH
	Concord	380	ml/ha	114	g ai/ha	BDG
	Sumisclex	500	ml/ha	250	g ai/ha	CE
8	Dithane Rainshield Neo Tec	2100	g/ha	1575	g ai/ha	A-H
	Gem	200	ml/ha	100	g ai/ha	A
	Coded	-	-	-	g ai/ha	BD
	Score	500	ml/ha	125	g ai/ha	CEG
	Sumisclex	500	ml/ha	250	g ai/ha	FH
9	Bravo	1100	ml/ha	792	g ai/ha	A-H
	Gem	200	ml/ha	100	g ai/ha	A
	Coded	-	-	-	g ai/ha	BD
	Score	500	ml/ha	125	g ai/ha	CEG
	Sumisclex	500	ml/ha	250	g ai/ha	FH

Note: Contact Xcel added to all treatments at 25 mL/100L

RESULTS

Table 1 – Crop phytotoxicity at 7 DA-B, 10 DA-C, 8 DA-D, 6 DA-E, 7 DA-F and 6 DA-G

Assessment Date					19-Feb-2024	29-Feb-2024	8-Mar-2024	14-Mar-2024	21-Mar-2024	27-Mar-2024
Part Assessed					LEAF, C	LEAF, C	LEAF, C	LEAF, C	LEAF, C	LEAF, C
Assessment Type					PHYGEN	PHYGEN	PHYGEN	PHYGEN	PHYGEN	PHYGEN
Assessment Unit					%	%	%	%	%	%
Assessment Min/Max/Interval					0, 100, -	0, 100, -	0, 100, -	0, 100, -	0, 100, -	0, 100, -
Reporting Basis					1 PLOT	1 PLOT	1 PLOT	1 PLOT	1 PLOT	1 PLOT
Crop Stage Majority/Min/Max					65, 65, 65	69, 69, 69	46, 45, 47	47, 46, 48	48, 48, 48	48, 48, 48
Trt-Eval Interval					7 DA-B	10 DA-C	8 DA-D	6 DA-E	7 DA-F	6 DA-G
Trt No.	Treatment Name	Rate	Rate Unit	Appl Code	1	4	7	10	13	16
1	Untreated Control				0.0-	0.0-	0.0-	0.0-	0.0-	0.0-
2	Dithane Rainshield Neo Tec	2100	g/ha	A-H	0.0-	0.0-	0.0-	0.0-	0.0-	0.0-
3	Dithane Rainshield Neo Tec	2100	g/ha	A-H	0.0-	0.0-	0.0-	0.0-	0.0-	0.0-
	Score	500	ml/ha	ACE						
4	Dithane Rainshield Neo Tec	2100	g/ha	A-H	0.0-	0.0-	0.0-	0.0-	0.0-	0.0-
	Score	500	ml/ha	ACE						
	Concord	380	ml/ha	BDF-H						
5	Dithane Rainshield Neo Tec	2100	g/ha	A-H	0.0-	0.0-	0.0-	0.0-	0.0-	0.0-
	Score	500	ml/ha	ACE						
	Sumisclex	500	ml/ha	BDF						
6	Dithane Rainshield Neo Tec	2100	g/ha	A-H	0.0-	0.0-	0.0-	0.0-	0.0-	0.0-
	Gem	200	ml/ha	AB						
	Score	500	ml/ha	CEG						
	Sumisclex	500	ml/ha	DFH						
7	Dithane Rainshield Neo Tec	2100	g/ha	A-H	0.0-	0.0-	0.0-	0.0-	0.0-	0.0-
	Score	500	ml/ha	AFH						
	Concord	380	ml/ha	BDG						
	Sumisclex	500	ml/ha	CE						
8	Dithane Rainshield Neo Tec	2100	g/ha	A-H	0.0-	0.0-	0.0-	0.0-	0.0-	0.0-
	Gem	200	ml/ha	A						
	Coded	-		BD						
	Score	500	ml/ha	CEG						
	Sumisclex	500	ml/ha	FH						
9	Bravo	1100	ml/ha	A-H	0.0-	0.0-	0.0-	0.0-	0.0-	0.0-
	Gem	200	ml/ha	A						
	Coded	-		BD						

Score	500ml/ha	CEG						
Sumisclex	500ml/ha	FH						
LSD P=.05			.	.	.	.	.	.
Standard Deviation			0.00	0.00	0.00	0.00	0.00	0.00
CV			0.0	0.0	0.0	0.0	0.0	0.0
Levene's F			0.00*	0.00*	0.00*	0.00*	0.00*	0.00*
Skewness			.	.	.	.	.	.
Kurtosis			.	.	.	.	.	.
Replicate F			0.000	0.000	0.000	0.000	0.000	0.000
Replicate Prob(F)			1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Treatment F			0.000	0.000	0.000	0.000	0.000	0.000
Treatment Prob(F)			1.0000	1.0000	1.0000	1.0000	1.0000	1.0000

Contact Xcel added to all treatments at 25 mL/100L
Means followed by same letter or symbol do not significantly differ (P=.05, LSD).
Could not calculate LSD (% mean diff) for columns 1,4,7,10,13,16 because error mean square = 0.

Table 2 – Early blight (Alternaria solani) severity at 7 DA-B, 10 DA-C, 8 DA-D, 6 DA-E, 7 DA-F and 6 DA-G

Assessment Date					19-Feb-2024	29-Feb-2024	8-Mar-2024	14-Mar-2024	21-Mar-2024	27-Mar-2024
Part Assessed					LEAF, P	LEAF, P	LEAF, P	LEAF, P	LEAF, P	LEAF, P
Assessment Type					PESSEV	PESSEV	PESSEV	PESSEV	PESSEV	PESSEV
Assessment Unit					%	%	%	%	%	%
Assessment Min/Max/Interval					0, 100, -	0, 100, -	0, 100, -	0, 100, -	0, 100, -	0, 100, -
Reporting Basis					1 LEAF	1 LEAF	1 LEAF	1 LEAF	1 LEAF	1 LEAF
Crop Stage Majority/Min/Max					65, 65, 65	69, 69, 69	46, 45, 47	47, 46, 48	48, 48, 48	48, 48, 48
Trt-Eval Interval					7 DA-B	10 DA-C	8 DA-D	6 DA-E	7 DA-F	6 DA-G
ARM Action Codes					&AA	&AA		&AL	&AL	
Trt No.	Treatment Name	Rate	Rate Unit	Appl Code	2	5	8	11	14	17
1	Untreated Control				0.09a	2.44a	4.53a	14.58a	73.13a	100.00a
2	Dithane Rainshield Neo Tec	2100	g/ha	A-H	0.01bc	0.65bc	1.14c	5.47b	21.08b	69.31b
3	Dithane Rainshield Neo Tec	2100	g/ha	A-H	0.00c	1.00b	2.01b	5.28b	23.84b	68.60b
	Score	500	ml/ha	ACE						
4	Dithane Rainshield Neo Tec	2100	g/ha	A-H	0.04ab	0.59cd	0.84c	3.75bc	12.91bc	51.43bc
	Score	500	ml/ha	ACE						
	Concord	380	ml/ha	BDF-H						
5	Dithane Rainshield Neo Tec	2100	g/ha	A-H	0.00c	0.49cd	0.78c	2.85cd	8.61cd	34.51cd
	Score	500	ml/ha	ACE						
	Sumisclex	500	ml/ha	BDF						
6	Dithane Rainshield Neo Tec	2100	g/ha	A-H	0.01bc	0.49cd	1.00c	3.11c	14.49bc	43.50cd
	Gem	200	ml/ha	AB						
	Score	500	ml/ha	CEG						
	Sumisclex	500	ml/ha	DFH						
7	Dithane Rainshield Neo Tec	2100	g/ha	A-H	0.02abc	0.33d	0.73c	2.80cd	9.42cd	46.70cd
	Score	500	ml/ha	AFH						
	Concord	380	ml/ha	BDG						
	Sumisclex	500	ml/ha	CE						
8	Dithane Rainshield Neo Tec	2100	g/ha	A-H	0.00c	0.40cd	0.44c	0.95e	5.13d	31.06d
	Gem	200	ml/ha	A						
	Coded	-		BD						
	Score	500	ml/ha	CEG						
	Sumisclex	500	ml/ha	FH						
9	Bravo	1100	ml/ha	A-H	0.01bc	0.61bcd	0.83c	1.91d	8.73cd	40.84cd
	Gem	200	ml/ha	A						
	Coded	-		BD						
	Score	500	ml/ha	CEG						
	Sumisclex	500	ml/ha	FH						

LSD P=.05	N/A	N/A	0.774	N/A	N/A	18.909
Standard Deviation	0.581t	0.828t	0.530	0.097t	0.179t	12.956
CV	141.48t	17.53t	38.85	14.79t	15.57t	24.0
Levene's F	2.846*	0.71	1.393	1.079	0.779	1.059
Skewness	1.8505*	1.6288*	2.2735*	0.7485	0.7039	0.5642
Kurtosis	3.7362*	2.6424*	4.6977*	0.6024	-0.0051	-0.7347
Replicate F	1.217	5.000	0.769	3.631	5.882	3.682
Replicate Prob(F)	0.3250	0.0078	0.5226	0.0272	0.0037	0.0259
Treatment F	2.512	16.886	22.773	26.388	12.325	11.357
Treatment Prob(F)	0.0386	0.0001	0.0001	0.0001	0.0001	0.0001

Contact Xcel added to all treatments at 25 mL/100L
Means followed by same letter or symbol do not significantly differ (P=.05, LSD).
* An asterisk next to the Levene's statistic indicates that homogeneity of variance cannot be assumed, and no statistical differences can be confirmed.
AA = Data transformed using arcsine square root % transformation with resulting letters of separation applied to original means.
AL = Data transformed using log transformation of X+1 with resulting letters of separation applied to original means.
&=Transformation applied to 'Plot' experimental unit means of subsamples

Table 3 – Early blight (Alternaria solani) incidence at 7 DA-B, 10 DA-C, 8 DA-D, 6 DA-E, 7 DA-F and 6 DA-G

Assessment Date					19-Feb-2024	29-Feb-2024	8-Mar-2024	14-Mar-2024	21-Mar-2024	27-Mar-2024
Part Assessed					LEAF, P	LEAF, P	LEAF, P	LEAF, P	LEAF, P	LEAF, P
Assessment Type					PESINC	PESINC	PESINC	PESINC	PESINC	PESINC
Assessment Unit					%	%	%	%	%	%
Assessment Min/Max/Interval					0, 100, -	0, 100, -	0, 100, -	0, 100, -	0, 100, -	0, 100, -
Reporting Basis					20 LEAF	20 LEAF	20 LEAF	20 LEAF	20 LEAF	20 LEAF
Crop Stage Majority/Min/Max					65, 65, 65	69, 69, 69	46, 45, 47	47, 46, 48	48, 48, 48	48, 48, 48
Trt-Eval Interval					7 DA-B	10 DA-C	8 DA-D	6 DA-E	7 DA-F	6 DA-G
ARM Action Codes					AL TIO[2]	TIO[5]	TIO[8]	AA TIO[11]	TIO[14]	TIO[17]
Trt No.	Treatment Name	Rate	Rate Unit	Appl Code	3	6	9	12	15	18
1	Untreated Control				12.5a	78.8a	96.3a	100.0a	100.0-	100.0-
2	Dithane Rainshield Neo Tec	2100	g/ha	A-H	1.3bc	47.5bc	90.0ab	98.8a	100.0-	100.0-
3	Dithane Rainshield Neo Tec	2100	g/ha	A-H	0.0c	60.0b	92.5ab	98.8a	100.0-	100.0-
	Score	500	ml/ha	ACE						
4	Dithane Rainshield Neo Tec	2100	g/ha	A-H	5.0ab	43.8cd	78.8bc	98.8a	100.0-	100.0-
	Score	500	ml/ha	ACE						
	Concord	380	ml/ha	BDF-H						
5	Dithane Rainshield Neo Tec	2100	g/ha	A-H	0.0c	40.0cde	86.3ab	98.8a	100.0-	100.0-
	Score	500	ml/ha	ACE						
	Sumisclex	500	ml/ha	BDF						
6	Dithane Rainshield Neo Tec	2100	g/ha	A-H	2.5abc	36.3cde	86.3ab	97.5ab	100.0-	100.0-
	Gem	200	ml/ha	AB						
	Score	500	ml/ha	CEG						
	Sumisclex	500	ml/ha	DFH						
7	Dithane Rainshield Neo Tec	2100	g/ha	A-H	3.8abc	26.3e	82.5ab	100.0a	100.0-	100.0-
	Score	500	ml/ha	AFH						
	Concord	380	ml/ha	BDG						
	Sumisclex	500	ml/ha	CE						
8	Dithane Rainshield Neo Tec	2100	g/ha	A-H	0.0c	31.3de	65.0c	77.5c	100.0-	100.0-
	Gem	200	ml/ha	A						
	Coded	-		BD						
	Score	500	ml/ha	CEG						
	Sumisclex	500	ml/ha	FH						
9	Bravo	1100	ml/ha	A-H	1.3bc	45.0cd	83.8ab	91.3b	100.0-	100.0-
	Gem	200	ml/ha	A						
	Coded	-		BD						
	Score	500	ml/ha	CEG						
	Sumisclex	500	ml/ha	FH						

LSD P=.05	N/A	14.91	15.20	N/A	.	.
Standard Deviation	0.39t	10.22	10.41	5.86t	0.00	0.00
CV	129.08t	22.5	12.31	7.06t	0.0	0.0
Levene's F	2.132	0.628	0.738	0.722	0.00*	0.00*
Skewness	1.0885*	0.7435	-0.6627	-1.2714*	.	.
Kurtosis	-0.1074	-0.0242	-0.7375	0.5477	.	.
Replicate F	1.259	5.470	7.349	2.910	0.000	0.000
Replicate Prob(F)	0.3106	0.0052	0.0012	0.0552	1.0000	1.0000
Treatment F	2.426	9.639	3.026	9.495	0.000	0.000
Treatment Prob(F)	0.0444	0.0001	0.0169	0.0001	1.0000	1.0000

Contact Xcel added to all treatments at 25 mL/100L
Means followed by same letter or symbol do not significantly differ (P=.05, LSD).
Could not calculate LSD (% mean diff) for columns 15,18 because error mean square = 0.
* An asterisk next to the Levene's statistic indicates that homogeneity of variance cannot be assumed, and no statistical differences can be confirmed.
TIO[2] = % Incidence (&0 = none)[2]
TIO[5] = % Incidence (&0 = none)[5]
TIO[8] = % Incidence (&0 = none)[8]
TIO[11] = % Incidence (&0 = none)[11]
TIO[14] = % Incidence (&0 = none)[14]
TIO[17] = % Incidence (&0 = none)[17]
AA = Data transformed using arcsine square root % transformation with resulting letters of separation applied to original means.
AL = Data transformed using log transformation of X+1 with resulting letters of separation applied to original means.

Table 4 – Early blight (Alternaria solani) area under disease progress curve (AUDPC) at 6 DA-G

Assessment Date					27-Mar-2024
Part Assessed					LEAF, P
Assessment Type					PESSEV
Assessment Unit					AUDPC
Reporting Basis					1 LEAF
Crop Stage Majority/Min/Max					48,48,48
Trt-Eval Interval					6 DA-G
ARM Action Codes					AL T29 AUDPC
Trt No.	Treatment Name	Rate	Rate Unit	Appl Code	59
1	Untreated Control				924.2a
2	Dithane Rainshield Neo Tec		2100g/ha	A-H	394.3b
3	Dithane Rainshield Neo Tec		2100g/ha	A-H	418.1b
	Score		500ml/ha	ACE	
4	Dithane Rainshield Neo Tec		2100g/ha	A-H	273.9bc
	Score		500ml/ha	ACE	
	Concord		380ml/ha	BDF-H	
5	Dithane Rainshield Neo Tec		2100g/ha	A-H	187.9cd
	Score		500ml/ha	ACE	
	Sumisclex		500ml/ha	BDF	
6	Dithane Rainshield Neo Tec		2100g/ha	A-H	256.3bc
	Gem		200ml/ha	AB	
	Score		500ml/ha	CEG	
	Sumisclex		500ml/ha	DFH	
7	Dithane Rainshield Neo Tec		2100g/ha	A-H	227.6c
	Score		500ml/ha	AFH	
	Concord		380ml/ha	BDG	
	Sumisclex		500ml/ha	CE	
8	Dithane Rainshield Neo Tec		2100g/ha	A-H	139.3d
	Gem		200ml/ha	A	
	Coded		-	BD	
	Score		500ml/ha	CEG	
	Sumisclex		500ml/ha	FH	
9	Bravo		1100ml/ha	A-H	203.0cd
	Gem		200ml/ha	A	
	Coded		-	BD	
	Score		500ml/ha	CEG	
	Sumisclex		500ml/ha	FH	
LSD P=.05					N/A
Standard Deviation					0.13t
CV					5.36t
Levene's F					0.448
Skewness					0.4677
Kurtosis					-0.0971
Replicate F					5.764
Replicate Prob(F)					0.0041
Treatment F					14.311
Treatment Prob(F)					0.0001

Contact Xcel added to all treatments at 25 mL/100L
Means followed by same letter or symbol do not significantly differ (P=.05, LSD).
* An asterisk next to the Levene's statistic indicates that homogeneity of variance cannot be assumed, and no statistical differences can be confirmed.
T29 = &@AUDPC(@MATCH(EDT=PESSEV,ERU=%,EPT=ALTESO))
AUDPC, , , = area under disease progress curve
AL = Data transformed using log transformation of X+1 with resulting letters of separation applied to original means.

Table 5 – Total yield in t/ha at 36 DA-H

Assessment Date					3-May-2024
Part Assessed					TUBER, C
Assessment Type					YIELD
Assessment Unit					T-MET
Reporting Basis					1 ha
Crop Stage Majority/Min/Max					49, 49, 49
Trt-Eval Interval					36 DA-H
Description					Total yield
ARM Action Codes					TY21
Trt No.	Treatment Name	Rate	Rate Unit	Appl Code	32
1	Untreated Control				38.69-
2	Dithane Rainshield Neo Tec	2100	g/ha	A-H	41.36-
3	Dithane Rainshield Neo Tec	2100	g/ha	A-H	39.56-
	Score	500	ml/ha	ACE	
4	Dithane Rainshield Neo Tec	2100	g/ha	A-H	46.53-
	Score	500	ml/ha	ACE	
	Concord	380	ml/ha	BDF-H	
5	Dithane Rainshield Neo Tec	2100	g/ha	A-H	44.53-
	Score	500	ml/ha	ACE	
	Sumisclex	500	ml/ha	BDF	
6	Dithane Rainshield Neo Tec	2100	g/ha	A-H	42.67-
	Gem	200	ml/ha	AB	
	Score	500	ml/ha	CEG	
	Sumisclex	500	ml/ha	DFH	
7	Dithane Rainshield Neo Tec	2100	g/ha	A-H	50.11-
	Score	500	ml/ha	AFH	
	Concord	380	ml/ha	BDG	
	Sumisclex	500	ml/ha	CE	
8	Dithane Rainshield Neo Tec	2100	g/ha	A-H	50.48-
	Gem	200	ml/ha	A	
	Coded	-		BD	
	Score	500	ml/ha	CEG	
	Sumisclex	500	ml/ha	FH	
9	Bravo	1100	ml/ha	A-H	40.67-
	Gem	200	ml/ha	A	
	Coded	-		BD	
	Score	500	ml/ha	CEG	
	Sumisclex	500	ml/ha	FH	
LSD P=.05					11.756
Standard Deviation					8.055
CV					18.37
Levene's F					0.827
Skewness					0.1372
Kurtosis					-0.2818
Replicate F					3.632
Replicate Prob(F)					0.0272
Treatment F					1.183
Treatment Prob(F)					0.3492

Contact Xcel added to all treatments at 25 mL/100L
Means followed by same letter or symbol do not significantly differ (P=.05, LSD).
TY21 = 6.25*[C25]

Table 6 – Percent yield by class at 36 DA-H

Assessment Date				3-May-2024	3-May-2024	3-May-2024	3-May-2024	3-May-2024	3-May-2024
Part Assessed				TUBER, C	TUBER, C	TUBER, C	TUBER, C	TUBER, C	TUBER, C
Assessment Type				YIELD	YIELD	YIELD	YIELD	YIELD	YIELD
Assessment Unit				%	%	%	%	%	%
Assessment Min/Max/Interval				0, 100, -	0, 100, -	0, 100, -	0, 100, -	0, 100, -	0, 100, -
Reporting Basis				1.6 m2	1.6 m2	1.6 m2	1.6 m2	1.6 m2	1.6 m2
Crop Stage Majority/Min/Max				49, 49, 49	49, 49, 49	49, 49, 49	49, 49, 49	49, 49, 49	49, 49, 49
Trt-Eval Interval				36 DA-H	36 DA-H	36 DA-H	36 DA-H	36 DA-H	36 DA-H
Description				% Size <50g	% Size 51-100g	% Size 101-200g	% Size 201-300g	% Size 301-400g	% Size > 401g
ARM Action Codes				AA T3	T4	T5	T6	T7	AL T8
Trt No.	Treatment Name	Rate	Rate Unit	Appl Code	47	48	49	50	51	52
1	Untreated Control				5.9-	19.1-	43.2-	24.3-	7.5-	0.0-
2	Dithane Rainshield Neo Tec	2100	g/ha	A-H	4.9-	23.3-	42.4-	21.8-	7.6-	0.0-
3	Dithane Rainshield Neo Tec	2100	g/ha	A-H	3.2-	17.9-	39.6-	29.2-	6.5-	3.6-
	Score	500	ml/ha	ACE						
4	Dithane Rainshield Neo Tec	2100	g/ha	A-H	3.6-	16.6-	43.0-	22.9-	7.9-	6.0-
	Score	500	ml/ha	ACE						
	Concord	380	ml/ha	BDF-H						
5	Dithane Rainshield Neo Tec	2100	g/ha	A-H	4.5-	17.7-	40.9-	26.1-	10.8-	0.0-
	Score	500	ml/ha	ACE						
	Sumisclex	500	ml/ha	BDF						
6	Dithane Rainshield Neo Tec	2100	g/ha	A-H	5.4-	20.7-	44.1-	22.5-	5.9-	1.5-
	Gem	200	ml/ha	AB						
	Score	500	ml/ha	CEG						
	Sumisclex	500	ml/ha	DFH						
7	Dithane Rainshield Neo Tec	2100	g/ha	A-H	3.3-	15.8-	40.5-	27.1-	10.6-	2.6-
	Score	500	ml/ha	AFH						
	Concord	380	ml/ha	BDG						
	Sumisclex	500	ml/ha	CE						
8	Dithane Rainshield Neo Tec	2100	g/ha	A-H	1.8-	10.9-	43.3-	28.5-	14.2-	1.2-
	Gem	200	ml/ha	A						
	Coded	-		BD						
	Score	500	ml/ha	CEG						
	Sumisclex	500	ml/ha	FH						
9	Bravo	1100	ml/ha	A-H	7.5-	23.5-	43.8-	14.6-	9.4-	1.3-
	Gem	200	ml/ha	A						
	Coded	-		BD						
	Score	500	ml/ha	CEG						

Sumisclex	500ml/ha FH						
LSD P=.05		N/A	10.20	16.58	12.70	11.80	N/A
Standard Deviation		3.80t	6.99	11.36	8.70	8.09	0.40t
CV		32.87t	38.02	26.85	36.1	90.43	195.37t
Levene's F		1.341	0.272	0.701	2.186	1.938	1.52
Skewness		-0.2342	0.1919	-0.5952	-0.2303	0.5538	1.5816*
Kurtosis		1.1807	-0.7326	0.2635	-0.901	-0.7261	0.889
Replicate F		0.524	0.153	0.742	0.026	0.966	1.121
Replicate Prob(F)		0.6702	0.9270	0.5377	0.9941	0.4249	0.3600
Treatment F		1.874	1.245	0.078	1.046	0.417	0.904
Treatment Prob(F)		0.1119	0.3169	0.9996	0.4307	0.8991	0.5293

Contact Xcel added to all treatments at 25 mL/100L
Means followed by same letter or symbol do not significantly differ (P=.05, LSD).
* An asterisk next to the Levene's statistic indicates that homogeneity of variance cannot be assumed, and no statistical differences can be confirmed.
T3 = [C19]/[C25]*100
T4 = [C20]/[C25]*100
T5 = [C21]/[C25]*100
T6 = [C22]/[C25]*100
T7 = [C23]/[C25]*100
T8 = [C24]/[C25]*100
AA = Data transformed using arcsine square root % transformation with resulting letters of separation applied to original means.
AL = Data transformed using log transformation of X+1 with resulting letters of separation applied to original means.

Table 7 – Total yield count at 36 DA-H

Assessment Date					3-May-2024
Part Assessed					TUBER, C
Assessment Type					COPLPA
Reporting Basis					1 m2
Crop Stage Majority/Min/Max					49, 49, 49
Trt-Eval Interval					36 DA-H
Description					Total count
ARM Action Codes					T28
Trt No.	Treatment Name	Rate	Rate Unit	Appl Code	46
1	Untreated Control				33.0-
2	Dithane Rainshield Neo Tec	2100	g/ha	A-H	35.2-
3	Dithane Rainshield Neo Tec	2100	g/ha	A-H	30.6-
	Score	500	ml/ha	ACE	
4	Dithane Rainshield Neo Tec	2100	g/ha	A-H	35.0-
	Score	500	ml/ha	ACE	
	Concord	380	ml/ha	BDF-H	
5	Dithane Rainshield Neo Tec	2100	g/ha	A-H	37.0-
	Score	500	ml/ha	ACE	
	Sumisclex	500	ml/ha	BDF	
6	Dithane Rainshield Neo Tec	2100	g/ha	A-H	37.8-
	Gem	200	ml/ha	AB	
	Score	500	ml/ha	CEG	
	Sumisclex	500	ml/ha	DFH	
7	Dithane Rainshield Neo Tec	2100	g/ha	A-H	38.1-
	Score	500	ml/ha	AFH	
	Concord	380	ml/ha	BDG	
	Sumisclex	500	ml/ha	CE	
8	Dithane Rainshield Neo Tec	2100	g/ha	A-H	34.1-
	Gem	200	ml/ha	A	
	Coded	-		BD	
	Score	500	ml/ha	CEG	
	Sumisclex	500	ml/ha	FH	
9	Bravo	1100	ml/ha	A-H	38.6-
	Gem	200	ml/ha	A	
	Coded	-		BD	
	Score	500	ml/ha	CEG	
	Sumisclex	500	ml/ha	FH	
LSD P=.05					5.16
Standard Deviation					3.53
CV					9.96
Levene's F					0.599
Skewness					-0.4783
Kurtosis					0.004
Replicate F					6.959
Replicate Prob(F)					0.0016
Treatment F					2.272
Treatment Prob(F)					0.0574

Contact Xcel added to all treatments at 25 mL/100L
Means followed by same letter or symbol do not significantly differ (P=.05, LSD).
T28 = [39]/1.6

Table 8 – Percent yield count by class at 36 DA-H

Assessment Date				3-May-2024	3-May-2024	3-May-2024	3-May-2024	3-May-2024	3-May-2024
Part Assessed				TUBER, C	TUBER, C	TUBER, C	TUBER, C	TUBER, C	TUBER, C
Assessment Type				COPLPA	COPLPA	COPLPA	COPLPA	COPLPA	COPLPA
Assessment Unit				%	%	%	%	%	%
Assessment Min/Max/Interval				0, 100, -	0, 100, -	0, 100, -	0, 100, -	0, 100, -	0, 100, -
Reporting Basis				1.6 m2	1.6 m2	1.6 m2	1.6 m2	1.6 m2	1.6 m2
Crop Stage Majority/Min/Max				49, 49, 49	49, 49, 49	49, 49, 49	49, 49, 49	49, 49, 49	49, 49, 49
Trt-Eval Interval				36 DA-H	36 DA-H	36 DA-H	36 DA-H	36 DA-H	36 DA-H
Description				% Size <50g	% Size 51-100g	% Size 101-200g	% Size 201-300g	% Size 301-400g	% Size > 401g
ARM Action Codes				T9	T10	T11	T12	AL T13	T14
Trt No.	Treatment Name	Rate	Rate Unit	Appl Code	53	54	55	56	57	58
1	Untreated Control				21.9-	28.6-	35.0-	12.0-	2.5-	0.0-
2	Dithane Rainshield Neo Tec	2100	g/ha	A-H	18.4-	32.6-	34.4-	11.6-	3.0-	0.0-
3	Dithane Rainshield Neo Tec	2100	g/ha	A-H	15.0-	30.7-	33.9-	16.2-	2.9-	1.3-
	Score	500	ml/ha	ACE						
4	Dithane Rainshield Neo Tec	2100	g/ha	A-H	15.5-	25.6-	39.9-	13.8-	3.2-	2.1-
	Score	500	ml/ha	ACE						
	Concord	380	ml/ha	BDF-H						
5	Dithane Rainshield Neo Tec	2100	g/ha	A-H	19.7-	27.7-	35.5-	13.1-	4.0-	0.0-
	Score	500	ml/ha	ACE						
	Sumisclex	500	ml/ha	BDF						
6	Dithane Rainshield Neo Tec	2100	g/ha	A-H	21.8-	29.3-	35.7-	10.8-	2.1-	0.4-
	Gem	200	ml/ha	AB						
	Score	500	ml/ha	CEG						
	Sumisclex	500	ml/ha	DFH						
7	Dithane Rainshield Neo Tec	2100	g/ha	A-H	14.6-	26.0-	39.1-	15.5-	4.1-	0.8-
	Score	500	ml/ha	AFH						
	Concord	380	ml/ha	BDG						
	Sumisclex	500	ml/ha	CE						
8	Dithane Rainshield Neo Tec	2100	g/ha	A-H	10.9-	21.1-	42.9-	17.8-	6.7-	0.6-
	Gem	200	ml/ha	A						
	Coded	-		BD						
	Score	500	ml/ha	CEG						
	Sumisclex	500	ml/ha	FH						
9	Bravo	1100	ml/ha	A-H	25.4-	30.7-	33.4-	7.1-	3.1-	0.4-
	Gem	200	ml/ha	A						
	Coded	-		BD						
	Score	500	ml/ha	CEG						

Sumisclex	500ml/ha	FH						
LSD P=.05			11.24	10.68	13.33	9.12	N/A	2.04
Standard Deviation			7.70	7.32	9.13	6.25	0.37t	1.40
CV			42.48	26.09	24.93	47.77	69.36t	228.13
Levene's F			1.097	0.522	1.053	0.859	0.633	1.211
Skewness			0.4177	-0.3421	-0.2521	0.3682	-0.2229	2.895*
Kurtosis			0.7184	-0.3329	0.2374	-0.6664	-0.9327	8.6119*
Replicate F			0.565	0.256	0.680	0.031	1.640	1.740
Replicate Prob(F)			0.6433	0.8565	0.5730	0.9926	0.2066	0.1855
Treatment F			1.384	0.891	0.502	1.061	0.386	0.976
Treatment Prob(F)			0.2533	0.5388	0.8429	0.4213	0.9174	0.4778

Contact Xcel added to all treatments at 25 mL/100L
Means followed by same letter or symbol do not significantly differ (P=.05, LSD).
* An asterisk next to the Levene's statistic indicates that homogeneity of variance cannot be assumed, and no statistical differences can be confirmed.
Where no Levene's statistic is reported, the test of homogenous variance has failed, and no statistical differences can be confirmed.
T9 = [C33]/[C39]*100
T10 = [C34]/[C39]*100
T11 = [C35]/[C39]*100
T12 = [C36]/[C39]*100
T13 = [C37]/[C39]*100
T14 = [C38]/[C39]*100
AL = Data transformed using log transformation of X+1 with resulting letters of separation applied to original means.

DISCUSSION

A field trial was conducted to evaluate the efficacy of various fungicide programmes for the control of early blight (*Alternaria solani*) and crop safety in potatoes. The trial was carried out in a commercially grown potato crop in the Pukekawa region during the 2024 growing season.

Crop phytotoxicity

Assessments for potato leaf injury were made at 7 DA-B, 10 DA-C, 8 DA-D, 6 DA-E, 7 DA-F and 6 DA-G. At all assessment timings, no symptoms of crop phytotoxicity were observed in any fungicide treatment under the conditions of the trial.

Early blight severity

Assessments for percent early blight severity per leaf and incidence were made at six assessment timings, 7 DA-B, 10 DA-C, 8 DA-D, 6 DA-E, 7 DA-F and 6 DA-G.

Untreated plots had 0.09% early blight severity per leaf on average at 7 DA-B. All fungicide treatments had between 0.00 and 0.04% early blight severity per leaf on average. All fungicide treatments except Dithane in programme with Score and Concord and Dithane in programme with Score, Concord and Sumisclex (Sumisclex was yet to be applied) significantly reduced early blight severity compared to untreated plots. Dithane in programme with Score, Dithane in programme with Score and Sumisclex, and Dithane in programme with Gem, Coded, Score and Sumisclex (Score and Sumisclex were yet to be applied) all reduced early blight to 0.00%, significantly lower than Dithane in programme with Score and Concord which had severity of 0.04%.

At 10 DA-C, untreated plots had 2.44% early blight severity per leaf on average. All fungicide treatments had between 0.33 and 1.00% early blight severity per leaf on average, significantly lower compared to untreated plots. All fungicide treatments except Dithane applied alone and Bravo in programme with Gem, Coded, Score and Sumisclex (Sumisclex was yet to be applied) significantly reduced early blight severity when compared to Dithane in programme with Score. Dithane in programme with Score, Concord and Sumisclex had the lowest early blight severity at 0.33%, significantly lower than Dithane applied alone and Dithane in programme with Score.

Untreated plots had 4.53% early blight severity per leaf on average at 8 DA-D. All fungicide treatments had between 0.44 and 2.01% early blight severity per leaf on average, significantly lower compared to untreated plots. Plots treated with Dithane in programme with Score had significantly higher early blight severity (2.01%) compared to all remaining fungicides which had severity between 0.44 and 1.14% on average.

At 6 DA-E, early blight severity increased to 14.58% per leaf on average in untreated plots. All fungicide treatments had between 0.95 and 5.47% early blight severity per leaf on average, significantly lower compared to untreated plots. All fungicide treatments except Dithane in programme with Score and Concord significantly reduced early blight severity compared to Dithane applied alone and Dithane in programme with Score. Bravo in programme with Gem, Coded, Score and Sumisclex (Sumisclex was yet to be applied) significantly reduced early blight severity to 1.91% when compared to Dithane applied alone, Dithane in programme with Score, Dithane in programme with Score and Concord and Dithane applied in programme with Gem, Score and Sumisclex. Dithane in programme with Gem, Coded, Score, and Sumisclex (Sumisclex was yet to be applied) had the lowest early blight severity at 0.95%, significantly lower than all other treatments.

At 7 DA-F, early blight severity had reached 73.13% per leaf on average in untreated plots. All fungicide treatments had between 5.13 and 23.84% early blight severity per leaf on average, significantly lower compared to untreated plots. All fungicide treatments except Dithane in programme with Score and Concord and Dithane in programme with Gem, Score and Sumisclex significantly reduced early blight severity compared to Dithane applied alone and Dithane in programme with Score. Dithane in programme with Gem, Coded, Score and Sumisclex had the lowest early blight severity at 5.13%, significantly lower than Dithane applied alone, Dithane in programme with Score, Dithane in programme with Score and Concord and Dithane in programme with Gem, Score and Sumisclex.

At 6 DA-G, early blight severity was 100% on average in untreated plots. All fungicide treatments had between 31.06 and 69.31% early blight severity per leaf on average, significantly lower compared to untreated plots. All fungicide treatments except Dithane in programme with Score and Concord significantly reduced early blight severity compared to Dithane applied alone and Dithane in programme with Score. Dithane in programme with Gem, Coded, Score and Sumisclex had the lowest early blight severity at 31.06%, significantly lower than Dithane applied alone, Dithane in programme with Score and Dithane in programme with Score and Concord.

Early blight incidence

Calculations were made to determine percent early blight incidence. At 7 DA-B, untreated plots had 12.5% early blight incidence on average. All fungicide treatments except Dithane in programme with Score and Concord, Dithane in programme with Gem, Score and Sumisclex (Score and Sumisclex were yet to be applied) and Dithane in programme with Score, Concord and Sumisclex (Sumisclex was yet to be applied) significantly reduced early blight incidence to between 0.0 and 1.3% compared to untreated plots.

At 10 DA-C, there was an increase in early blight incidence to 78.8% on average in untreated plots. All fungicide treatments had between 26.3 and 60.0% early blight incidence on average, significantly lower compared to untreated plots. All fungicide treatments except Dithane applied alone significantly reduced early blight incidence compared to Dithane applied in programme with Score. Dithane applied in programme with Score, Concord, and Sumisclex had the lowest incidence at 26.3%, significantly lower than all other fungicide treatments except Dithane in programme with Score and Sumisclex, Dithane in programme with Gem, Score and Sumisclex (Sumisclex was yet to be applied) and Dithane in programme with Gem, Coded, Score and Sumisclex (Sumisclex was yet to be applied).

At 8 DA-D, untreated plots had an early blight incidence of 96.3%. Dithane in programme with Score and Concord as well as Dithane in programme with Gem, Coded, Score and Sumisclex (Sumisclex was yet to be applied) significantly reduced early blight incidence to 78.8% and 65.0% respectively when compared to untreated plots.

By 6 DA-E, early blight incidence in untreated plots had reached 100.0%. Dithane in programme with Gem, Coded, Score and Sumisclex (Sumisclex was yet to be applied) and Bravo in programme with Gem, Coded, Score and Sumisclex (Sumisclex was yet to be applied) significantly reduced early blight incidence compared to untreated plots. Dithane in programme with Gem, Coded, Score and Sumisclex reduced early blight incidence to 77.5%, this was significantly lower than all other fungicide treatments.

From 7 DA-F, onwards all plots had an early blight incidence of 100.0.%

Early blight area under disease progress curve

The area under disease progress curve (AUDPC), which summarises disease pressure over time, was calculated from all early blight severity data collected between 7 DA-B and 6 DA-G.

AUDPC showed that all fungicide treatments significantly reduced early blight severity per leaf compared to untreated plots. All fungicide treatments except Dithane in programme with Score and Concord and Dithane in programme with Gem, Score and Sumisclex significantly reduced early blight severity compared to Dithane applied alone and in programme with Score.

Dithane in programme with Gem, Coded, Score and Sumisclex had the lowest early blight pressure, significantly lower than all other fungicide treatments except Dithane in programme with Score and Sumisclex and Bravo in programme with Gem, Coded, Score and Sumisclex.

Total yield in t/ha

Trial plots were hand harvested at 21 DA-H and assessed for yield at 36 DA-H. Tubers were weighed showing all treatments were statistically equivalent for total yield. Untreated plots had the lowest yield at 38.69 t/ha while Dithane in programme with Gem, Coded, Score and Sumisclex had the had the greatest yield at 50.48 t/ha.

Percent yield by class

At harvest tubers were separated into size grades based on weight. In the below 50 g grade all treatments were statistically equivalent with between 1.8 and 7.5% of total weight. In the 51-100 g grade all treatments were statistically equivalent with between 10.9 and 23.5% of total weight. In the 101-200 g grade all treatments were statistically equivalent with between 39.6 and 44.1% of total weight. In the 201-300 g grade all treatments were statistically equivalent with between 14.6 and 28.5% of total weight. In the 301-400 g grade all treatments were statistically equivalent with between 5.9 and 14.2% of total weight. In the greater than 401 g grade all treatments were statistically equivalent with between 0.0 and 6.0% of total weight.

Total yield count

At harvest the number of tubers were counted showing all treatments were statistically equivalent for average total counts with between 30.6 and 38.6 tubers.

Percent yield count by class

At harvest tubers were separated into size grades based on weight and counted. In the below 50 g grade all treatments were statistically equivalent with between 10.9 and 25.4% of total count. In the 51-100 g grade all treatments were statistically equivalent with between 21.1 and 32.6% of total count. In the 101-200 g grade all treatments were statistically equivalent with between 33.4 and 42.9% of total count. In the 201-300 g grade all treatments were statistically equivalent with between 7.1 and 17.8% of total count. In the 301-400 g grade all treatments were statistically equivalent with between 2.1 and 6.7% of total count. In the above 401 g grade all treatments were statistically equivalent with between 0.0 and 2.1% of total count.

CONCLUSIONS

- All fungicide programmes significantly reduced AUDPC compared to untreated plots by 6 DA-G.

- Plots treated with Dithane in programme with Score and Sumisclex, Dithane in programme with Score, Concord and Sumisclex and Bravo in programme with Gem, Coded, Score and Sumisclex significantly reduced AUDPC compared to Dithane alone and Dithane in programme with Score.

- Plots treated with Dithane in programme with Gem, Coded, Score and Sumisclex had the lowest AUDPC in the trial, significantly lower compared to all remaining fungicides except Bravo in programme with Gem, Coded, Score and Sumisclex.

- At 7 DA-B, all treatments except Dithane in programme with Score and Concord (treatments 4 and 7) and Dithane in programme with Gem (treatment 6) significantly reduced early blight incidence compared to untreated plots.

- At 10 DA-C, all fungicide treatments significantly reduced average early blight incidence compared to untreated plots.

- At 8 DA-D, Dithane in programme with Score and Concord (treatment 4) as well as Dithane in programme with Gem, Coded and Score (treatment 8) significantly reduced early blight incidence when compared to untreated plots.

- At 6 DA-E, Dithane in programme with Gem, Coded and Score (treatment 8) and Bravo in programme with Gem, Coded and Score (treatment 9) significantly reduced early blight incidence compared to untreated plots.

- Dithane in programme with Gem, Coded, Score and Sumisclex had the lowest early blight incidence at 7 DA-B, 8 DA-D and 6 DA-E.

- At harvest all treatments were statistically equivalent for total yield and weight at all grade sizes.

- At harvest all treatments were statistically equivalent for total tuber count and count at all grade sizes.

- At all assessment timings, no symptoms of crop phytotoxicity were observed in any fungicide treatments under the conditions of the trial.

APPENDICES

Appendix i - Trial details

Trial Site Information

Location	363 Murray Road, Pukekawa, Waikato, New Zealand, 2696
GPS Co-ordinates	-37.30006, 174.980226
Treated Plot Width	1.6m
Treated Plot Length	6.0 m
Treated Plot Area	9.6m^2
Replications	4
Treatments	9
Site Type	Field
Experimental Unit	1 Plot
Study Design	Randomised Complete Block (RCB)

Cooperator

Name	Thomas Nicholson
Address	Hinemoa Produce, 363 Murray Road, Pukekawa, 2696 New Zealand

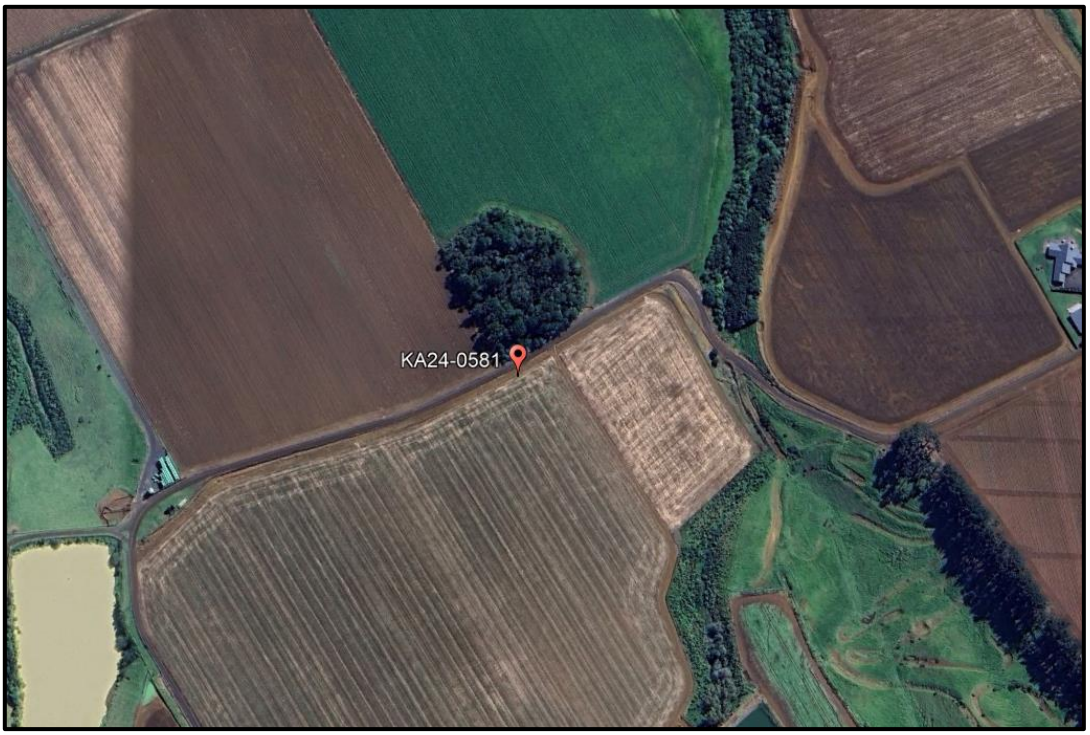
Crop Description

Scientific Name	*Solanum tuberosum*
Common Name	Potato
Variety	Agria
ARM Code	SOLTU
Harvest Equipment	Hand harvest
Harvest Width	0.8 m
Harvest Length	2 m

Pest Description

Scientific Name	*Alternaria solani*
Common Name	Early blight of potato
ARM Code	ALTESO

Trial location



Application Description

Code	A	B	C	D	E
Date	5-Feb-2024	12-Feb-2024	19-Feb-2024	29-Feb-2024	8-Mar-2024
Start Time	3:50 PM	10:00 AM	10:00 AM	2:26 PM	11:00 AM
End Time	4:49 PM	11:30 AM	10:15 AM	3:49 PM	12:00 PM
Method	SPRAY	SPRAY	SPRAY	SPRAY	SPRAY
Placement	FOLIAR	FOLIAR	FOLIAR	FOLIAR	FOLIAR
Air Temperature	26.1 C	25.3 C	23 C	24 C	21.2 C
Relative Humidity %	50	56.2	69	51.7	71.6
Wind Velocity	5 KPH	0 KPH	5 KPH	10 KPH	13.5 KPH
Wind Direction	SW	CA	W	S	W
Dew Presence	N, no	N, no	N, no	N, no	N, no
Soil Moisture	SLIWET	DRY	SLIDRY	DRY	SLIWET
Cloud Cover %	0	0	30	25	95

Code	F	G	H
Date	14-Mar-2024	21-Mar-2024	28-Mar-2024
Start Time	3:26 PM	11:30 AM	10:45 AM
End Time	4:43 PM	12:30 PM	12:00 PM
Method	SPRAY	SPRAY	SPRAY
Placement	FOLIAR	FOLIAR	FOLIAR
Air Temperature	22.1 C	19.2 C	19.2 C
Relative Humidity %	76.3	47.5	77.5
Wind Velocity	0 KPH	5 KPH	13.5 KPH
Wind Direction	CA	NE	W
Dew Presence	N, no	N, no	Y, yes
Soil Moisture	SLIWET	DRY	SLIWET
Cloud Cover %	100	3	80

Application Equipment

Code	A	B	C	D	E
Type	SPRAYE	SPRAYE	SPRAYE	SPRAYE	SPRAYE
Operation Pressure	220 kPa	300 kPa	220 kPa	300 kPa	300 kPa
Nozzle Model	110-03	25	110-03	25	25
Nozzle Type	FLDOOU	FLAFAI	FLAFAI	FLAFAI	FLAFAI
Band Width	1.6 m	1.6 m	1.6 m	1.6 m	1.6 m
Boom Height	50.0 cm	50.0 cm	50.0 cm	50.0 cm	50.0 cm
Ground Speed	3.6 KPH	2.84 KPH	3.6 KPH	2.84 KPH	2.84 KPH
Carrier	WATER	WATER	WATER	WATER	WATER
Application Amount	400 L/ha	400 L/ha	400 L/ha	400 L/ha	400 L/ha
Mix Size	2.0 L	3.0 L	2.0 L	3.0 L	3.0 L

Code	F	G	H
Type	SPRAYE	SPRAYE	SPRAYE
Operation Pressure	300 kPa	300 kPa	300 kPa
Nozzle Model	25	25	25
Nozzle Type	FLAFAI	FLAFAI	FLAFAI
Band Width	1.6 m	1.6 m	1.6 m
Boom Height	50.0 cm	50.0 cm	50.0 cm
Ground Speed	2.84 KPH	2.84 KPH	2.84 KPH
Carrier	WATER	WATER	WATER
Application Amount	400 L/ha	400 L/ha	400 L/ha
Mix Size	3.0 L	3.0 L	3.0 L

Crop Stage at Each Application

Code	A	B	C	D	E
ARM Code	SOLTU	SOLTU	SOLTU	SOLTU	SOLTU
Majority, %	35	63	65	69	46
Minimum, %	34	62	65	69	45
Maximum, %	35	63	65	69	47

Code	F	G	H
ARM Code	SOLTU	SOLTU	SOLTU
Majority, %	47	48	49
Minimum, %	46	48	49
Maximum, %	48	48	49

Notes

Date	5-Feb-2024
By	Jarrod Harvey
Comment	No disease present at application

Trial plan

Rep	Blk									
4	4	7	8	1	3	6	2	5	4	9
	Plot	28	29	30	31	32	33	34	35	36
3	3	5	2	4	1	8	7	3	9	6
	Plot	19	20	21	22	23	24	25	26	27
2	2	4	2	8	9	6	1	7	3	5
	Plot	10	11	12	13	14	15	16	17	18
1	1	2	3	7	9	1	8	6	5	4
	Plot	1	2	3	4	5	6	7	8	9

Assessment Techniques

Assessment type	Scale	Method
Phytotoxicity	0-100%	0= No discolouration evident 10 = Negligible/ little defect. Leaf spotting. 20 = Slight, discolouration, distortion and / or stunting clearly seen 30 = Moderate twisting and stunting. No burning 40 = Substantial twisting and up to 40% leaf burning 50 = 50% leaf burnt/ lost 60 = 60% leaf burnt/ lost 70 = 70% leaf burnt/ lost 80 = 80% leaf burnt/ lost 90 = 90% leaf burnt/ lost 100 = Complete loss of plant. Dead
Early blight severity	(0-100) %	0 = No disease observed 100 = Total leaf area affected by blight. 20 leaves per plot
Area Under Disease Progress Curve AUDPC	Value	Calculated (using ARM) from disease severity data using ARM. AUDPC combines multiple observations of disease progress into a single value to provide a summary over time.
Early blight incidence	(0-100) %	Calculated from severity data. 20 leaves per plot
Tuber count	Number	Count of the number of tubers by grade size per harvested area
Crop yield	t/ha	Weight of tubers by grade size per harvested area. Calculations were made to convert all weights of tubers into a per hectare basis using ARM.

Statistical interpretation

All data from this trial was analysed using a confidence limit of 95%, unless otherwise specified. All mention of significant differences contained within this report refer to statistically significant differences. Levene's test was used to test for homogeneity.

Abbreviation guide

Trial Details

SLIWET = slightly wet, moist
CA = calm
DRY = dry
SLIDRY = slightly dry
FLDOOU = twin flat - fan

Data Tables

Part Assessed

LEAF = leaf
TUBER = tuber
C = Crop is Part Rated
P = Pest is Part Rated

Assessment Type

PHYGEN = phytotoxicity - general / injury
PESSEV = pest severity
PESINC = pest incidence
YIELD = yield
YIETOT = yield - accumulated or season total
COPLPA = count - plant part

Assessment Unit

%, 0, 100, = percent
kg, , , = kilogram
T-MET, , , = ton (metric=1000 kg)
NUMBER, , , = number
AUDPC, , , = area under disease progress curve
PLOT = total plot

LEAF = leaf
m2 = square meter
ha = hectare

ARM Action Codes

AA = Automatic arcsine square root % transformation
AL = Automatic log transformation of X+1
AA = Arcsine square root percent([2])
TIO[2] = % Incidence (&0 = none)[2]
TIO[5] = % Incidence (&0 = none)[5]
TIO[8] = % Incidence (&0 = none)[8]
AL = LOG([11]+ 1)
TIO[11] = % Incidence (&0 = none)[11]
TIO[14] = % Incidence (&0 = none)[14]
TIO[17] = % Incidence (&0 = none)[17]
T1 = [C19]+[C20]+[C21]+[C22]+[C23]+[C24]
TY15 = 6.25*[C19]
TY16 = 6.25*[C20]
TY17 = 6.25*[C21]
TY18 = 6.25*[C22]
TY19 = 6.25*[C23]
TY20 = 6.25*[C24]
TY21 = 6.25*[C25]
T2 = [C33]+[C34]+[C35]+[C36]+[C37]+[C38]
T22 = [33]/1.6
T23 = [34]/1.6
T24 = [35]/1.6
T25 = [36]/1.6
T26 = [37]/1.6
T27 = [38]/1.6
T28 = [39]/1.6
T3 = [C19]/[C25]*100
T4 = [C20]/[C25]*100
T5 = [C21]/[C25]*100
T6 = [C22]/[C25]*100
T7 = [C23]/[C25]*100
T8 = [C24]/[C25]*100
T9 = [C33]/[C39]*100
T10 = [C34]/[C39]*100
T11 = [C35]/[C39]*100
T12 = [C36]/[C39]*100
T13 = [C37]/[C39]*100
T14 = [C38]/[C39]*100
T29 = &@AUDPC(@MATCH(EDT=PESSEV,ERU=%,EPT=ALTESO))

Appendix ii - Plot data

Table 1 - Crop phytotoxicity at 7 DA-B, 10 DA-C, 8 DA-D, 6 DA-E, 7 DA-F and 6 DA-G

Assessment Date						19-Feb-2024	29-Feb-2024	8-Mar-2024	14-Mar-2024	21-Mar-2024	27-Mar-2024
Part Assessed						LEAF, C	LEAF, C	LEAF, C	LEAF, C	LEAF, C	LEAF, C
Assessment Type						PHYGEN	PHYGEN	PHYGEN	PHYGEN	PHYGEN	PHYGEN
Assessment Unit						%	%	%	%	%	%
Assessment Min/Max/Interval						0, 100, -	0, 100, -	0, 100, -	0, 100, -	0, 100, -	0, 100, -
Reporting Basis						1 PLOT	1 PLOT	1 PLOT	1 PLOT	1 PLOT	1 PLOT
Crop Stage Majority/Min/Max						65, 65, 65	69, 69, 69	46, 45, 47	47, 46, 48	48, 48, 48	48, 48, 48
Trt-Eval Interval						7 DA-B	10 DA-C	8 DA-D	6 DA-E	7 DA-F	6 DA-G
Trt No.	Treatment Name	Rate	Rate Unit	Appl Code	Plot	1	4	7	10	13	16
1	Untreated Control				5	0.0	0.0	0.0	0.0	0.0	0.0
					15	0.0	0.0	0.0	0.0	0.0	0.0
					22	0.0	0.0	0.0	0.0	0.0	0.0
					30	0.0	0.0	0.0	0.0	0.0	0.0
					Mean =	0.0	0.0	0.0	0.0	0.0	0.0
2	Dithane Rainshield Neo Tec	2100	g/ha	A-H	1	0.0	0.0	0.0	0.0	0.0	0.0
					11	0.0	0.0	0.0	0.0	0.0	0.0
					20	0.0	0.0	0.0	0.0	0.0	0.0
					33	0.0	0.0	0.0	0.0	0.0	0.0
					Mean =	0.0	0.0	0.0	0.0	0.0	0.0
3	Dithane Rainshield Neo Tec	2100	g/ha	A-H	2	0.0	0.0	0.0	0.0	0.0	0.0
	Score	500	ml/ha	ACE	17	0.0	0.0	0.0	0.0	0.0	0.0
					25	0.0	0.0	0.0	0.0	0.0	0.0
					31	0.0	0.0	0.0	0.0	0.0	0.0
					Mean =	0.0	0.0	0.0	0.0	0.0	0.0
4	Dithane Rainshield Neo Tec	2100	g/ha	A-H	9	0.0	0.0	0.0	0.0	0.0	0.0
	Score	500	ml/ha	ACE	10	0.0	0.0	0.0	0.0	0.0	0.0
	Concord	380	ml/ha	BDF-H	21	0.0	0.0	0.0	0.0	0.0	0.0
					35	0.0	0.0	0.0	0.0	0.0	0.0
					Mean =	0.0	0.0	0.0	0.0	0.0	0.0
5	Dithane Rainshield Neo Tec	2100	g/ha	A-H	8	0.0	0.0	0.0	0.0	0.0	0.0
	Score	500	ml/ha	ACE	18	0.0	0.0	0.0	0.0	0.0	0.0
	Sumisclex	500	ml/ha	BDF	19	0.0	0.0	0.0	0.0	0.0	0.0
					34	0.0	0.0	0.0	0.0	0.0	0.0
					Mean =	0.0	0.0	0.0	0.0	0.0	0.0
6	Dithane Rainshield Neo Tec	2100	g/ha	A-H	7	0.0	0.0	0.0	0.0	0.0	0.0
	Gem	200	ml/ha	AB	14	0.0	0.0	0.0	0.0	0.0	0.0
	Score	500	ml/ha	CEG	27	0.0	0.0	0.0	0.0	0.0	0.0
	Sumisclex	500	ml/ha	DFH	32	0.0	0.0	0.0	0.0	0.0	0.0

				Mean =	0.0	0.0	0.0	0.0	0.0	0.0
7	Dithane Rainshield Neo Tec	2100g/ha	A-H	3	0.0	0.0	0.0	0.0	0.0	0.0
	Score	500ml/ha	AFH	16	0.0	0.0	0.0	0.0	0.0	0.0
	Concord	380ml/ha	BDG	24	0.0	0.0	0.0	0.0	0.0	0.0
	Sumisclex	500ml/ha	CE	28	0.0	0.0	0.0	0.0	0.0	0.0
				Mean =	0.0	0.0	0.0	0.0	0.0	0.0
8	Dithane Rainshield Neo Tec	2100g/ha	A-H	6	0.0	0.0	0.0	0.0	0.0	0.0
	Gem	200ml/ha	A	12	0.0	0.0	0.0	0.0	0.0	0.0
	Coded	-	BD	23	0.0	0.0	0.0	0.0	0.0	0.0
	Score	500ml/ha	CEG	29	0.0	0.0	0.0	0.0	0.0	0.0
	Sumisclex	500ml/ha	FH							
				Mean =	0.0	0.0	0.0	0.0	0.0	0.0
9	Bravo	1100ml/ha	A-H	4	0.0	0.0	0.0	0.0	0.0	0.0
	Gem	200ml/ha	A	13	0.0	0.0	0.0	0.0	0.0	0.0
	Coded	-	BD	26	0.0	0.0	0.0	0.0	0.0	0.0
	Score	500ml/ha	CEG	36	0.0	0.0	0.0	0.0	0.0	0.0
	Sumisclex	500ml/ha	FH							
				Mean =	0.0	0.0	0.0	0.0	0.0	0.0

Table 2 - Early blight (Alternaria solani) severity at 7 DA-B, 10 DA-C, 8 DA-D, 6 DA-E, 7 DA-F and 6 DA-G

Assessment Date						19-Feb-2024	29-Feb-2024	8-Mar-2024	14-Mar-2024	21-Mar-2024	27-Mar-2024
Part Assessed						LEAF, P	LEAF, P	LEAF, P	LEAF, P	LEAF, P	LEAF, P
Assessment Type						PESSEV	PESSEV	PESSEV	PESSEV	PESSEV	PESSEV
Assessment Unit						%	%	%	%	%	%
Assessment Min/Max/Interval						0, 100, -	0, 100, -	0, 100, -	0, 100, -	0, 100, -	0, 100, -
Reporting Basis						1 LEAF	1 LEAF	1 LEAF	1 LEAF	1 LEAF	1 LEAF
Crop Stage Majority/Min/Max						65, 65, 65	69, 69, 69	46, 45, 47	47, 46, 48	48, 48, 48	48, 48, 48
Trt-Eval Interval						7 DA-B	10 DA-C	8 DA-D	6 DA-E	7 DA-F	6 DA-G
Trt No.	Treatment Name	Rate	Rate Unit	Appl Code	Plot	2	5	8	11	14	17
1	Untreated Control				5	0.00	2.30	4.73	10.55	45.51	100.00
					15	0.03	1.35	2.81	9.70	54.75	100.00
					22	0.25	2.90	4.85	18.95	92.25	100.00
					30	0.08	3.20	5.75	19.10	100.00	100.00
					Mean =	0.09	2.44	4.53	14.58	73.13	100.00
2	Dithane Rainshield Neo Tec	2100	g/ha	A-H	1	0.00	0.50	0.75	3.51	6.13	45.75
					11	0.00	0.85	1.50	4.95	17.40	87.00
					20	0.03	0.80	1.26	7.10	30.90	79.25
					33	0.00	0.45	1.05	6.30	29.90	65.25
					Mean =	0.01	0.65	1.14	5.47	21.08	69.31
3	Dithane Rainshield Neo Tec	2100	g/ha	A-H	2	0.00	0.35	1.00	2.95	5.60	41.40
	Score	500	ml/ha	ACE	17	0.00	1.20	2.78	5.95	44.10	84.25
					25	0.00	1.35	2.18	7.15	29.40	74.75
					31	0.00	1.10	2.08	5.05	16.25	74.00
					Mean =	0.00	1.00	2.01	5.28	23.84	68.60
4	Dithane Rainshield Neo Tec	2100	g/ha	A-H	9	0.03	0.35	0.46	3.10	8.95	33.70
	Score	500	ml/ha	ACE	10	0.03	0.50	0.83	2.17	7.15	36.75
	Concord	380	ml/ha	BDF-H	21	0.00	0.70	1.05	5.28	17.60	74.50
					35	0.10	0.80	1.01	4.44	17.95	60.75
					Mean =	0.04	0.59	0.84	3.75	12.91	51.43
5	Dithane Rainshield Neo Tec	2100	g/ha	A-H	8	0.00	0.35	0.89	2.48	7.00	21.20
	Score	500	ml/ha	ACE	18	0.00	0.40	0.85	2.40	6.95	38.35
	Sumisclex	500	ml/ha	BDF	19	0.00	0.45	0.53	1.66	7.50	25.75
					34	0.00	0.75	0.87	4.85	13.00	52.75
					Mean =	0.00	0.49	0.78	2.85	8.61	34.51
6	Dithane Rainshield Neo Tec	2100	g/ha	A-H	7	0.00	0.40	1.18	4.00	20.36	45.50
	Gem	200	ml/ha	AB	14	0.03	0.30	0.61	2.23	10.20	35.90
	Score	500	ml/ha	CEG	27	0.03	0.70	1.08	3.35	16.25	54.75
	Sumisclex	500	ml/ha	DFH	32	0.00	0.55	1.14	2.85	11.15	37.85
					Mean =	0.01	0.49	1.00	3.11	14.49	43.50
7	Dithane Rainshield Neo Tec	2100	g/ha	A-H	3	0.00	0.35	0.61	2.75	4.70	38.15

	Score	500ml/ha	AFH	16	0.05	0.25	1.07	3.00	11.55	55.75
	Concord	380ml/ha	BDG	24	0.00	0.30	0.75	3.10	7.96	49.40
	Sumisclex	500ml/ha	CE	28	0.03	0.40	0.48	2.35	13.45	43.50
				Mean =	0.02	0.33	0.73	2.80	9.42	46.70
8	Dithane Rainshield Neo Tec	2100g/ha	A-H	6	0.00	0.15	0.53	0.91	2.87	24.20
	Gem	200ml/ha	A	12	0.00	0.30	0.33	0.75	3.00	15.65
	Coded	-	BD	23	0.00	0.35	0.43	0.77	4.80	30.90
	Score	500ml/ha	CEG	29	0.00	0.80	0.48	1.35	9.85	53.50
	Sumisclex	500ml/ha	FH							
				Mean =	0.00	0.40	0.44	0.95	5.13	31.06
9	Bravo	1100ml/ha	A-H	4	0.00	0.60	0.68	1.74	4.80	33.55
	Gem	200ml/ha	A	13	0.00	0.50	0.66	1.47	6.05	27.75
	Coded	-	BD	26	0.00	0.50	1.14	1.60	6.20	35.45
	Score	500ml/ha	CEG	36	0.03	0.85	0.84	2.83	17.85	66.60
	Sumisclex	500ml/ha	FH							
				Mean =	0.01	0.61	0.83	1.91	8.73	40.84

Table 3 - Early blight (Alternaria solani) incidence at 7 DA-B, 10 DA-C, 8 DA-D, 6 DA-E, 7 DA-F and 6 DA-G

Assessment Date						19-Feb-2024	29-Feb-2024	8-Mar-2024	14-Mar-2024	21-Mar-2024	27-Mar-2024
Part Assessed						LEAF, P	LEAF, P	LEAF, P	LEAF, P	LEAF, P	LEAF, P
Assessment Type						PESINC	PESINC	PESINC	PESINC	PESINC	PESINC
Assessment Unit						%	%	%	%	%	%
Assessment Min/Max/Interval						0, 100, -	0, 100, -	0, 100, -	0, 100, -	0, 100, -	0, 100, -
Reporting Basis						20 LEAF	20 LEAF	20 LEAF	20 LEAF	20 LEAF	20 LEAF
Crop Stage Majority/Min/Max						65, 65, 65	69, 69, 69	46, 45, 47	47, 46, 48	48, 48, 48	48, 48, 48
Trt-Eval Interval						7 DA-B	10 DA-C	8 DA-D	6 DA-E	7 DA-F	6 DA-G
ARM Action Codes						TIO[2]	TIO[5]	TIO[8]	TIO[11]	TIO[14]	TIO[17]
Trt No.	Treatment Name	Rate	Rate Unit	Appl Code	Plot	3	6	9	12	15	18
1	Untreated Control				5	0.0	75.0	90.0	100.0	100.0	100.0
					15	5.0	65.0	95.0	100.0	100.0	100.0
					22	35.0	80.0	100.0	100.0	100.0	100.0
					30	10.0	95.0	100.0	100.0	100.0	100.0
					Mean =	12.5	78.8	96.3	100.0	100.0	100.0
2	Dithane Rainshield Neo Tec	2100	g/ha	A-H	1	0.0	45.0	70.0	95.0	100.0	100.0
					11	0.0	55.0	95.0	100.0	100.0	100.0
					20	5.0	55.0	95.0	100.0	100.0	100.0
					33	0.0	35.0	100.0	100.0	100.0	100.0
					Mean =	1.3	47.5	90.0	98.8	100.0	100.0
3	Dithane Rainshield Neo Tec	2100	g/ha	A-H	2	0.0	30.0	75.0	95.0	100.0	100.0
	Score	500	ml/ha	ACE	17	0.0	65.0	95.0	100.0	100.0	100.0
					25	0.0	70.0	100.0	100.0	100.0	100.0
					31	0.0	75.0	100.0	100.0	100.0	100.0
					Mean =	0.0	60.0	92.5	98.8	100.0	100.0
4	Dithane Rainshield Neo Tec	2100	g/ha	A-H	9	5.0	25.0	55.0	95.0	100.0	100.0
	Score	500	ml/ha	ACE	10	5.0	40.0	75.0	100.0	100.0	100.0
	Concord	380	ml/ha	BDF-H	21	0.0	60.0	85.0	100.0	100.0	100.0
					35	10.0	50.0	100.0	100.0	100.0	100.0
					Mean =	5.0	43.8	78.8	98.8	100.0	100.0
5	Dithane Rainshield Neo Tec	2100	g/ha	A-H	8	0.0	30.0	90.0	100.0	100.0	100.0
	Score	500	ml/ha	ACE	18	0.0	40.0	95.0	100.0	100.0	100.0
	Sumisclex	500	ml/ha	BDF	19	0.0	35.0	60.0	95.0	100.0	100.0
					34	0.0	55.0	100.0	100.0	100.0	100.0
					Mean =	0.0	40.0	86.3	98.8	100.0	100.0
6	Dithane Rainshield Neo Tec	2100	g/ha	A-H	7	0.0	35.0	75.0	95.0	100.0	100.0
	Gem	200	ml/ha	AB	14	5.0	30.0	70.0	100.0	100.0	100.0
	Score	500	ml/ha	CEG	27	5.0	35.0	100.0	100.0	100.0	100.0
	Sumisclex	500	ml/ha	DFH	32	0.0	45.0	100.0	95.0	100.0	100.0
					Mean =	2.5	36.3	86.3	97.5	100.0	100.0

7	Dithane Rainshield Neo Tec	2100g/ha	A-H	3	0.0	25.0	75.0	100.0	100.0	100.0
	Score	500ml/ha	AFH	16	10.0	25.0	90.0	100.0	100.0	100.0
	Concord	380ml/ha	BDG	24	0.0	30.0	85.0	100.0	100.0	100.0
	Sumisclex	500ml/ha	CE	28	5.0	25.0	80.0	100.0	100.0	100.0
				Mean =	3.8	26.3	82.5	100.0	100.0	100.0
8	Dithane Rainshield Neo Tec	2100g/ha	A-H	6	0.0	15.0	55.0	70.0	100.0	100.0
	Gem	200ml/ha	A	12	0.0	30.0	55.0	70.0	100.0	100.0
	Coded	-	BD	23	0.0	30.0	75.0	80.0	100.0	100.0
	Score	500ml/ha	CEG	29	0.0	50.0	75.0	90.0	100.0	100.0
	Sumisclex	500ml/ha	FH							
				Mean =	0.0	31.3	65.0	77.5	100.0	100.0
9	Bravo	1100ml/ha	A-H	4	0.0	45.0	65.0	90.0	100.0	100.0
	Gem	200ml/ha	A	13	0.0	30.0	80.0	85.0	100.0	100.0
	Coded	-	BD	26	0.0	45.0	95.0	90.0	100.0	100.0
	Score	500ml/ha	CEG	36	5.0	60.0	95.0	100.0	100.0	100.0
	Sumisclex	500ml/ha	FH							
				Mean =	1.3	45.0	83.8	91.3	100.0	100.0

TIO[2] = % Incidence (&0 = none)[2]
TIO[5] = % Incidence (&0 = none)[5]
TIO[8] = % Incidence (&0 = none)[8]
TIO[11] = % Incidence (&0 = none)[11]
TIO[14] = % Incidence (&0 = none)[14]
TIO[17] = % Incidence (&0 = none)[17]

Table 4 - Early blight (Alternaria solani) area under disease progress curve (AUDPC) at 6 DA-G

Assessment Date						27-Mar-2024
Part Assessed						LEAF, P
Assessment Type						PESSEV
Assessment Unit						AUDPC
Assessment Min/Max/Interval						
Reporting Basis						1 LEAF
Crop Stage Majority/Min/Max						48,48,48
Trt-Eval Interval						6 DA-G
ARM Action Codes						T29 AUDPC
Trt No.	Treatment Name	Rate	Rate Unit	Appl Code	Plot	59
1	Untreated Control				5	718.2
					15	750.9
					22	1084.1
					30	1143.6
					Mean =	924.2
2	Dithane Rainshield Neo Tec	2100	g/ha	A-H	1	209.6
					11	424.4
					20	500.9
					33	442.5
					Mean =	394.3
3	Dithane Rainshield Neo Tec	2100	g/ha	A-H	2	189.9
	Score	500	ml/ha	ACE	17	608.3
					25	489.2
					31	384.9
					Mean =	418.1
4	Dithane Rainshield Neo Tec	2100	g/ha	A-H	9	185.9
	Score	500	ml/ha	ACE	10	181.2
	Concord	380	ml/ha	BDF-H	21	385.8
					35	342.5
					Mean =	273.9
5	Dithane Rainshield Neo Tec	2100	g/ha	A-H	8	134.5
	Score	500	ml/ha	ACE	18	185.3
	Sumisclex	500	ml/ha	BDF	19	144.5
					34	287.1
					Mean =	187.9
6	Dithane Rainshield Neo Tec	2100	g/ha	A-H	7	306.7
	Gem	200	ml/ha	AB	14	195.5
	Score	500	ml/ha	CEG	27	305.6
	Sumisclex	500	ml/ha	DFH	32	217.4
					Mean =	256.3
7	Dithane Rainshield Neo Tec	2100	g/ha	A-H	3	170.3
	Score	500	ml/ha	AFH	16	271.8
	Concord	380	ml/ha	BDG	24	228.0
	Sumisclex	500	ml/ha	CE	28	240.3
					Mean =	227.6
8	Dithane Rainshield Neo Tec	2100	g/ha	A-H	6	102.2
	Gem	200	ml/ha	A	12	76.3
	Coded	-		BD	23	135.0
	Score	500	ml/ha	CEG	29	243.9
	Sumisclex	500	ml/ha	FH		
					Mean =	139.3
9	Bravo	1100	ml/ha	A-H	4	153.3
	Gem	200	ml/ha	A	13	141.3
	Coded	-		BD	26	169.5
	Score	500	ml/ha	CEG	36	347.8
	Sumisclex	500	ml/ha	FH		
					Mean =	203.0

T29 = &@AUDPC(@MATCH(EDT=PESSEV,ERU=%,EPT=ALTESO))
AUDPC, , , = area under disease progress curve

Table 5 - Total yield per plot by class at 36 DA-H

Assessment Date Part Assessed Assessment Type Assessment Unit Reporting Basis Crop Stage Majority/Min/Max Trt-Eval Interval Description ARM Action Codes					3-May-2024 TUBER, C YIETOT kg 1.6 m2 49, 49, 49 36 DA-H Total yield T1	3-May-2024 TUBER, C YIELD kg 1.6 m2 49, 49, 49 36 DA-H Size <50g	3-May-2024 TUBER, C YIELD kg 1.6 m2 49, 49, 49 36 DA-H Size 51-100g	3-May-2024 TUBER, C YIELD kg 1.6 m2 49, 49, 49 36 DA-H Size 101-200g	3-May-2024 TUBER, C YIELD kg 1.6 m2 49, 49, 49 36 DA-H Size 201-300g	3-May-2024 TUBER, C YIELD kg 1.6 m2 49, 49, 49 36 DA-H Size 301-400g	3-May-2024 TUBER, C YIELD kg 1.6 m2 49, 49, 49 36 DA-H Size > 401g
Trt No.	Treatment Name	Rate	Rate Unit	Appl Code	Plot	25	19	20	21	22	23	24
1	Untreated Control				5	4.52	0.50	0.90	0.98	1.44	0.70	0.00
					15	6.00	0.29	1.14	3.65	0.92	0.00	0.00
					22	6.80	0.21	1.80	3.12	1.00	0.67	0.00
					30	7.44	0.35	0.82	3.30	2.62	0.35	0.00
					Mean =	6.19	0.34	1.17	2.76	1.50	0.43	0.00
2	Dithane Rainshield Neo Tec	2100	g/ha	A-H	1	4.79	0.40	1.30	1.81	0.96	0.32	0.00
					11	6.91	0.17	1.62	3.50	1.62	0.00	0.00
					20	9.41	0.23	1.33	2.75	3.40	1.70	0.00
					33	5.36	0.33	1.52	2.79	0.41	0.31	0.00
					Mean =	6.62	0.28	1.44	2.71	1.60	0.58	0.00
3	Dithane Rainshield Neo Tec	2100	g/ha	A-H	2	6.28	0.17	0.89	1.14	2.18	1.00	0.90
	Score	500	ml/ha	ACE	17	4.84	0.10	1.14	2.46	1.14	0.00	0.00
					25	7.31	0.24	1.37	3.25	2.14	0.31	0.00
					31	6.89	0.33	1.04	3.11	2.01	0.40	0.00
					Mean =	6.33	0.21	1.11	2.49	1.87	0.43	0.23
4	Dithane Rainshield Neo Tec	2100	g/ha	A-H	9	8.87	0.06	0.65	2.64	2.98	1.11	1.43
	Score	500	ml/ha	ACE	10	6.08	0.38	1.96	2.12	0.93	0.69	0.00
	Concord	380	ml/ha	BDF-H	21	9.04	0.09	1.21	4.57	2.46	0.71	0.00
					35	5.79	0.37	0.78	3.30	0.89	0.00	0.45
					Mean =	7.45	0.23	1.15	3.16	1.82	0.63	0.47
5	Dithane Rainshield Neo Tec	2100	g/ha	A-H	8	6.02	0.25	1.15	2.52	0.76	1.34	0.00
	Score	500	ml/ha	ACE	18	8.09	0.36	0.89	3.04	2.10	1.70	0.00
	Sumisclex	500	ml/ha	BDF	19	8.22	0.22	1.85	3.31	2.84	0.00	0.00
					34	6.17	0.42	1.11	2.70	1.94	0.00	0.00
					Mean =	7.13	0.31	1.25	2.89	1.91	0.76	0.00
6	Dithane Rainshield Neo Tec	2100	g/ha	A-H	7	7.68	0.41	1.06	2.94	1.85	0.97	0.45
	Gem	200	ml/ha	AB	14	6.08	0.41	1.54	2.70	1.43	0.00	0.00
	Score	500	ml/ha	CEG	27	7.30	0.45	1.72	3.35	1.43	0.35	0.00
	Sumisclex	500	ml/ha	DFH	32	6.25	0.22	1.25	2.98	1.42	0.38	0.00
					Mean =	6.83	0.37	1.39	2.99	1.53	0.43	0.11

7	Dithane Rainshield Neo Tec	2100g/ha	A-H	3	6.60	0.34	1.68	3.10	1.14	0.34	0.00
	Score	500ml/ha	AFH	16	7.79	0.27	1.20	1.74	3.07	1.51	0.00
	Concord	380ml/ha	BDG	24	10.18	0.12	0.92	5.16	2.12	1.38	0.48
	Sumisclex	500ml/ha	CE	28	7.50	0.27	0.99	3.16	2.32	0.32	0.44
				Mean =	8.02	0.25	1.20	3.29	2.16	0.89	0.23
8	Dithane Rainshield Neo Tec	2100g/ha	A-H	6	6.94	0.12	1.25	3.27	1.97	0.33	0.00
	Gem	200ml/ha	A	12	7.57	0.18	0.86	4.02	2.13	0.38	0.00
	Coded	-	BD	23	9.68	0.31	0.51	4.04	2.76	2.06	0.00
	Score	500ml/ha	CEG	29	8.12	0.00	0.74	2.53	2.35	2.10	0.40
	Sumisclex	500ml/ha	FH								
				Mean =	8.08	0.15	0.84	3.47	2.30	1.22	0.10
9	Bravo	1100ml/ha	A-H	4	7.55	0.32	1.38	4.36	0.87	0.62	0.00
	Gem	200ml/ha	A	13	8.38	0.34	1.35	3.10	2.13	1.04	0.42
	Coded	-	BD	26	5.96	0.53	1.67	2.14	0.61	1.01	0.00
	Score	500ml/ha	CEG	36	4.14	0.53	1.30	1.85	0.46	0.00	0.00
	Sumisclex	500ml/ha	FH								
				Mean =	6.51	0.43	1.43	2.86	1.02	0.67	0.11

T1 = [C19]+[C20]+[C21]+[C22]+[C23]+[C24]

Table 6 - Percent yield per plot by class at 36 DA-H

Assessment Date Part Assessed Assessment Type Assessment Unit Assessment Min/Max/Interval Reporting Basis Crop Stage Majority/Min/Max Trt-Eval Interval Description ARM Action Codes					3-May-2024 TUBER, C YIELD % 0, 100, - 1.6 m2 49, 49, 49 36 DA-H % Size <50g T3	3-May-2024 TUBER, C YIELD % 0, 100, - 1.6 m2 49, 49, 49 36 DA-H % Size 51-100g T4	3-May-2024 TUBER, C YIELD % 0, 100, - 1.6 m2 49, 49, 49 36 DA-H % Size 101-200g T5	3-May-2024 TUBER, C YIELD % 0, 100, - 1.6 m2 49, 49, 49 36 DA-H % Size 201-300g T6	3-May-2024 TUBER, C YIELD % 0, 100, - 1.6 m2 49, 49, 49 36 DA-H % Size 301-400g T7	3-May-2024 TUBER, C YIELD % 0, 100, - 1.6 m2 49, 49, 49 36 DA-H % Size > 401g T8
Trt No.	Treatment Name	Rate	Rate Unit	Appl Code	Plot	47	48	49	50	51	52
1	Untreated Control				5	11.1	19.9	21.7	31.9	15.5	0.0
					15	4.8	19.0	60.8	15.3	0.0	0.0
					22	3.1	26.5	45.9	14.7	9.9	0.0
					30	4.7	11.0	44.4	35.2	4.7	0.0
					Mean =	5.9	19.1	43.2	24.3	7.5	0.0
2	Dithane Rainshield Neo Tec	2100	g/ha	A-H	1	8.4	27.1	37.8	20.0	6.7	0.0
					11	2.5	23.4	50.7	23.4	0.0	0.0
					20	2.4	14.1	29.2	36.1	18.1	0.0
					33	6.2	28.4	52.1	7.6	5.8	0.0
					Mean =	4.9	23.3	42.4	21.8	7.6	0.0
3	Dithane Rainshield Neo Tec	2100	g/ha	A-H	2	2.7	14.2	18.2	34.7	15.9	14.3
	Score	500	ml/ha	ACE	17	2.1	23.6	50.8	23.6	0.0	0.0
					25	3.3	18.7	44.5	29.3	4.2	0.0
					31	4.8	15.1	45.1	29.2	5.8	0.0
					Mean =	3.2	17.9	39.6	29.2	6.5	3.6
4	Dithane Rainshield Neo Tec	2100	g/ha	A-H	9	0.7	7.3	29.8	33.6	12.5	16.1
	Score	500	ml/ha	ACE	10	6.3	32.2	34.9	15.3	11.3	0.0
	Concord	380	ml/ha	BDF-H	21	1.0	13.4	50.6	27.2	7.9	0.0
					35	6.4	13.5	57.0	15.4	0.0	7.8
					Mean =	3.6	16.6	43.0	22.9	7.9	6.0
5	Dithane Rainshield Neo Tec	2100	g/ha	A-H	8	4.2	19.1	41.9	12.6	22.3	0.0
	Score	500	ml/ha	ACE	18	4.4	11.0	37.6	26.0	21.0	0.0
	Sumisclex	500	ml/ha	BDF	19	2.7	22.5	40.3	34.5	0.0	0.0
					34	6.8	18.0	43.8	31.4	0.0	0.0
					Mean =	4.5	17.7	40.9	26.1	10.8	0.0
6	Dithane Rainshield Neo Tec	2100	g/ha	A-H	7	5.3	13.8	38.3	24.1	12.6	5.9
	Gem	200	ml/ha	AB	14	6.7	25.3	44.4	23.5	0.0	0.0
	Score	500	ml/ha	CEG	27	6.2	23.6	45.9	19.6	4.8	0.0
	Sumisclex	500	ml/ha	DFH	32	3.5	20.0	47.7	22.7	6.1	0.0

				Mean =	5.4	20.7	44.1	22.5	5.9	1.5
7	Dithane Rainshield Neo Tec	2100g/ha	A-H	3	5.2	25.5	47.0	17.3	5.2	0.0
	Score	500ml/ha	AFH	16	3.5	15.4	22.3	39.4	19.4	0.0
	Concord	380ml/ha	BDG	24	1.2	9.0	50.7	20.8	13.6	4.7
	Sumisclex	500ml/ha	CE	28	3.6	13.2	42.1	30.9	4.3	5.9
				Mean =	3.3	15.8	40.5	27.1	10.6	2.6
8	Dithane Rainshield Neo Tec	2100g/ha	A-H	6	1.7	18.0	47.1	28.4	4.8	0.0
	Gem	200ml/ha	A	12	2.4	11.4	53.1	28.1	5.0	0.0
	Coded	-	BD	23	3.2	5.3	41.7	28.5	21.3	0.0
	Score	500ml/ha	CEG	29	0.0	9.1	31.2	28.9	25.9	4.9
	Sumisclex	500ml/ha	FH							
				Mean =	1.8	10.9	43.3	28.5	14.2	1.2
9	Bravo	1100ml/ha	A-H	4	4.2	18.3	57.7	11.5	8.2	0.0
	Gem	200ml/ha	A	13	4.1	16.1	37.0	25.4	12.4	5.0
	Coded	-	BD	26	8.9	28.0	35.9	10.2	16.9	0.0
	Score	500ml/ha	CEG	36	12.8	31.4	44.7	11.1	0.0	0.0
	Sumisclex	500ml/ha	FH							
				Mean =	7.5	23.5	43.8	14.6	9.4	1.3

T3 = [C19]/[C25]*100
T4 = [C20]/[C25]*100
T5 = [C21]/[C25]*100
T6 = [C22]/[C25]*100
T7 = [C23]/[C25]*100
T8 = [C24]/[C25]*100

Table 7 - Total yield count and yield by class at 36 DA-H

Assessment Date Part Assessed Assessment Type Reporting Basis Crop Stage Majority/Min/Max Trt-Eval Interval Description ARM Action Codes						3-May-2024 TUBER, C COPLPA 1.6 m2 49, 49, 49 36 DA-H Total count T2	3-May-2024 TUBER, C COPLPA 1.6 m2 49, 49, 49 36 DA-H Size <50g	3-May-2024 TUBER, C COPLPA 1.6 m2 49, 49, 49 36 DA-H Size 51-100g	3-May-2024 TUBER, C COPLPA 1.6 m2 49, 49, 49 36 DA-H Size 101-200g	3-May-2024 TUBER, C COPLPA 1.6 m2 49, 49, 49 36 DA-H Size 201-300g	3-May-2024 TUBER, C COPLPA 1.6 m2 49, 49, 49 36 DA-H Size 301-400g	3-May-2024 TUBER, C COPLPA 1.6 m2 49, 49, 49 36 DA-H Size > 401g
Trt No.	Treatment Name	Rate	Rate Unit	Appl Code	Plot	39	33	34	35	36	37	38
1	Untreated Control				5	44.0	17.0	12.0	7.0	6.0	2.0	0.0
					15	55.0	10.0	15.0	26.0	4.0	0.0	0.0
					22	58.0	7.0	23.0	22.0	4.0	2.0	0.0
					30	54.0	10.0	11.0	21.0	11.0	1.0	0.0
					Mean =	52.8	11.0	15.3	19.0	6.3	1.3	0.0
2	Dithane Rainshield Neo Tec	2100	g/ha	A-H	1	48.0	14.0	16.0	13.0	4.0	1.0	0.0
					11	60.0	8.0	20.0	25.0	7.0	0.0	0.0
					20	62.0	7.0	17.0	19.0	14.0	5.0	0.0
					33	55.0	11.0	20.0	21.0	2.0	1.0	0.0
					Mean =	56.3	10.0	18.3	19.5	6.8	1.8	0.0
3	Dithane Rainshield Neo Tec	2100	g/ha	A-H	2	38.0	5.0	11.0	8.0	9.0	3.0	2.0
	Score	500	ml/ha	ACE	17	44.0	5.0	16.0	18.0	5.0	0.0	0.0
					25	59.0	8.0	19.0	22.0	9.0	1.0	0.0
					31	55.0	12.0	14.0	20.0	8.0	1.0	0.0
					Mean =	49.0	7.5	15.0	17.0	7.8	1.3	0.5
4	Dithane Rainshield Neo Tec	2100	g/ha	A-H	9	48.0	3.0	9.0	18.0	12.0	3.0	3.0
	Score	500	ml/ha	ACE	10	62.0	15.0	25.0	16.0	4.0	2.0	0.0
	Concord	380	ml/ha	BDF-H	21	63.0	5.0	15.0	31.0	10.0	2.0	0.0
					35	51.0	12.0	10.0	24.0	4.0	0.0	1.0
					Mean =	56.0	8.8	14.8	22.3	7.5	1.8	1.0
5	Dithane Rainshield Neo Tec	2100	g/ha	A-H	8	51.0	11.0	15.0	18.0	3.0	4.0	0.0
	Score	500	ml/ha	ACE	18	62.0	13.0	12.0	23.0	9.0	5.0	0.0
	Sumisclex	500	ml/ha	BDF	19	68.0	9.0	24.0	23.0	12.0	0.0	0.0
					34	56.0	13.0	15.0	20.0	8.0	0.0	0.0
					Mean =	59.3	11.5	16.5	21.0	8.0	2.3	0.0
6	Dithane Rainshield Neo Tec	2100	g/ha	A-H	7	60.0	14.0	13.0	21.0	8.0	3.0	1.0
	Gem	200	ml/ha	AB	14	62.0	16.0	20.0	20.0	6.0	0.0	0.0
	Score	500	ml/ha	CEG	27	65.0	14.0	21.0	23.0	6.0	1.0	0.0
	Sumisclex	500	ml/ha	DFH	32	55.0	9.0	17.0	22.0	6.0	1.0	0.0
					Mean =	60.5	13.3	17.8	21.5	6.5	1.3	0.3
7	Dithane Rainshield Neo Tec	2100	g/ha	A-H	3	59.0	10.0	22.0	21.0	5.0	1.0	0.0

	Score	500ml/ha	AFH	16	54.0	8.0	16.0	13.0	13.0	4.0	0.0
	Concord	380ml/ha	BDG	24	71.0	7.0	11.0	39.0	9.0	4.0	1.0
	Sumisclex	500ml/ha	CE	28	60.0	10.0	13.0	25.0	10.0	1.0	1.0
				Mean =	61.0	8.8	15.5	24.5	9.3	2.5	0.5
8	Dithane Rainshield Neo Tec	2100g/ha	A-H	6	57.0	7.0	17.0	24.0	8.0	1.0	0.0
	Gem	200ml/ha	A	12	54.0	6.0	11.0	27.0	9.0	1.0	0.0
	Coded	-	BD	23	64.0	13.0	7.0	27.0	11.0	6.0	0.0
	Score	500ml/ha	CEG	29	43.0	0.0	10.0	16.0	10.0	6.0	1.0
	Sumisclex	500ml/ha	FH								
				Mean =	54.5	6.5	11.3	23.5	9.5	3.5	0.3
9	Bravo	1100ml/ha	A-H	4	68.0	12.0	18.0	32.0	4.0	2.0	0.0
	Gem	200ml/ha	A	13	66.0	12.0	18.0	23.0	9.0	3.0	1.0
	Coded	-	BD	26	61.0	19.0	21.0	15.0	3.0	3.0	0.0
	Score	500ml/ha	CEG	36	52.0	18.0	18.0	14.0	2.0	0.0	0.0
	Sumisclex	500ml/ha	FH								
				Mean =	61.8	15.3	18.8	21.0	4.5	2.0	0.3

T2 = [C33]+[C34]+[C35]+[C36]+[C37]+[C38]

Table 8 - Percent yield count by class at 36 DA-H

Assessment Date Part Assessed Assessment Type Assessment Unit Assessment Min/Max/Interval Reporting Basis Crop Stage Majority/Min/Max Trt-Eval Interval Description ARM Action Codes					3-May-2024 TUBER, C COPLPA % 0, 100, - 1.6 m2 49, 49, 49 36 DA-H % Size <50g T9	3-May-2024 TUBER, C COPLPA % 0, 100, - 1.6 m2 49, 49, 49 36 DA-H % Size 51-100g T10	3-May-2024 TUBER, C COPLPA % 0, 100, - 1.6 m2 49, 49, 49 36 DA-H % Size 101-200g T11	3-May-2024 TUBER, C COPLPA % 0, 100, - 1.6 m2 49, 49, 49 36 DA-H % Size 201-300g T12	3-May-2024 TUBER, C COPLPA % 0, 100, - 1.6 m2 49, 49, 49 36 DA-H % Size 301-400g T13	3-May-2024 TUBER, C COPLPA % 0, 100, - 1.6 m2 49, 49, 49 36 DA-H % Size > 401g T14
Trt No.	Treatment Name	Rate	Rate Unit	Appl Code	Plot	53	54	55	56	57	58
1	Untreated Control				5	38.6	27.3	15.9	13.6	4.5	0.0
					15	18.2	27.3	47.3	7.3	0.0	0.0
					22	12.1	39.7	37.9	6.9	3.4	0.0
					30	18.5	20.4	38.9	20.4	1.9	0.0
					Mean =	21.9	28.6	35.0	12.0	2.5	0.0
2	Dithane Rainshield Neo Tec	2100	g/ha	A-H	1	29.2	33.3	27.1	8.3	2.1	0.0
					11	13.3	33.3	41.7	11.7	0.0	0.0
					20	11.3	27.4	30.6	22.6	8.1	0.0
					33	20.0	36.4	38.2	3.6	1.8	0.0
					Mean =	18.4	32.6	34.4	11.6	3.0	0.0
3	Dithane Rainshield Neo Tec	2100	g/ha	A-H	2	13.2	28.9	21.1	23.7	7.9	5.3
	Score	500	ml/ha	ACE	17	11.4	36.4	40.9	11.4	0.0	0.0
					25	13.6	32.2	37.3	15.3	1.7	0.0
					31	21.8	25.5	36.4	14.5	1.8	0.0
					Mean =	15.0	30.7	33.9	16.2	2.9	1.3
4	Dithane Rainshield Neo Tec	2100	g/ha	A-H	9	6.3	18.8	37.5	25.0	6.3	6.3
	Score	500	ml/ha	ACE	10	24.2	40.3	25.8	6.5	3.2	0.0
	Concord	380	ml/ha	BDF-H	21	7.9	23.8	49.2	15.9	3.2	0.0
					35	23.5	19.6	47.1	7.8	0.0	2.0
					Mean =	15.5	25.6	39.9	13.8	3.2	2.1
5	Dithane Rainshield Neo Tec	2100	g/ha	A-H	8	21.6	29.4	35.3	5.9	7.8	0.0
	Score	500	ml/ha	ACE	18	21.0	19.4	37.1	14.5	8.1	0.0
	Sumisclex	500	ml/ha	BDF	19	13.2	35.3	33.8	17.6	0.0	0.0
					34	23.2	26.8	35.7	14.3	0.0	0.0
					Mean =	19.7	27.7	35.5	13.1	4.0	0.0
6	Dithane Rainshield Neo Tec	2100	g/ha	A-H	7	23.3	21.7	35.0	13.3	5.0	1.7
	Gem	200	ml/ha	AB	14	25.8	32.3	32.3	9.7	0.0	0.0
	Score	500	ml/ha	CEG	27	21.5	32.3	35.4	9.2	1.5	0.0
	Sumisclex	500	ml/ha	DFH	32	16.4	30.9	40.0	10.9	1.8	0.0

				Mean =	21.8	29.3	35.7	10.8	2.1	0.4
7	Dithane Rainshield Neo Tec	2100g/ha	A-H	3	16.9	37.3	35.6	8.5	1.7	0.0
	Score	500ml/ha	AFH	16	14.8	29.6	24.1	24.1	7.4	0.0
	Concord	380ml/ha	BDG	24	9.9	15.5	54.9	12.7	5.6	1.4
	Sumisclex	500ml/ha	CE	28	16.7	21.7	41.7	16.7	1.7	1.7
				Mean =	14.6	26.0	39.1	15.5	4.1	0.8
8	Dithane Rainshield Neo Tec	2100g/ha	A-H	6	12.3	29.8	42.1	14.0	1.8	0.0
	Gem	200ml/ha	A	12	11.1	20.4	50.0	16.7	1.9	0.0
	Coded	-	BD	23	20.3	10.9	42.2	17.2	9.4	0.0
	Score	500ml/ha	CEG	29	0.0	23.3	37.2	23.3	14.0	2.3
	Sumisclex	500ml/ha	FH							
				Mean =	10.9	21.1	42.9	17.8	6.7	0.6
9	Bravo	1100ml/ha	A-H	4	17.6	26.5	47.1	5.9	2.9	0.0
	Gem	200ml/ha	A	13	18.2	27.3	34.8	13.6	4.5	1.5
	Coded	-	BD	26	31.1	34.4	24.6	4.9	4.9	0.0
	Score	500ml/ha	CEG	36	34.6	34.6	26.9	3.8	0.0	0.0
	Sumisclex	500ml/ha	FH							
				Mean =	25.4	30.7	33.4	7.1	3.1	0.4

T9 = [C33]/[C39]*100
T10 = [C34]/[C39]*100
T11 = [C35]/[C39]*100
T12 = [C36]/[C39]*100
T13 = [C37]/[C39]*100
T14 = [C38]/[C39]*100

Appendix iii - Weather data

	February 2024			March 2024			April 2024			May 2024		
Date	**Min ºC**	**Max ºC**	**Rain mm**	**Min ºC**	**Max ºC**	**Rain mm**	**Min ºC**	**Max ºC**	**Rain mm**	**Min ºC**	**Max ºC**	**Rain mm**
1	14.6	23.0		11.4	21.4		6.0	18.0.		7.6	19.9	4.8
2	14.9	22.5	1.2	11.2	21.6		7.8	19.4		9.3	15.9	16.6
3	12.3	19.1	14.4	14.6	18.6	11.4	7.4	21.1		7.3	17.4	1.2
4	10.1	21.0		12.7	20.1	21.6	10.0	19.7		7.9	19.8	0.2
5	9.7	21.7		10.2	17.3	2.4	9.6	16.6	4.4	6.7	19.7	
6	10.7	24.5		7.8	18.4	0.4	11.4	17.9		10.1	18.3	3.4
7	12.0	23.4		7.2	17.7	0.4	11.2	17.9		7.4	16.5	0.2
8	10.8	23.1		12.0	21.3	0.2	10.2	18.9		4.1	17.0	
9	15.2	25.4		9.7	18.8		11.5	20.7		4.1	16.4	
10	15.0	25.2		8.9	22.6		13.4	20.4		0.2	14.2	
11	12.7	19.7	0.2	8.9	19.5		16.1	19.0	2.4	2.6	15.2	
12	9.0	22.8		14.7	20.2	4.4	11.9	18.8	13.8	1.8	17.5	
13	9.2	22.0		12.9	20.4	0.2	9.3	16.6	2.2	6.7	17.6	0.4
14	9.4	24.8		13.2	19.9	1.2	7.9	17.7	1.4	5.4	15.4	0.2
15	11.7	25.1		11.3	16.1	10	6.8	17.3	1.0	11.1	20.3	24.6
16	13.3	24.4		7.7	16.8	0.4	8.8	17.4	2.0	11.7	17.7	14.0
17	13.1	26.1		5.1	18.4		7.8	17.7	4.8	7.7	17.2	0.2
18	10.7	24.3		8.7	17.7	0.4	7.6	17.0		5.0	17.7	
19	11.6	23.7		7.7	19.2		11.2	18.9	12.4	7.1	17.3	
20	11.4	21.9	2.8	6.0	18.3		12.1	15.5	16.0	7.8	14.2	19
21	8.2	20.2		6.0	18.2		11.8	15.1	0.6	12.9	17.6	3.4
22	9.6	23.4		4.9	19.4		11.0	16.8		10.2	19.4	0.2
23	12.0	22.4		12.0	18.8	8.4	7.2	19.1		7.8	18.3	
24	10.9	25.6		12.3	20.7		7.3	18.0		7.8	16.5	10.2
25	15.1	20.7	24.6	11.2	19.8		10.9	19.5	1.8	7.6	15.6	4.8
26	14.6	18.2	6.8	12.2	20.8	1.6	8.2	17.9		11.5	16.8	4.0
27	11.0	19.3	5.8	12.0	19.4	4.2	8.6	19.3		10.3	15.0	3.8
28	9.5	22.0		9.5	18.1	2.2	8.8	18.0.		8.8	15.7	10.8
29	10.3	24.1		6.7	15.8	4.4	9.7	21.4		7.8	14.4	19.6
30				4.4	17.2					7.4	16.0	0.6
31				3.1	16.5					12.0	17.2	
Total			**55.8**			**73.8**			**62.8**			**142.2**

Appendix iv - Photographs

Photo 1 - Untreated on the left and treatment 8 on the right at 7 DA-F

Photo 2 - Early blight in treatment 7 at 7 DA-F

Photo 3 - Early blight in treatment 3 at 7 DA-F

Photo 4 - Early blight in treatment 9 at 7 DA-F

Photo 5 - Early blight in treatment 6 at 7 DA-F