AIM Research Trial Report: **Effect of Fungicide Quash on Marketable Yield**
Working Group: Science & Technology
Crop Year: 2021
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Project Rationale:

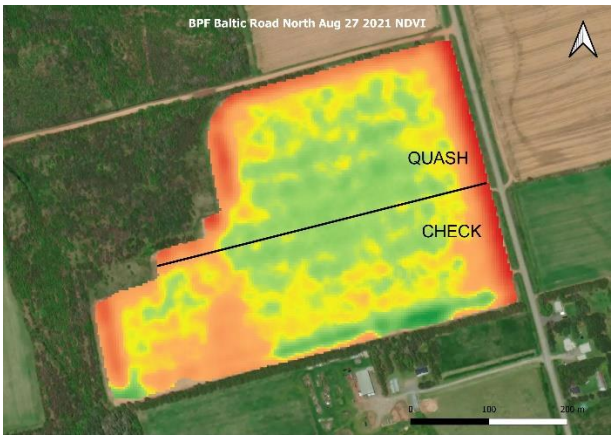
There has been some work done by multiple researchers in the United States in the last decade examining the potential effect of the fungicide Quash (metconazole) on potato yields, independent of their control of early blight. Previous studies in Idaho, Washington, and North Dakota appeared to show a 20 to 40 cwt/acre increase in potato yield when applied once before row closure. Multiple applications did not appear to show any additional benefit. Quash is not commonly used in Prince Edward Island, but it is a registered fungicide for early blight and white mold control, and is a different fungicide group than most of the commonly used products. It was agreed by the Science & Tech Working Group to do a small preliminary project to determine whether Quash had an effect on yields under PEI growing conditions. 2021 field trials are a continuation of work that was started in 2020, when two fields were set up to compare Quash with a grower standard fungicide program.

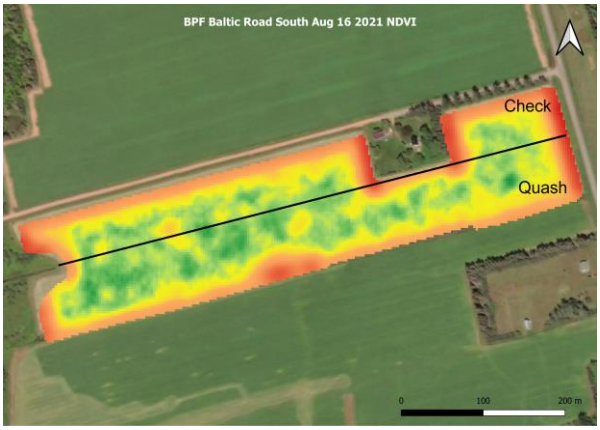
Project Overview:

In late June/early July, Quash fungicide was applied at the label rate at either the first or second fungicide treatment. Both participating growers split two fields, comparing Quash with their standard fungicide program. On both farms, the early blight/brown spot product in the standard practice was Luna Tranquility. NDVI maps were obtained from satellite imagery in August/September to analyze whether there was any difference in plant health or plant growth between treatment and control. In October, four 10-foot harvest strips were taken in each treatment in each field and graded at Cavendish Farms Central Grading. The same number of plants were dug in each strip.

Results:

NDVI maps of the two Clearwater Russet fields from August 28th (right) and September 1st (left). There was not a clear difference in treatment effect from the NDVI maps.





NDVI maps from the two Russet Burbank fields from August 16th (right) and August 27th (left). Again, no real difference is evident at the line of treatment in these two fields.

Table 3: Yield and quality for Clearwater Russets – Field MWM-DR

Treatment	Total Yield cwt/ac	Smalls %	> 10 oz %	Total Defects %	Specific Gravity	M. Yield cwt/ac	Payout $/acre
Control (GSP)	371.2	8.5	15.2	9.6	1.096	314.1	4190
Quash	377.8	10.5	20.9	6.2	1.097	325.1	4402
Difference	6.6	2.0	5.7	-3.4	0.001	11.0	212

Table 4: Yield and quality for Clearwater Russets – Field MWM-MR

Treatment	Total Yield cwt/ac	Smalls %	> 10 oz %	Total Defects %	Specific Gravity	M. Yield cwt/ac	Payout $/acre
Control (GSP)	356.5	11.3	10.0	3.4	1.096	309.2	4154
Quash	366.5	9.8	17.9	4.2	1.097	320.4	4309
Difference	10.0	-1.5	7.9	0.8	0.001	11.2	155

Table 5: Yield and quality for Russet Burbanks – Field BPR-Glen

Treatment	Total Yield cwt/ac	Smalls %	> 10 oz %	Total Defects %	Specific Gravity	M. Yield cwt/ac	Payout $/acre
Control (GSP)	438.3	6.0	39.4	4.1	1.085	405.7	5313
Quash	362.9	7.0	28.2	5.5	1.081	362.9	4543
Difference	-75.4	1.0	-10.2	1.4	-0.004	-42.8	-770

Table 6: Yield and quality for Russet Burbanks – Field BPR-GR

Treatment	Total Yield cwt/ac	Smalls %	> 10 oz %	Total Defects %	Specific Gravity	M. Yield cwt/ac	Payout $/acre
Control (GSP)	389.3	5.9	39.9	10.2	1.085	389.3	5117
Quash	378.2	6.7	30.0	5.9	1.082	378.2	4865
Difference	-11.1	0.8	-9.9	-4.3	-0.003	-11.1	-252

In looking at these four fields individually, we do not see any statistically significant difference in yield or quality when comparing the use of Quash at row closure compared with a grower standard fungicide program. There are some numeric differences between treatments that vary from field to field, but none of these differences were significant at $p < 0.1$ (90% confidence interval).

We then combined the data from the two Clearwater Russet sites and the two Russet Burbank sites, to see if this would provide more statistical power. Average yields and variances were quite similar between the sites with a common variety.

Table 6: Yield and quality for Clearwater Russets over two fields

Treatment	Total Yield cwt/ac	Smalls %	> 10 oz %	Total Defects %	Specific Gravity	M. Yield cwt/ac	Payout $/acre
Control (GSP)	363.9	311.7	12.6	6.5	1.096	311.7	4172
Quash	372.2	322.8	19.4	5.2	1.097	322.8	4355
Difference	8.3	11.1	6.8	-1.3	0.001	11.1	182

Table 6: Yield and quality for Russet Burbanks over two fields

Treatment	Total Yield cwt/ac	Smalls %	> 10 oz %	Total Defects %	Specific Gravity	M. Yield cwt/ac	Payout $/acre
Control (GSP)	443.3	6.0	39.6 b	7.1	1.085 b	397.5	5215
Quash	412.3	6.8	29.1 a	5.7	1.082 a	370.6	4704
Difference	-31.0	0.8	-10.5	-1.4	-0.003	-26.9	-511

Once again, there was no statistical difference for yield or quality for the Clearwater Russet variety across two sites. These two sites were relatively close geographically and produced very similar data for yield and quality.

For the two Russet Burbank sites, there was a statistically significant difference in both the percentage of ten ounce tubers as well as specific gravity, both favouring the control treatment. While differences in yield were not large, the difference in crop value per acre was very close to being statistically significant ($p=0.105$) due to the combination of numerically lower yields and differences in crop quality, affecting bonus payments.

Summary:

Looking at the results of both 2020 and 2021, it does not appear that there was any observed difference in yield or quality for Quash compared to the grower's standard practice for the two long-season varieties analyzed. Across six site-years, three fields were numerically higher for yield and crop value with Quash, and three were higher for the grower standard fungicide program (Luna Tranquility). None of these differences were statistically significant; therefore, it appears that there is not a benefit to using Quash at row closure. Given the lack of product availability in PEI as well as the high price of the product, it is doubtful that Quash will get much use by Island potato producers; nonetheless, if looking for an option for chemistry rotation for early blight detection, it did not appear to have any detrimental results.

We would like to thank:

- Black Pond Farms and MWM Farms for agreeing to participate in this trial with us.
- Bernadette Forrester of Cavendish Agri-Services for working with us to procure the product for the trial.
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- Morgan McNeil for her assistance with harvest sampling and data analysis
- The team with the PEI Department of Agriculture & Land for their assistance and Scott Howatt for their assistance with harvest sampling
- Cavendish Farms Central Grading for helping with grading these samples.