Rapid And Cost Effective Genomic Tools For Developing Rust And Midge Resistant Canadian Wheat

Objective: To promote rapid deployment of high impact resistance genes into Canadian wheat cultivars.

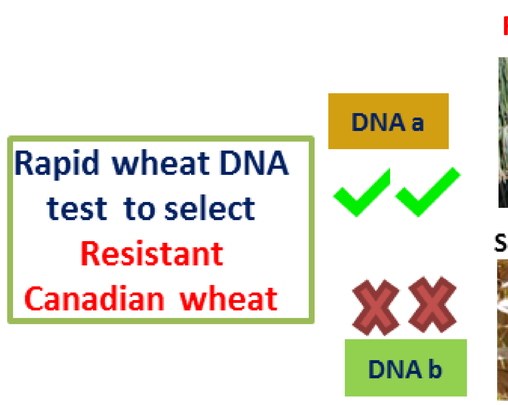
Outputs thus far: Cost effective, breeder friendly and diagnostic SNP markers for rust resistance genes; 12 markers tightly-linked to leaf rust gene *Lr16;* 6 markers tightly-linked to stem rust gene *SrCad;* Profile of 7 markers tightly linked to *Sm1* have been determined on a panel of 96 Canadian cultivars/lines. Efforts to develop perfect markers is underway.

Impact: Significant reduction in cost of phenotyping. Acceleration of the release of disease resistant Canadian wheat.

Deployment path: DNA Markers and genotyping methods will be provided to Canadian wheat breeding programs at AAFC and other CWA partners

Delivery date: *Lr16* and *SrCad* markers were delivered to breeders in 2016; *Sm1* delivery by the end of 2016

Resources committed: ~4.2M over 5 years



In Canada ~ 80% of recently developed spring wheat cultivars are susceptible to highly pathogenic (Ug99) stem rust and resistant cultivars are grown on < 2% of the acreage.

Without DNA test, conventional tests of Ug99 stem rust requires plant pathogen level 3 (PPC3) biocontainment laboratory.

Diagnostic DNA markers for Ug99 stem rust Resistance gene *SrCad*

Marker	DNA of Resistant Wheat	DNA of Susceptible Wheat
kwm999	a	b
kwm1000	a	b
kwm987	a	b
kwm994	a	b
kwm997	a	b
kwm907	a	b

Diagnostic DNA markers for Leaf rust R gene *Lr16* (not all markers shown)

Marker	DNA of Resistant Wheat	DNA of Susceptible Wheat
kwm677	a	b
kwm742	a	b
kwm747	a	b
kwm748	a	b
kwm749	a	b
kwm750	a	b

Opportunity for collaboration: Developing markers for other high Impact genes (e.g *Bt10*).

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