

PULSE ROOT ROT STRATEGY

Mission:
Eradicate the risk of root rots in pulses



Suspected *Aphanomyces* in a pea and canola intercrop site near Linden, AB in July 2022.

Alberta Pulse Growers (APG) has joined forces with its counterparts in Manitoba and Saskatchewan to eliminate the risk of root rot for Canada's pea and lentil farmers.

The pulse commissions have formed the Root Rot Task Force to act as a lightning rod to unify root rot research and collaboration. The Root Rot Task Force has developed a strategic plan with the goal of eradicating root rot in peas and lentils.

"Profitable and sustainable pea and lentil production require us to eliminate this risk," said APG Research and Extension Manager Dr. Jenn Walker, who serves on the task force. "The Root Rot Task Force has developed a strategic action plan to address the challenges pulse growers face due to root rot complex. Our mission is to eradicate the risk of root rots through a coordinated, collaborative effort across the pulse industry."

APG was first introduced to the pathogen *Aphanomyces euteiches* in 2013. It was immediately identified as a serious threat to pulse production. This discovery was a catalyst to research efforts aimed at managing this and other root diseases. Over the last several years, significant effort has been made towards understanding the disease, as well as correctly diagnosing and addressing the intricacies of the complex interaction between plant, pathogen and environment.

In concert with investigations focused on *Aphanomyces*, other root pathogens have also become antagonists in the effort to address what is now the Achilles heel of growing peas and lentils across Alberta and much of western Canada. Pulse growers are facing up to eight-year rotations in their pea and lentil acres in Alberta and Saskatchewan. Farmers in some growing areas are considering removing peas and lentils from their rotations entirely.

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Unfortunately, the things researchers don't know far outnumber what they do understand when it comes to root rot in pulses.

While this issue is at the forefront of both private and publicly-funded research, product development, and breeding efforts, there has been limited collaboration among stakeholders. Lack of information sharing and jointly-funded projects can be considered one reason the agriculture industry in western Canada has not made much headway in finding solutions for root rot in pulses.

As third-party, non-profit, grower representative groups the three Prairie pulse commissions - Alberta Pulse Growers, Manitoba Pulse

and Soybean Growers, and Saskatchewan Pulse Growers - are uniquely situated to bridge the divide between research efforts, private industry, and other stakeholder groups.

Part of this strategy is the development of the Pulse Root Rot Network comprising all stakeholders working in pea and lentil production with the goal of driving collaborative efforts across private and public sectors with focused, efficient research on eliminating root rot in peas and lentils. Individual efforts to date have not yielded many tools or resources growers can take to the field.

"Without collective effort and open communication," Walker noted, "we are facing the loss of pea and lentil acres across western Canada."

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Dr. Jenn Walker

Table 1. Developed by the Root Rot Task Force with members from Alberta Pulse Growers, Manitoba Pulse and Soybean Growers, and Saskatchewan Pulse Growers. Strategic action plan to eradicate the risk of root rot in pulses.

Category <i>What is the focus area?</i>	Primary Goal & Pathway <i>What is the overall goal and execution path?</i>	Specific Target Outcomes <i>What are the specific target outcomes to achieve the main goal?</i>
Research: Root rot mitigation tools and practices are developed through coordinated and targeted research	Agronomy - Provide growers with recommendations and tools for effective on-farm root rot risk management and assessment.	<ol style="list-style-type: none"> 1. Infection risk prediction tools and resources are accurate and consistent (soil tests, maps) 2. Testing product effectiveness and agronomic practice continues 3. Understand the impacts of agronomic management including crop rotation, crop sequencing, plant health, and fertility on root rot complex 4. Drive development and adoption of best agronomic management practices
	Breeding – Robust genetic resistance to root rot pathogens is available to growers	<ol style="list-style-type: none"> 1. Varieties of peas and lentils have resistance to <i>Aphanomyces</i> and <i>Fusarium</i> species and are commercially available 2. New sources of resistance for <i>Aphanomyces</i> and <i>Fusarium</i> and resistance across the whole pathogen complex are identified and developed 3. Integrated management strategies are available to protect the levels of resistance 4. Genomics of resistance is understood
	Pathology – Biology, pathogenicity, and interactions of the root rot pathogens are understood for pulses	<ol style="list-style-type: none"> 1. Structure of populations is known and monitored regularly 2. Hosts known are known for pathogenicity 3. Biology and life cycle of the pathogen(s) are documented 4. Understand the influence of the environment (soil, moisture, soil microbiome) on pathogen(s) 5. Interaction of the root rot species is understood
Funding: Funding mechanisms established for root rots that are collaborative, coordinated, and accessible	Process –Reliable funding capacity and streamlined process for research selection is established	<ol style="list-style-type: none"> 1. Co-funded resource pool is created and leveraged to drive root rot projects 2. Process for applications and decisions are established
	Capacity —Human, capital, or monetary resource limitations do not hinder advancement of root rot research	<ol style="list-style-type: none"> 1. Increased capacity for root rot research 2. Extended funding is established for projects that require long-term research
Communication: Unified, science-based messages on root rot recommendations and information for growers, agronomists, and industry	Collaborative – Cohesive development and coordinated updates of recommendations and root rot extension across provinces and disciplines	<ol style="list-style-type: none"> 1. Unified and consistent messaging on root rot recommendations 2. One-stop shop for root rot information through the establishment of a website 3. Research library is available that contains all relevant reports and summaries on root rots 4. Pulse Root Rot Network of stakeholders is effective at mobilizing efforts to eradicate the risk of root rots
	Leadership – Establish a reputation for gold standard processes in root rot research and extension	<ol style="list-style-type: none"> 1. Canada as a leader in root rot initiatives and information for the sustainability of pulses in rotations

HOW DO FARMERS ENSURE A HEALTHY START FOR PEA SEEDLINGS LIKE THESE?

Things growers can do to assess the risk of root rot:

- **TEST** your soil. Labs can provide a presence/absence based on critical number of spores/gram of soil.
- **EVALUATE** the planned pulse fields. Know your soil texture - heavier soils are more prone to disease.
- **PLANT** high quality seed and **APPLY** seed treatment. This will help protect against several pathogens that can increase a plant's vulnerability to more serious disease.
- **MAKE SURE** if you see yellowing in your pea and lentil fields that you don't assume it's *Aphanomyces*. Send plants for testing to confirm.
- **CHOOSE** to grow an alternative pulse crop to extend your rotation. Faba beans are a viable option.