

# Evaluation of potato late blight management utilizing host plant resistance and reduced rates and frequencies of fungicide applications; 2004-05.

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## Introduction

In April 2001, an alliance among potato research programs in North Dakota, Minnesota, Wisconsin and Michigan was established; this has been formally recognized as the Quad State Potato Research group [now NCR 205 (North Central Technical Group 205)] and a pilot study was carried out at MSU to determine the feasibility of this collaboration as related to late blight control. The four breeding programs submitted varieties and advanced breeding lines (ABL) and late blight field trials were initiated at the Muck Soils Research Farm, Laingsburg, MI.

## Objectives

The objective of this study was to determine if acceptable control of foliar late blight can be achieved by using increased fungicide spray intervals and reduced application rates of residual contact fungicides on potato germplasm with a range of susceptibility to late blight developed at each of the four public potato breeding programs.

## Methods and materials

Field experiments were carried out (2004-2005) to evaluate the efficacy of combining host resistance with reduced rates and frequencies of the residual contact fungicide fluazinam to control foliar potato late blight (*Phytophthora infestans*).

Potato cultivars (cvs.) and advanced breeding lines (ABL) developed in four states were used in combination with fluazinam applications at 0, 50% and 100% of the manufacturer recommended application rate (MRAR) applied at 5, 7, 10 or 14 day application intervals.

The cv. Torridon was used as a resistant reference and the cvs. Snowden and FL 1879 as susceptible.

Efficacy of application programs were compared statistically to the RAUDPC of the non-treated and to the maximum application rate at the minimum application interval program in the reference varieties.

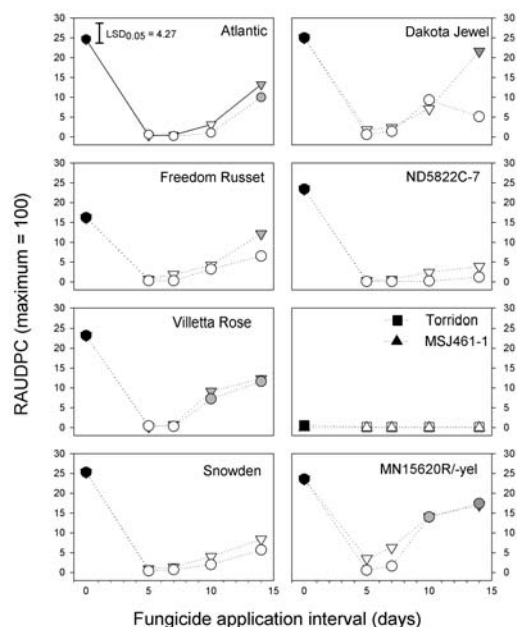


Figure 1. Mean RAUDPC (max = 100) in potato cultivars and ABL inoculated with *Phytophthora infestans* (US8, A2) and protected with reduced rates of fluazinam applied at 50 or 100% at 5, 7, 10 or 14-day intervals at 50 or 100% manufacturers recommended application rate. The least significant difference was RAUDPC = 4.27, for comparisons among all cultivars at all fungicide application rates and frequencies. All comparisons were tested at  $p = 0.05$ . 2004 trial.



- ▼ 50% MRAR ● 100% MRAR
- ▽ NSD from 100% MRAR @ 5 day interval
- ▽ NSD from non-treated and 100% MRAR @ 5 day interval
- ▽ NSD from non-treated control

Key for both figures

## Results and Discussion

Cultivars Torridon and MSJ461-1 and Jacqueline Lee, Stirling, Torridon, MSJ461-1 and MSK136-2 were resistant in 2004 and 2005, respectively. All other cultivars were susceptible except Freedom Russet in 2004 which was intermediate in susceptibility .

Full rate application of fluazinam at 5, 7, 10 or 14-day intervals resulted in effective control in most varieties and in partial control in a few cvs./ABL; and at 10 or 14 day intervals partial control.

50% MRAR of fluazinam applied at 5 or 7 days provided effective blight control in resistant and moderately susceptible cvs./ABL and partial control in susceptible cvs./ABL.

The study demonstrates that potato cvs./ABL with reduced susceptibility to late blight can be managed with reduced fungicide rates and longer application intervals, thus offering a less expensive option for disease control.

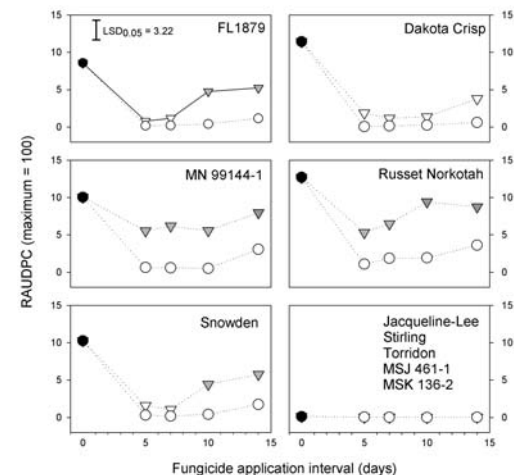


Figure 2. As figure 1; 2005 season. LSD<sub>0.05</sub> = 3.32 (all comparisons).