

Evaluation of Fungicides for the Control of Early Blight (*Alternaria solani*) in Potatoes during the 2026 Season in Pukekohe, New Zealand.

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Summary

A replicated field trial was conducted during the 2026 growing season at the Plant and Food Research Farm, operated by Plant & Food Research, Pukekohe, New Zealand, to evaluate the efficacy of selected fungicides for the control of early blight in potatoes. Treatments were applied weekly over a seven-week period in a drag-race format to compare product performance under uniform disease pressure.

Disease development was initially low across the trial; however, conditions became conducive for disease progression, resulting in substantial increases in both incidence and severity by the final assessment. Statistical analysis demonstrated that treatment effects were not significant during early assessments but became highly significant at the final rating ($P < 0.001$).

Under these conditions, difenoconazole (Score) and procymidone (Procym) provided the most effective control of early blight, significantly reducing both lesion counts and disease severity relative to the untreated control. In contrast, fenamidone (Reason) and mandestrobin (Intuity) were less effective, with disease levels comparable to untreated plots.

Introduction

Early blight, caused by *Alternaria solani*, is a significant foliar disease of potatoes in New Zealand, particularly under warm and humid conditions typical of late summer in Pukekohe. The disease can result in early leaf drop, reduced photosynthetic capacity, and yield loss if not controlled.

The objective of this trial was to evaluate and compare the performance of a range of fungicides with different modes of action under field conditions. The trial was conducted as part of the 2026 Seed & Field Cropstock event to provide robust, locally relevant data for growers and industry stakeholders.

Materials and Methods

Site Description

The trial was established at the Plant and Food Research Farm (49 Cronin Road, Pukekohe) and planted on 31st of January. The site was managed under standard agronomic practices to ensure optimal crop growth and to minimise stress factors such as weed competition and insect pressure. General insecticide applications were applied as required across all plots.

Experimental Design

The trial was arranged as a randomised complete block design (RCBD) with four replicates per treatment. Individual plots consisted of a single bed measuring 1.72 m in width and 7 m in length. Treatments were randomly allocated within each replicate to minimise spatial variability.

Fungicide Treatments

Seven fungicide treatments, along with an untreated control, were evaluated (Table 1).

Table 1. Fungicide treatments evaluated for early blight control

Treatment	Product	Active Ingredient	Rate
1	Untreated	–	–
2	Score	difenoconazole	0.5 L/ha
3	BAS750	–	1 L/ha
4	Procym	procymidone	0.5 L/ha
5	SF001	–	0.375 L/ha
6	Reason	fenamidone	0.3 L/ha
7	Intuity	mandestrobin	1.5 L/ha

Fungicide Application

Applications were made using a calibrated CO₂ backpack sprayer delivering 300 L/ha at 200 kPa through 11002 AITTJ60 teejet nozzles spaced at 30cm. Fungicides were applied weekly over seven consecutive weeks. Du-Wett surfactant was included at 100 mL per 100 L of spray solution in accordance with label recommendations.

Disease Assessments

Disease incidence and severity were assessed weekly over a 4-week period (19th March - 9th April), with the final assessment conducted eight days after the last application.

Incidence was quantified as the mean number of lesions per compound leaf, based on a sample of 25 compound leaves collected from the centre of each plot to avoid edge effects. Severity was estimated as the percentage of leaf area infected on the same sampling units.

Statistical Analysis

Data were analysed using analysis of variance (ANOVA) appropriate for an RCBD. Assumptions of normality and homogeneity of variance were assessed, and transformations were applied where necessary. Treatment means were separated using Tukey's Honest Significant Difference (HSD) test at the 5% level of significance.

Results

Disease Progression

Disease pressure was minimal at the commencement of the trial, with negligible differences observed among treatments. As the season progressed, environmental conditions favoured disease development, resulting in an increase in both incidence and severity by the final assessment. This progression allowed clear differentiation of fungicide performance.

Final Disease Incidence

Significant differences in disease incidence were observed at the final assessment ($P = 0.0001$). Mean lesion counts per leaf are presented in Table 2.

Table 2. Final early blight incidence (lesions per leaf)

Treatment	Incidence	Significance Group
Untreated	2.91	ab
Score	1.37	c
BAS750	1.76	bc
Procym	1.32	c
SF001	2.95	ab
Reason	3.23	a
Intuity	3.13	a

Both Score and Procym significantly reduced lesion numbers compared with the untreated control, whereas Reason and Intuity recorded the highest levels of disease incidence.

Final Disease Severity

Disease severity followed a similar trend, with highly significant treatment effects observed at the final assessment ($P = 0.0001$) (Table 3).

Table 3. Final early blight severity (% leaf area infected)

Treatment	Severity (%)	Significance Group
Untreated	54.50	a
Score	7.65	d
BAS750	17.90	bcd
Procym	12.25	cd
SF001	40.55	ab
Reason	35.25	abc
Intuity	42.45	ab

Score provided the greatest reduction in disease severity, followed by Procym. BAS750 offered intermediate control, while SF001, Reason, and Intuity were less effective.

Statistical Overview

Treatment effects were not statistically significant during early assessments due to low disease pressure. However, as disease intensity increased, treatment differences became more pronounced, culminating in highly significant differences at the final rating.

Variability within the dataset decreased over time, resulting in improved statistical power and confidence in treatment separation at the final assessment.

Discussion

The results of this trial demonstrate clear differences in fungicide performance under increasing early blight pressure. The superior performance of difenoconazole (Score) is consistent with its known efficacy against *Alternaria solani*, providing both protectant and curative activity. Procymidone (Procym) also delivered strong disease suppression, suggesting its suitability as a rotational partner in fungicide programmes.

BAS750 provided moderate control, indicating it may have a role within integrated disease management strategies, particularly when used in rotation with more effective products.

In contrast, SF001, Reason (fenamidone), and Intuity (mandestrobin) were less effective under the conditions of this trial. The relatively poor performance of these products may reflect limited activity against early blight, suboptimal timing relative to disease development, or environmental factors influencing efficacy.

Conclusions

Under the conditions of this trial:

- Score (difenoconazole) provided the highest level of control of early blight
- Procym (procymidone) also demonstrated strong efficacy
- BAS750 provided moderate suppression
- SF001, Reason, and Intuity were less effective

Recommendations

Under the conditions of this trial, the following recommendations for effective management of early blight in potatoes were identified:

- Prioritise highly effective fungicides such as Score in spray programmes
- Incorporate Procym as a rotational partner to support resistance management
- Use BAS750 as part of a broader integrated programme
- Avoid reliance on less effective products under moderate to high disease pressure

All fungicide applications should be integrated with resistance management strategies, including rotation of modes of action and adherence to label recommendations.

Appendix -
Appendix i – Weather Data

Date	February			March			April		
	Max (°C)	Min (°C)	Rainfall (mm)	Max (°C)	Min (°C)	Rainfall (mm)	Max (°C)	Min (°C)	Rainfall (mm)
1	26.6	16.7	0.3	26.8	12.1	2.9	20.5	12	0
2	28.2	20	8	21.7	6	0	23.1	11.8	0
3	23.8	15.9	3.4	19.9	8.1	0	23.1	11	0
4	24.9	15.7	0.1	21.9	8.2	0	21.9	13.1	1.5
5	26	14.9	0	24.6	9.1	0	22.1	14.1	0.1
6	24.1	15.8	0	24.2	9.4	0	21.6	16	0
7	25.9	18.8	0	24.8	11.3	0	19.8	16.6	22.3
8	25.9	11.7	0.6	25.2	12.5	0	22.8	13.1	9.9
9	26.3	15.2	0	26.8	11.7	0	23.7	13.1	0
10	28.4	16.5	0	24.6	14.3	0	-	-	-
11	29.2	16.2	0	18.9	13.9	0	-	-	-
12	27	19.2	1.3	24.2	16.2	0.6	-	-	-
13	25	19.8	23.2	28	17.4	8.3	-	-	-
14	21.1	16.1	0	22.6	12.3	0	-	-	-
15	22.1	14.6	0.4	23.1	10.7	0	-	-	-
16	24.3	12.2	1.3	23.9	10.2	0.1	-	-	-
17	25.1	14.1	0	24.9	11	0	-	-	-
18	25.1	14.2	1.4	26.2	12.7	0	-	-	-
19	24.1	14.6	0.4	27	10.3	0	-	-	-
20	24.4	13.9	0	26.3	11.7	0	-	-	-
21	24.2	10.1	0	28.1	13.5	0	-	-	-
22	24.2	12.2	0	27.9	15.2	0	-	-	-
23	26	11.3	0	26.2	11.7	0	-	-	-
24	26	14.9	0	22.8	14.6	0	-	-	-

25	27.5	14.1	0	20.1	15.6	32.6	-	-	-
26	27	14	0	20.2	15.9	60.7	-	-	-
27	26.9	15.1	0	27.9	15	0	-	-	-
28	24.8	15.5	0.3	25.4	12.8	0	-	-	-
29	-	-		25.1	15.9	12.5	-	-	-
30	-	-		22.7	15.6	1.4	-	-	-
31	-	-		20.6	12.2	0	-	-	-