3.2 Fungicide strategies for blackleg

KEY PRACTICE: Consider early application of fungicide for blackleg management only when disease risk is high due to short crop rotations, erosion of cultivar resistance, or hail damage.

PROJECT TITLE, LEAD RESEARCHER: "Mitigating the risk of blackleg disease of canola using fungicide strategies," 2011-15, Gary Peng, Agriculture and Agri-Food Canada (AAFC); Dilantha Fernando, University of Manitoba; Ralph Lange, Alberta Innovates — Technology Futures
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Blackleg is the most widespread fungal disease of canola in Western Canada and poses a serious threat to production. Selecting a rotation of R-rated varieties and maintaining a minimum break of two to three years between canola crops may protect against blackleg risk and allow effective long-term management of this disease.

Pathogen race shifts have been reported in recent years which may be linked to overuse of the same blackleg resistance genes in canola varieties. The trend towards tighter rotations due to market opportunities also increases the pathogen inoculum pressure. With increasing risk, prevalence and severity across the Prairies, growers have questions about which fungicides are most efficient, cost-effective and when they should be applied.

Gary Peng with AAFC led this four-year study to assess the benefits of fungicide treatments based on application timing and host resistance. A total of 17 site years were analyzed from five field sites in Vegreville, AB, Scott and Melfort, SK, and Brandon and Carman, MB.

In these tests, the blackleg-susceptible canola variety Westar was used to represent a worst-case scenario of resistance breakdown. Infection relied mostly on diseased canola residues in the plot areas. Several fungicides registered for blackleg control in canola were applied: Headline, Tilt, Quadris and Quilt Xcel. Application timings varied from: the 2 to 4 leaf stage, split application at the 2 to 4 leaf and prior to bolting, or an application of Headline alone just prior to bolting. These results were compared to unsprayed plots as a control.

Fungicide benefits susceptible varieties

VARIETY	TREATMENT	DIS INCIDENCE (%)	DIS SEVERITY (0-5)	GRAIN YIELD (bu./ac.)
WESTAR (S)	Non-treated control	54.1	1.5	26.4
	Headline (2-4 leaf)	42.8*	0.9*	30.4*
	Quadris (2-4 leaf)	41.8*	0.8*	30.2*
	Tilt (2-4 leaf)	57.0	1.5	27.1
	Quilt (2-4 leaf)	47.2	1.1*	30.5*
	Headline (rosette)	49.4	1.3	28.1
	Tilt + Headline**	46.8*	1.2*	29.4*
	Headline + Tilt**	41.6*	0.9*	30.5*
43E01 (MR)	Non-treated control	53.2	1.3	37.3
	Headline (2-4 leaf)	40.3*	0.8*	37.5
45H29 (R)	Non-treated control	44.1	0.9	49.3
	Headline (2-4 leaf)	35.9*	0.6*	50.2

* Means are significanly different from the non-treated control of the same cultivar ($P \leq 0.05$, Dunnett's Test).
**Split applications at the 2-4 leaf and prior to bolting stages, respectively.

Effect of fungicide treatment on blackleg and grain yield of canola with varying levels of disease resistance over 17 site-years between 2011 and 2014.

Over all site years, all but two of these treatments (Tilt applied at the 2 to 4 leaf stage or Headline alone prior to bolting) reduced blackleg and increased seed yield in the susceptible variety.

This was also the trend when analyzing the eight site years where infection occurred at moderate to high levels (average disease severity of greater than 1.0). However, in the nine site years with low levels of the disease severity, these differences were not evident.

Disease incidence and severity on the moderately resistant and resistant canola varieties in this study were of similar patterns as those of the susceptible variety, with or without fungicide treatment. However, seed yield from the MR and R tests was higher and did not significantly benefit from any fungicide application, producing more seed than Westar with or without a fungicide treatment.

Recommendations

- Genetic resistance and longer crop rotations continue to be the main course of action for blackleg management in Western Canada.

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- Scout crops for accurate identification of the proportion of plants affected by the disease (shortly after swathing) to estimate economic impact based on disease incidence and severity (see below) for blackleg management planning.
- Strobilurin fungicide application at the 2 to 4 leaf stage may be considered only when the variety is susceptible (short crop rotations or after hail damage) and disease risk is high. Multiple applications are generally not required for maximum efficacy.
- Don't use blackleg fungicide if varieties are resistant in your field. ●

Blackleg field rating scale

Score blackleg for each clipped tap root using the following scale

0

No diseased tissue visible in the cross section.

1

Diseased tissue occupies 25% or less of cross section.

2

Diseased tissue occupies 26-50% of cross section.

3

Diseased tissue occupies 51-75% of cross section.

4

Diseased tissue occupies 75% or more of cross section.

5

Diseased tissue occupies 100% of cross section with significant constriction of affected tissues; tissues dry and brittle; plant dead.