

Project: **Alternaria survey to monitor fungicide resistance**
Working Group: Seed and Tuber Quality
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Early blight and brown spot are common foliar fungal diseases in potato production in North America and particularly in Prince Edward Island. Both diseases are caused by species of *Alternaria* fungi which cause necrotic lesions on leaves. In severe cases, *Alternaria* infections can cause lesions on tubers as well, making them unmarketable. Potato growers routinely use well-timed applications of foliar fungicides to limit the spread of early blight and brown spot, but there are limited number of modes of action in the products available to producers, and not all products are effective at control of both *Alternaria solani* (which causes early blight) as well as *Alternaria alternata* (the primary pathogen causing brown spot).

In this project, the Working Group wanted to collect leaf samples across PEI to determine which species of *Alternaria* are most commonly found in the province, and are we able to detect any indications of resistance to fungicides in these pathogens. For this project, we partnered with Dr. Rick Peters, member of the of the AIM Seed & Tuber Quality working group and plant pathologist at AAFC Charlottetown and his lab to isolate pathogens from the collected samples. Afterward, samples were sent to Dr. Julie Pasche and her lab at North Dakota State University (NDSU) to analyze the isolates for species identification and genetic mutations.

2024 Survey Results:

In 2024, 21 leaf samples were collected, which produced a total of 58 isolates; however, not all isolates produced viable spores. Samples were collected from Bloomfield in western Prince County to Souris in eastern Kings County. Varieties sampled included:

- Targhee Russet (6 samples)
- Dakota Russet (3 samples)
- Ranger Russet (1 sample)
- Satina (1 sample)
- Mountain Gem Russet (3 samples)
- Russet Burbank (3 samples)
- Caribou Russet (1 sample)
- Alverstone Russet (1 sample)
- Althea (1 sample)

- Ranier Russet (1 sample)

Among the 58 tested isolates, the following information was obtained:

Species Name	# of isolates	# of isolates with mutations previously identified	# of isolates with newly identified mutations
<i>Alternaria alternata</i>	34	10	5
<i>Alternaria arborescens</i>	12	8	7
<i>Alternaria tenuissima</i>	3	2	2
<i>Alternaria solani</i>	0	--	--
No spores produced	9	--	--

It was very interesting to find no isolates that were identified as *Alternaria solani*, as most samples submitted were identified in the field as being suspected of having early blight.

Regarding fungicide resistance, there appeared to be a higher level of genetic mutations related to fungicide resistance in the *A. arborescens* isolates, with two-thirds of the isolates having at least one previously seen mutation, and several isolates having as many as five previously reported mutations. In seven isolates, previously unreported mutations were identified in more than one isolate. However, further study is required to determine if these are related to fungicide resistance.

The level of mutation was comparatively less in the *A. alternata* isolates, but almost a third of the isolates still had a previously identified mutation related to resistance.

2025 Survey Results:

In 2025, 13 leaf samples were collected, which produced a total of 46 isolates. Most samples this year came from eastern Prince County and Western Queens County. Varieties sampled this year were:

- Mountain Gem Russet (5 samples)
- Targhee Russet (4 samples)
- Russet Burbank (2 samples)
- Prospect (1 sample)
- Unnamed breeding clone (1 sample)

Among the 46 tested isolates, the following information was obtained:

Species Name	# of isolates	# of isolates with mutations previously identified	# of isolates with newly identified mutations
<i>Alternaria alternata</i>	14	6	0
<i>Alternaria arborescens</i>	5	5	0
<i>Alternaria tenuissima</i>	2	0	0
<i>Alternaria solani</i>	0	--	--
No spores produced	3	--	--
Possible other <i>Alternaria</i> species	19	5	4
Botrytis	3	--	--

Compared to 2024 samples, the number and diversity of mutations was lower in 2025. The *A. arborescens* isolates had a higher degree of mutation than the *A. alternata* isolates again this year, but with a smaller overall number of mutations detected. Nineteen isolates could not be identified by existing species ID methods but five of these isolates had near identical occurrences of genetic mutations that lead the team to wonder whether they represent a *Alternaria* species other than the three already tested. More will need to be done to explore these results.

Summary:

- There is more diversity in small-spored *Alternaria* species than previously known in PEI. *Alternaria alternata* is still the most common species, but two other species were positively identified and there may be at least one more to be identified, subject to further research. No *Alternaria solani* isolates were obtained across two years of study.
- The level of genetic mutation in the *A. arborescens* isolates was comparatively high, with 13 out of 17 isolates having previously identified mutations associated with reduced fungicide efficacy.
- One-third of *A. alternata* isolates had a previously identified mutation.

Recommendations for Producers:

- PEI producers are recommended to prioritize use of fungicides which control brown spot rather than just early blight.

- Producers are recommended to rotate chemistries from different fungicide groups to maximize efficacy and reduce the risk of developing resistance.
- Producers seeing significant symptoms after fungicide application are advised to try different chemistry for the next treatment.

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