

AIM Working Group: Seed & Tuber Quality
Trial: Effect of Minuet on Common Scab
Year: 2023
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Project Rationale:

Common scab, caused primarily by *Streptomyces* spp. of bacteria, continues to be a significant source of losses in marketable yield for PEI potato producers. While there has been a movement toward varieties that are more resistant to common scab, there are no varieties commonly grown in PEI that are completely resistant to scab. Furthermore, there are few cultural practices or control products that have shown consistent control of common scab. One of the few cultural practices that has been associated with lower levels of common scab is lower soil pH levels; conversely, low pH can have a negative effect on nutrient availability and on yield potential in potatoes and in other rotation crops.

Recent research conducted under the FVGC’s national cluster project on common scab indicated that the use of the Bayer in-furrow biopesticide Serenade Soil may help to suppress common scab symptoms. Serenade Soil has not been routinely used on most PEI farms, so there was interest from the Working Group to look into this more on a field scale. Bayer has since rebranded Serenade Soil as Minuet, so we undertook field scale trials in 2023 to evaluate this product for scab control.

Project Parameters:

Three farms agreed to assess Minuet in on-farm trials in 2023. Trial locations and partner farms included:

- MacLennan Properties (MP) – Springfield West (variety Ranger Russet)
- Hilltop Produce (HTP) – Newton (variety Ranger Russet)
- MacSull Farms (MSF) – French River (variety Kennebec)

Each of these fields applied the label rate of Minuet (379 mL/ac) on a portion of a field in comparison to no Minuet. At MacLennan Properties, Minuet and the control were also compared with use of an additional in-furrow biological product, Microflora Pro. Each of the fields were planted with a variety that was known to be susceptible to common scab.

GPS locations of each treatment were collected after planting. In late September, 10-foot harvest samples were collected for assessment of both tuber blemish diseases (including common scab) as well as for total and marketable yield.

Results for MacLennan Properties:

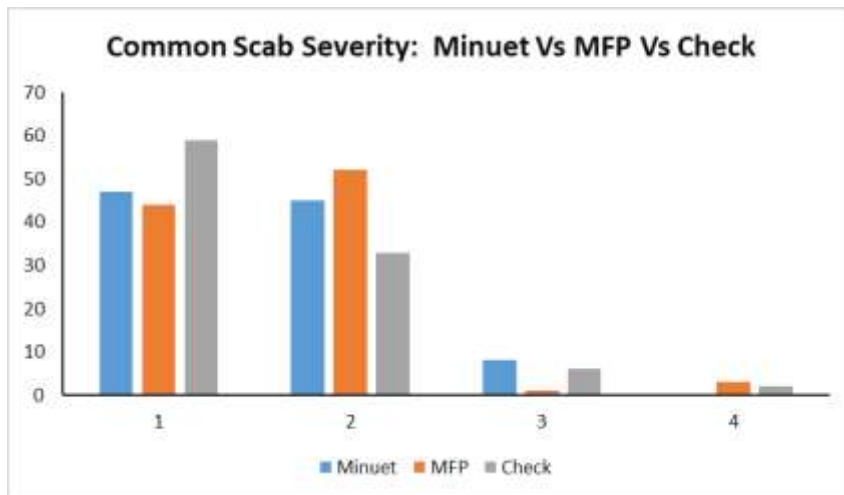
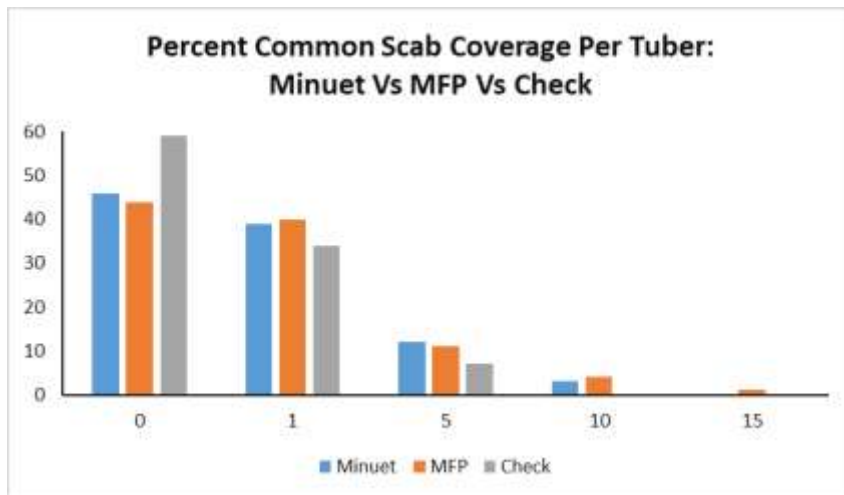
Grading:

Treatment	Smalls cwt/ac	Canada #1 cwt/ac	> 10 oz cwt/ac	Off-Type/Culls cwt/ac	Total Yield cwt/ac
Check	75.2	111.2	0.0	3.5	189.8
Microflora Pro	63.3	149.9	2.4	1.2	216.9
Minuet	74.2	120.7	0	0	194.9
p value	0.72	0.36	0.41	0.25	0.32

It appears that there is no statistical difference in yield between the three treatments in this field. It should be noted that there are only four 10-foot samples per treatment due to time constraints and a lack of common scab observed at harvest. There is a slight numerical improvement in yield in favour of the Microflora Pro treatment, but this was not statistically significant. This field of Ranger Russets was grown for seed, so it is not surprising to have very few tubers over 10 ounces. We did not provide a marketable yield for this field as the grade standard was not for seed but for Canada #1.

Tuber Blemishes:

Treatment	% Scab	Scab Severity	% Rhizoctonia	% Silver Scurf
Check	0.7	0.5	0.01	1.5
Microflora Pro	1.5	0.6	0.1	2.9
Minuet	1.9	0.6	0.2	0.9
p value	0.02	0.40	0.004	<0.001



Based on 100 tubers per treatment, there was a significantly lower percent scab per tuber on the untreated check than on the two biological in-furrow treatments. However, it should be noted that the percentage of scab was quite low in all three treatments. This is confirmed by the low level of scab

severity across all three treatments, with no difference evident between treatments. In the graphs above, we can see that there are more tubers with zero scab in the untreated check than in the two treated strips, and there are more tubers with 1% and 5% scab in the treatments than the untreated check. Nonetheless, tubers at 1% and 5% scab would still be considered to be generally low for common scab, particularly on a processing contract. We don't see much difference in scab severity between the treatments.

There was also a statistical difference in Rhizoctonia between treatments, with the control again having the lowest incidence. Again, levels are very low across all three treatments. The Minuet treatment did appear to have a lower incidence of silver scurf than the other two treatments.

Results for MacSull Farms:

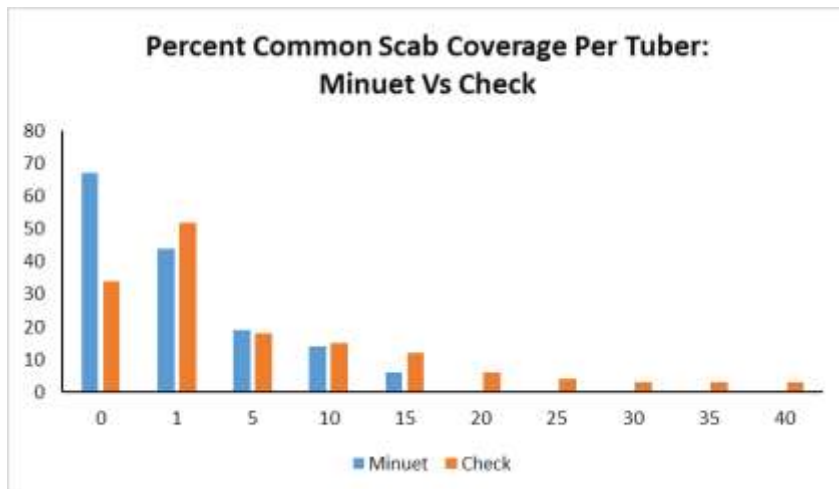
Grading:

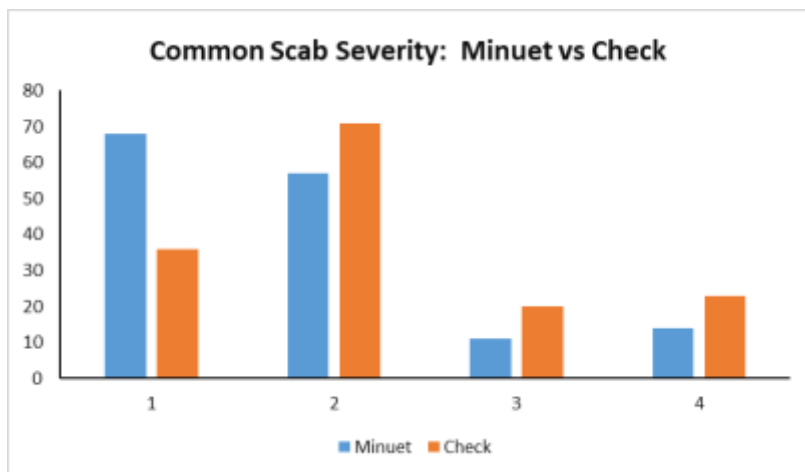
Treatment	Smalls cwt/ac	Canada #1 cwt/ac	> 10 oz cwt/ac	Off-Type/Culls cwt/ac	Total Yield cwt/ac	Market. Yield cwt/ac
Check	8.5	208.1	35.7	24.3	276.5	243.7
Minuet	10.6	205.8	50.4	27.9	294.6	256.2
Difference	2.1	-2.3	14.7	3.6	18.1	12.5
p value	0.55	0.88	0.31	0.72	0.19	0.44

There was no significant difference in yield or size distribution between the Minuet treatment and the untreated control in this field of Kennebecs.

Tuber Blemishes:

Treatment	% Scab	Scab Severity	% Rhizoctonia	% Silver Scurf
Check	6.6	1.2	1.5	21.1
Minuet	2.4	0.8	2.3	19.4
Difference	-4.2	-0.4	0.8	-1.7
p value	<0.001	<0.001	0.003	0.395





In this field, there did appear to be a significant reduction in both percent scab and scab severity in favour of Minuet. There appeared to be a 64% reduction in common scab incidence in favour of Minuet when examining 150 tubers from each treatment. There was also a corresponding reduction in scab severity for the Minuet treatment. In looking at the number of observations at each percent scab and at each severity level, there is a definite trend toward lower scab pressure in the Minuet treatment. In fact, twice as many tubers were scored zero in the Minuet treatment compared to the check.

Interestingly, there was a significant increase in the percentage of Rhizoctonia (black scurf) symptoms in the Minuet treatment. No significant difference was observed for silver scurf, but the level of silver scurf symptoms for both treatment and control were elevated.

Hilltop Produce:

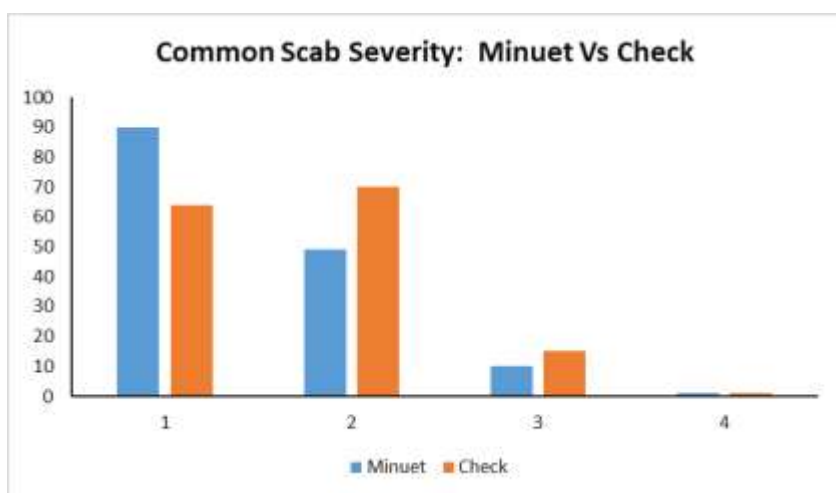
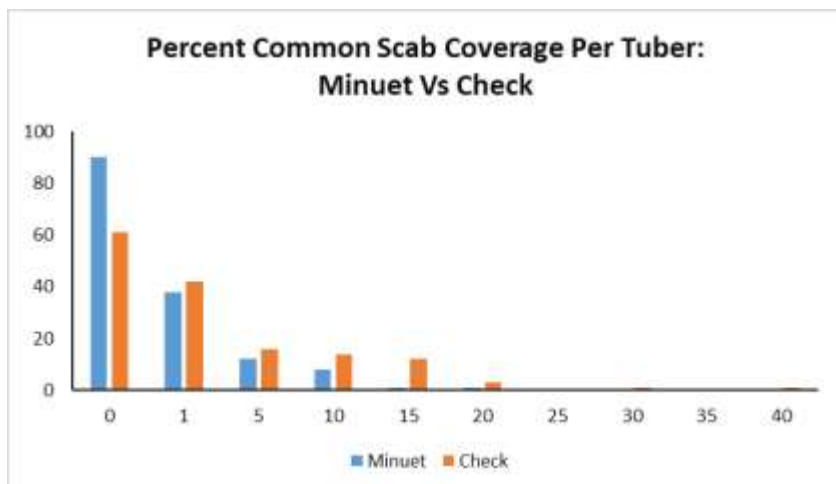
Grading:

Treatment	Smalls cwt/ac	Canada #1 cwt/ac	> 10 oz cwt/ac	Off-Type/Culls cwt/ac	Total Yield cwt/ac	Market. Yield cwt/ac
Check	18.3	209.8	81.5	5.7	315.3	291.3
Minuet	15.2	169.7	108.4	7.6	300.9	278.1
Difference	-3.1	-40.1	26.9	1.9	-14.4	-13.2
p value	0.55	0.17	0.29	0.71	0.41	0.48

Once again, there was no significant difference in yield or size distribution between the Minuet treatment and the untreated control in this field of Ranger Russets. This was the best yielding field in the study, with negligible difference between treatment and control for yield and size.

Tuber Blemishes:

Treatment	% Scab	Scab Severity	% Rhizoctonia	% Silver Scurf
Check	3.6	0.7	0	5.8
Minuet	1.4	0.5	0.5	6.6
Difference	-2.2	-0.2	0.5	0.8
p value	<0.001	0.002	0.178	0.382



Similarly to the MacSull field, there was a reduction in percent scab and scab severity in favour of the Minuet treatment, with a 61% reduction in percent scab. The Minuet treatment had a much higher number of tubers scoring zero for scab and had very few observations over 10%.

Also, we saw a slight increase in Rhizoctonia incidence in the Minuet treatment (though statistically non-significant) and no difference in silver scurf incidence, consistent with results from the MacSull field.

Comparing all three fields:

Grading:

Treatment	Smalls cwt/ac	Canada #1 cwt/ac	> 10 oz cwt/ac	Off-Type/Culls cwt/ac	Total Yield cwt/ac
Check	28.9	184.5	43.9	12.1	269.4
Minuet	28.2	170.9	59.5	13.2	272.0
Difference	-0.7	-13.6	15.6	1.1	2.6
p value	0.952	0.466	0.362	0.832	0.891

There appears to be no difference in yield or size distribution across these three fields due to the use of Minuet at planting. It is somewhat challenging to compare yield across the three fields, as two different

varieties were grown, and one of the fields was grown for seed and killed early. However, since we saw no difference in yield in each individual field analysis, it follows that we would not see a difference across fields. This is not a surprise, as we did not necessarily expect to see a yield increase due to the use of this product.

Tuber Blemishes:

Treatment	% Scab	Scab Severity	% Rhizoctonia	% Silver Scurf
Check	4.0	0.8	0.6	10.4
Minuet	1.7	0.6	0.9	9.9
Difference	-2.3	-0.2	0.3	-0.5
p value	<0.001	<0.001	0.002	0.647

Across the three trial fields, it does appear that Minuet produced tubers with significantly less common scab incidence and with lower common scab severity. Interestingly, Rhizoctonia incidence was higher in the Minuet treatment, which is surprising given that Minuet is labeled for Rhizoctonia suppression.

Summary:

- Use of Minuet provided no increase in yield or change in tuber size distribution compared to the control treatment. There was also no significant difference in off-type or culled tubers.
- Use of Minuet reduced the percentage of common scab by approximately 60% and the severity of common scab in two out of three trial fields. In the third field there was a significantly higher percentage of scab (at lower levels than the other two fields) but with no difference in scab severity.
- There was significantly higher rates of black scurf from Rhizoctonia in the Minuet treatment than in the untreated control. This was unexpected; however, the overall rates of black scurf are generally low.
- There was no significant difference in silver scurf coverage across the three trials.
- This trial should be repeated on additional farm fields in 2024 to add confidence to these results. The weather in most parts of the province was not generally conducive to common scab development in 2023; this may be different in another growing season.

Thank you to MacLennan Properties, Hilltop Produce and MacSull Farms for partnering with us on this farmer-initiated field trial. Thanks also to Rick Peters, Kim MacDonald, Bennett Crane and the team at AAFC Charlottetown for their assistance in grading the samples for this trial.