AIM Trial Report: Straw Mulch to Reduce Impact of Aphids in PVY Spread
Working Group: Seed and Tuber Quality Improvement
Crop Year: 2025
Author: Ryan Barrett

Project Rationale:

One of the largest challenges facing seed producers in Prince Edward Island is the transmission of Potato Virus Y (PVY). Numerous research papers have been published in Canada and elsewhere demonstrating the reduction in marketable potato yield due to PVY infection. In recent years, the dominance of new necrotic PVY strains not only cause yield reductions but also are linked to internal defects in certain varieties. Since 2022, aphid numbers have dramatically increased in the Atlantic Northeast (PEI, New Brunswick, Maine), with a much earlier appearance of green peach aphids (*Myzus persicae*), which is known to be a more efficient vector of virus spread than other non-colonizing aphid species.

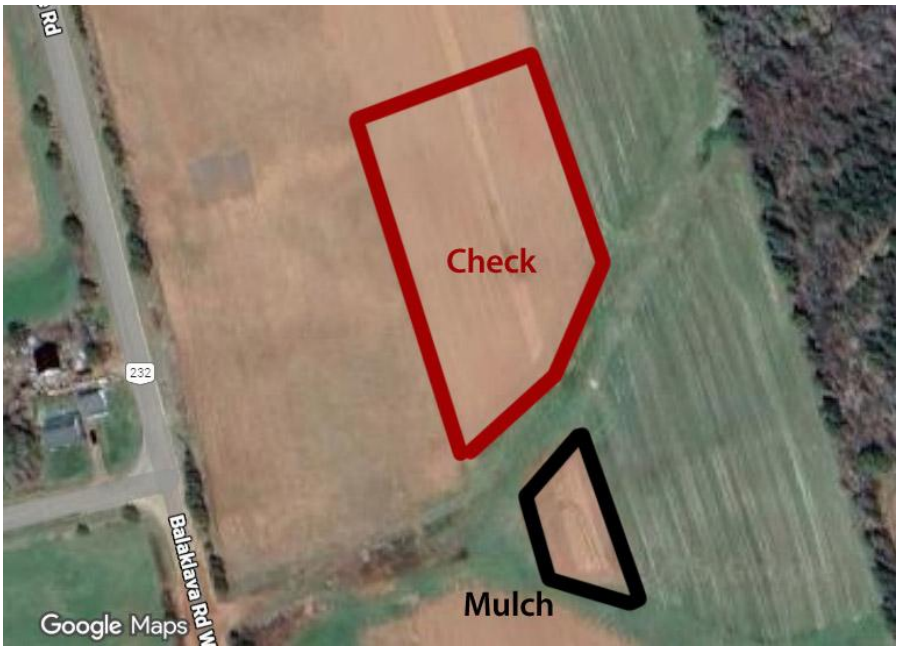
There are several cultural management practices that seed producers can use to reduce PVY spread. Planting clean seed, frequent application of mineral oil and effective aphicides to foliage, the use of green border crops to attract aphids away from potato fields, and early termination of seed fields have all been associated with reduced PVY spread in the past. During a study tour to Scotland by the AIM Seed & Tuber Quality Working Group in 2023, multiple growers and agronomists mentioned that straw mulch has been used on high-generation seed in Europe to deter aphid visitation. The theory for using straw mulch is that aphids are deterred from visiting potato underlaid by straw mulch because of the colour difference between the green plants and the yellow/beige straw, compared to the colour difference between green plants and dark soil that they are used to. Aphids are highly responsive to colour when deciding where to land; therefore, interrupting these patterns may result in a reduction in PVY transmission.

As a result, the AIM Seed Working Group decided to pursue a field trial for the first time in 2024 where use of straw mulch was compared with a control treatment with no mulch under field conditions. Brett Francis, an AIM Seed Working Group member was the collaborating producer on this trial. This trial was repeated with slight changes in set-up in 2025, which is the subject of this project report.

Project Overview:

The trial field located at GPS (46.265623, -63.514284) was planted on May 28th, 2025 with Targhee Russets of E2 class for seed propagation.

Most of the field was grown according to grower standard practice (check). Approximately one acre of the field physically separate from the rest of the field (separated by a grassed waterway/ headland) was used as the treatment area (Mulch).



After giving the potatoes time to emerge, straw bales were spread across the Mulch section on July 1st using a bale buster. 8 bales were used to cover approximately 0.5 acre of the field, which is considerably more than was used in 2024.

On September 22nd, four 10-foot samples were dug in each treatment. Samples were graded based on two different seed sizes; under 40 mm and over 40 mm. No off-type or non-marketable tubers were recorded. A marketable yield estimate was then calculated with a factor of 13. From each treatment, four samples of 50 tubers each were submitted to the Potato Quality Institute for post-harvest PVY testing through grow-out and ELISA testing.

Aphids were collected with a yellow pan trap in both treatment and check twice per week under the PEI Department of Agriculture Aphid Alert Program.

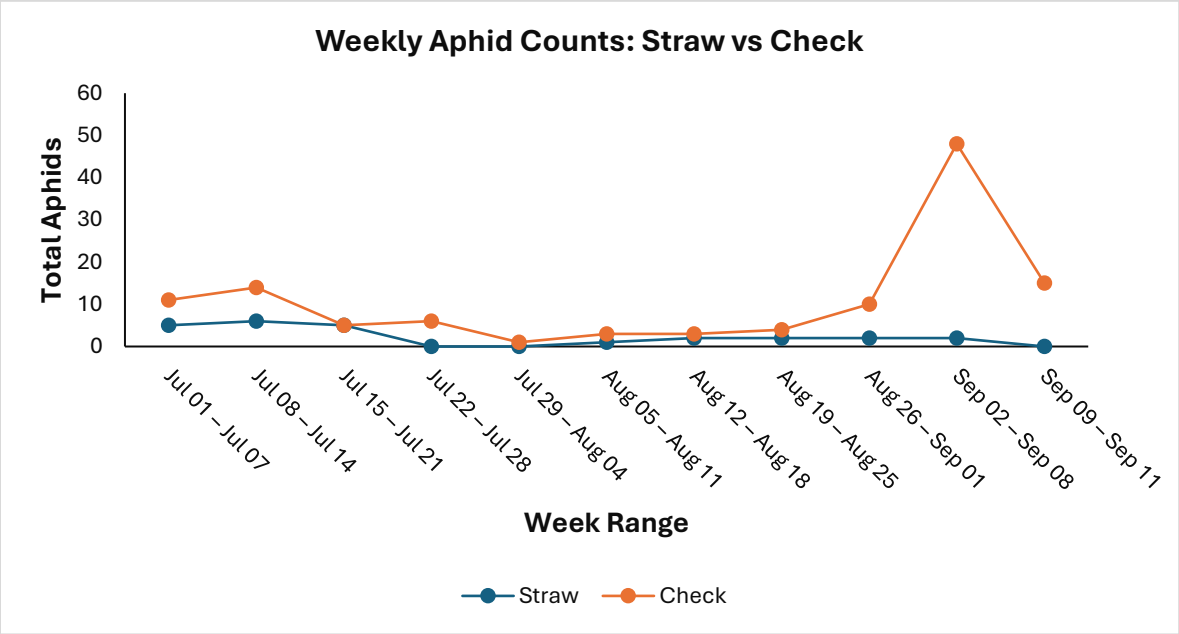
Photos of the field:

Left: Check treatment with no mulch applied. Right: Straw applied to the Mulch treatment area with a bale buster. Photos taken July 3rd, 2025 (2 days after application).

Results:

Table 1. Aphid numbers collected under the PEIDA Aphid Alert Program from July 1 to Sept 11, 2025

Total Aphids		
	Mulch	**Check**
Potato Aphid	0	3
Buckthorn Aphid	0	8
Bird Cherry-Oat Aphid	3	38
Other Aphid	20	69
Tarnished Plant Bug	2	2
Total Aphids	**25**	**120**



In 2024, when a much lower rate of straw was applied to the treatment area, we saw little difference in aphid numbers. This year, aphid numbers were relatively similar (though consistently slightly higher in the check treatment) throughout the season until late in the season, when aphid numbers peaked in the check treatment while remaining low in the mulch treatment area.

Table 2. Potato yield data collected from the 2025 Straw Mulch trial field.

Treatment	**<40 mm**	**>40 mm**	**Total Yield**
	cwt	**cwt**	**cwt/ac**
Check	49.4	109.5	158.9
Mulch	22.8	208.7	231.4
p-value	0.037	0.002	0.003

There was a significantly higher total yield and marketable yield in the mulch treatment area compared to the check. The mulch treatment also had a lower proportion of yield under 40 mm in size. It should be noted that the total yield found in the check treatment area was a little lower than what the grower reported from the field as a whole. Nonetheless, the check and mulch treatment areas were adjacent, and harvest samples had the same number of plants per 10 feet.

In addition, the grower reported that they could not mechanically harvest the mulch treatment area, as the straw kept bunching up at the front of the harvester. As a result, the mulch area was left unharvested other than our hand-harvested research samples. The combination of a higher rate of straw applied than in 2024 (when there were no issues with harvest) as well as a lack of rain to help breakdown the straw on the surface of the soil is likely to have contributed to this.

Aerial photo comparing foliar growth between the check and mulch treatments. Photo taken September 5, 2025.

During collection of harvest samples, there were multiple places seen where tubers were set just under the surface of the soil or even partially on top of the soil but underneath the straw mulch. The research team has not previously encountered this. As the straw mulch was applied before tuber initiation, it appears that the plants equated the mulch with the soil and set tubers higher than we would normally see.

Photos of tubers set on top of the soil, under the straw mulch in the 2025 trial field.

PVY Results:

Treatment	PVY %
Check	0.0
Straw Mulch	0.5
p-value	0.356

We submitted four sub-samples of 50 tubers randomly collected from each treatment to the Potato Quality Institute for PVY post-harvest testing. Results were all clear for the check treatment. Three out of four samples from the mulch treatment were clear, with one tuber testing positive in the fourth. There is no statistical difference between these treatments for PVY. It should be noted that the producer reported this field as testing zero for PVY in routine post-harvest testing.

Summary:

- There were considerably fewer aphids observed in the straw mulch treatment compared to the check treatment, particularly during the end of the collection period (late August/early September).
- There was a significantly higher yield (+72.5 cwt) in the straw mulch treatment compared to the check treatment.
- There was no statistical difference in PVY reading from the post harvest testing results.
- It appears that the amount of straw used on the treatment area was too much, as the grower was unable to harvest that part of the field with their harvesting equipment. Future research should look at lower rates of straw than used in 2025.

Acknowledgements:

- Thanks to Brett and David Francis for conducting this trial in 2025.
- Thanks to Humna Khan for assistance with aphid collection, harvest and grading.
- Thanks to the PEI Department of Agriculture's Aphid Alert program, for allowing this site to contribute two aphid collection sites in 2025.