



Fluopyram fungicide seed treatment reduces blackleg

CATEGORY [disease](#) | April 30, 2020

Several fungicides were evaluated for control of cotyledon infection by *Leptosphaeria maculans* and blackleg disease of canola. Under controlled environmental conditions, fluopyram showed greater efficacy than fluquinconazole in limiting cotyledon infection, while regular seed treatments with Prosper EverGold or Helix Vibrance were ineffective. In field trials, fluopyram reduced the infection on canola cotyledons, a critical pathway for the pathogen to get into the canola stem, potentially limiting blackleg.

Cotyledon and lower-leaf infection play a major role in blackleg disease development. A seed treatment that targets early infection could be more effective than a foliar fungicide application. This study assessed fungicide seed treatments to control blackleg disease. There is currently no registered seed-treatment product targeting aboveground blackleg infection.

Assessing seed treatments in the greenhouse

The blackleg-susceptible (S) canola variety 'Westar' and resistant (R) variety 'InVigor L157H' were used in initial assessments in a growth cabinet. Fluopyram and three new seed-treatment candidates, and three undisclosed chemistries were evaluated against Prosper EverGol or Helix Vibrance. Fluquinconazole, a fungicide used commonly with canola in Australia against blackleg, was also included as a check.

Five isolates of *L. maculans* were used for inoculations of canola cotyledons to represent common pathogen races on the Prairies and to avoid major-gene resistance from the R cultivar. Proper EverGol and Helix Vibrance were ineffective in preventing cotyledon infection by *L. maculans*. Fluopyram prevented the infection completely. Fluquinconazole and one new experimental fungicide moderately reduced infection on InVigor L157H, but only slightly on the susceptible 'Westar' relative to untreated or Prosper EverGol controls. The other experimental products showed little efficacy.

Effect of delayed germination/emergence after planting on efficacy of fluopyram

Five rates of fluopyram were seed applied to assess the interaction with delayed germination/emergence caused by delayed watering for 1, 2 and 3 weeks after planting in the greenhouse. Each rate of fluopyram reduced cotyledon infection significantly on both susceptible and resistant varieties. In general, these treatments reduced infection severity by more than 90% relative to untreated controls. Delayed watering after planting showed little effect on efficacy, regardless of the fungicide rate used.

Assessment of fluopyram seed treatment for control of blackleg in field conditions

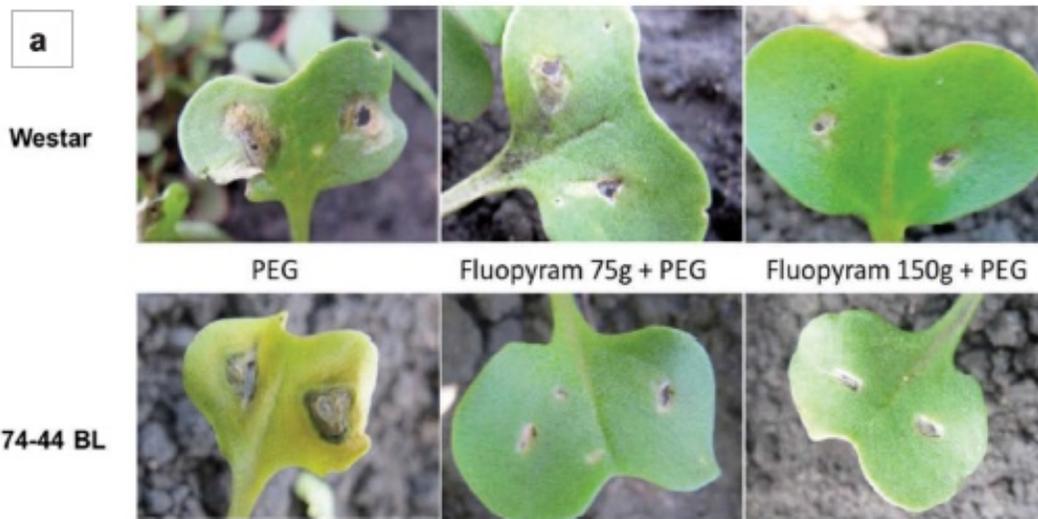
Field trials were carried out on AAFC Research Farms near Melfort, Saskatchewan and Brandon, Manitoba in 2017 and 2018. In 2017, fluopyram was mixed with Prosper EverGol or Poncho 600 (clothianidin). Poncho is an insecticide seed treatment for control of flea beetles. The fungicide fluquinconazole was also mixed with Prosper EverGol to compare against fluopyram. Prosper EverGol and Poncho 600 alone were used as standard and insecticide seed treatment checks. These seed treatments were applied to blackleg-susceptible Westar canola. About one week after seedling emergence, cotyledons of 100 plants in two central rows were inoculated with two *L. maculans* isolates.

In 2018, the blackleg resistant variety 74-44BL and susceptible Westar were treated with fluopyram at 2 rates in a mixture with Prosper EverGol. Prosper EverGol was also used as a control on both varieties. 74-44BL carries the resistance genes *Rlm1* and *Rlm3*, as well as a level of non-specific resistance. Cotyledons were inoculated with a mixture of pathotypes representing the common *L. maculans* races found in recent years, and carry no *Avr* genes that correspond to the resistance genes *Rlm1* or *Rlm3* carried by 74-44BL.

When inoculated at the cotyledon stage, fluopyram often reduced blackleg incidence and the Disease Severity Index compared to Prosper EverGol alone. In the field, the researchers found fluopyram less effective than under controlled-environment conditions where cotyledon infection

was inhibited completely. However, all fluopyram treatments were highly effective with substantially reduced infection development, and reduced blackleg disease on the susceptible Westar cultivar.

Cotyledon infection resulted from inoculation with *Leptosphaeria maculans* in field trials near Brandon, Manitoba and Melfort, Saskatchewan (2018)



Source: Peng et al. 2020. PEG = Prosper EverGol

No differences in cotyledon infection were observed between the susceptible and resistant varieties, which makes sense because the *L. maculans* isolates used for inoculation carry no *Avr* genes corresponding to any of the R genes in the resistant cultivar 74-44 BL.

Fluquinconazole treatment reduced blackleg Disease Incidence or Disease Severity Index on Westar in only one of the two 2017 field trials.

Fluopyram seed treatment could be a new management tool because it targets the critical infection window at the cotyledon stage. The researchers concluded that when variety resistance is being eroded due to a shift in the pathogen population, seed treatment with fluopyram might be a valuable tool to limit the impact of disease during the restoration of variety resistance.

Financial support from the Canola Agronomic Research Program (Alberta Canola Producers Commission, Manitoba Canola Growers Association, and SaskCanola, and administered by the Canola Council of Canada).

Gary Peng, Xunjia Liu, Debra L. McLaren, Linda McGregor & Fengqun Yu (2020): Seed treatment with the fungicide fluopyram limits cotyledon infection by *Leptosphaeria maculans* and reduces blackleg of canola, Canadian Journal of Plant Pathology.

<https://doi.org/10.1080/07060661.2020.1725132>

Photos by Gary Peng.