

## Pea breeding for Western Canada

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SPG Contributions	Project Status	Duration/Timeline of Project (Year to Year)	Co-funders	Total Project Cost
\$188,053.75	Active	December 2020 – April 2024	Saskatchewan Ministry of Agriculture – Agriculture Development Fund (ADF); Alberta Pulse Growers Commission; Western Grains Research Foundation; Manitoba Pulse and Soybean Growers	\$1,857,256.00

### Project Description

To develop high yielding pea varieties for Western Canada with improved resistance to root rot.

Good progress was made in all aspects of the CDC pea breeding program in 2022 including crossing campaigns, early generation nurseries, yield trials, registration trials, provincial regional trials, and variety releases. As a fundamental component of the pea breeding activities, emphasis continues on improving root rot resistance. Recombinant inbred line population PR-26, developed from the cross PI 660729 X CDC Amarillo, was evaluated for root rot severity under field conditions. Three species of Fusarium (*F. avenaceum*, *F. redolens*, and *F. solani*) were identified in the Campus field nursery. Progress has been made towards marker-assisted introgression of two major Quantitative Trait Loci (QTLs) of Aphanomyces resistance, Ae-Ps-7.6 (a and b) and Ae-Ps-4.5, into diverse genetic backgrounds. Early generation breeding lines (F1s of three-way crosses) of >30 combinations of crosses were used for marker-assisted selection, with a preference to select the combination of both the above QTLs in a homozygous state. The selected individual plants are in the breeding pipeline for evaluation of their agronomic performance. Lines selected over generations and carried forward to the elite trials will be re-tested with markers for confirmation of the desirable alleles. We progressed with phenotyping of a Genome-Wide Association Study (GWAS) panel of 233 lines for *F. avenaceum* resistance in growth chamber conditions and the study is over 80% complete. We are evaluating the same GWAS panel in silico for the presence of alleles of *F. solani* resistance reported by our colleagues in published studies.

### Outcome

### Research Objective

#### OBJECTIVE 1

To develop high yielding pea varieties for Western Canada with improved resistance to root rot.