

## Testing for *Aphanomyces* Root Rot

Bruce Barker, P.Ag.

Surveys across Western Canada have found two main pathogens responsible for root rots in pulses. *Fusarium* species are distributed widely, with *F. avenaceum* and *F. solani* the most virulent types of root rot that can cause yield loss. *Aphanomyces euteiches*, first reported in Saskatchewan in 2012, is a more recent concern.

*Aphanomyces* root rot is most common under good soil moisture conditions. The pathogen is a water mould that depends on moisture for the zoospores to move in the soil and infect plant roots. Infection can happen anytime during the growing season, and spores can persist for many years in the soil. Root rots may still show up in drier growing conditions, and may or not be *Aphanomyces* root rot.

The seedling stage seems to be the most susceptible for *Fusarium* root rot, but symptoms do not typically become visible until late flower. In drier years, root rot symptoms showing up later in the season may be caused by one of many different pathogens.

*Aphanomyces* root rot is very difficult to identify and isolate with conventional methods, and requires a DNA test for confirmation. For fields with a history of root rot, recommendations are for growers to test their fields for the presence of *A. euteiches* so that they can implement practices to manage the disease if is present.

Several labs in Western Canada can test for the *Aphanomyces* root rot pathogen. These labs may analyze either root tissue or a soil sample. While each lab has its own sampling and submission protocol, the following are general recommendations for soil and plant sampling.

### Soil

- Sample field in a W shaped pattern across entire field or focus on taking samples from low spots, water runs, or other suspect areas where yellowing and poor growth in previous pea or lentil crop was noted.
- Collect soil from four to eight inches (10 to 20 centimetres) deep in the surface A-horizon layer, or less as depth allows, without taking any of the B-horizon subsoil.
- Submit a minimum two cup sample of soil.

### Plant Tissue

- Infected plants are concentrated sources of pathogen, and represent a significant escalation in the amount of inoculum present in a field.
- Scout for suspect plants showing signs of *Aphanomyces* such as wilting and yellowing of the plant, and caramel coloured roots. Submit root tissue only (fresh, dried, or frozen) for testing.

Some labs provide their own sample kit. Contact the lab for their specific sampling and submission requirements.

### What The Results Mean

The results from a lab test in the fall can mean several things depending on the reporting lab. The first is positive or negative. This simply means that the *Aphanomyces* pathogen is present in the sample, but does not put a number on the amount of spores per gram of soil, or level of infection of the root tissue.

Some labs take the positive/negative test one step further in their reporting, where a positive result means that the pathogen is present at levels that would be capable of causing disease. A negative result cannot guarantee that the pathogen is not present in the field, but just not present in the soil sample.

Finally, some labs provide a quantitative result reporting on the number of spores per gram of soil, usually at an additional cost. This number is useful since research by Agriculture and Agri-Food Canada has determined the risk of *A. euteiches* causing disease is 100 oospores per gram of soil in the Dark Brown soils, and 750 oospores per gram in the Brown and Black soils. However, the presence of *Fusarium spp.*, particularly in the Brown soils, increases disease severity. Because *Fusarium spp.* are so widespread on the Prairies, the risk threshold for *A. euteiches* has been adjusted. The number of *A. euteiches* oospores where the pathogen may start to cause an impact on the crop has been set at 100 oospores per gram of soil for all soil types.

If *A. euteiches* is confirmed in a field, growers should follow recommended management practices that include rotating to non-susceptible crops or more tolerant pulse crops such as faba beans, chickpeas, or soybeans, and maintaining a minimum of six to eight years between susceptible hosts such as peas, lentils, dry beans, and alfalfa.

For more information on *Aphanomyces* root rot management practices, check the [Root Rot in Peas and Lentils in Western Canada](#) document on the Saskatchewan Pulse Growers' website.



Figure 1. Healthy seedlings (left) vs root rot infected seedlings (right).

## Certified Labs

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- **20/20 Seed Labs**

[www.2020seedlabs.ca](http://www.2020seedlabs.ca)

507 – 11 Avenue  
Nisku, AB T9E 7N5  
Toll Free: 1.877.420.2099  
Fax Toll Free: 1.888.900.1810

3489 Pembina Hwy  
Winnipeg, MB R3V 1A4  
Phone: 1.204.261.3755

Soil test results are reported as positive or negative. A positive result means the pathogen is present at levels capable of causing the disease. Plant specimen results are analyzed to isolate root rot pathogens that include *Fusarium* species, *Pythium* species, and *Rhizoctonia solani*, in addition to *Aphanomyces euteiches*.

- **BDS Laboratories**

[www.bdslabs.com](http://www.bdslabs.com)

Northern Bank Building  
#13 Qu'Appelle Street  
P.O. Box 363  
Qu'Appelle, SK S0G 4A0  
1.888.BDS.Labs (237.5227)

Tests root samples from six plants from affected area. Reports positive or negative for *A. euteiches*.

- **BioVision Seed Labs**

[www.biovision.ca](http://www.biovision.ca)

Unit 310, 280 Portage Close  
Sherwood Park, AB T8H 2R6  
1.800.952.5407

PCR method for detection and quantification. For soil, results are expressed as 'Detected' if all replicates have detectable PCR product greater than 100 oospores/gram of soil, otherwise the result will be reported as 'Not Detected'. For root tissue, results are expressed as 'Detected' or 'Not Detected'.

- **Discovery Seed Labs**

[www.seedtesting.com](http://www.seedtesting.com)

450 Melville Street  
Saskatoon, SK S7J 4M2  
1.306.249.4484

Soil or root tests detect the presence of *A. euteiches*. Results are reported as positive or negative. Discovery Seed Labs has the ability to quantify the number of oospores per gram of soil and have done some quantitative reports for agronomists/farmers to establish a baseline for a field.

- **Quantum Genetix**

[www.quantumgenetix.com](http://www.quantumgenetix.com)

HWY 16 & Floral Rd  
Site 501 Comp 11  
RR 5 Station Main  
Saskatoon SK S7K 3J8  
1.306.956.2071

Soil tests with report of detect or negative. For an additional fee, they can detect and quantify the number of oospores per gram of soil.