



Blackleg severity and disease loss in canola

CATEGORY [disease](#) | November 13, 2018

For every 1-unit increase in disease severity rating on a scale of 1 to 5, yield loss in a susceptible variety was 17.2% and pod loss was 13.0%. Disease severity was lower and seed yield was 120% to 128% higher in the moderately resistant to resistant hybrids compared with the susceptible cultivar.

In Canada, blackleg caused by *Leptosphaeria maculans* has been managed largely by the deployment of resistant cultivars. However, in recent years the virulence of *L. maculans* populations has shifted in some fields, resulting in the erosion of genetic resistance and an increase in disease severity.

Two experiments were set up to determine the relationship between blackleg disease severity and the yield of canola in Alberta. The blackleg susceptible variety Westar, a moderately resistant variety 1950RR, and resistant hybrid 46S53RR were grown in 2013 on heavily infested blackleg sites at the Crop Diversification Centre North, Edmonton, Alberta. In 2014, the experiment was repeated with the same varieties at CDCN and at a site near Namao, Alberta. In another experiment in 2015, the moderately resistant canola hybrid InVigor 5440 and Westar were sown at two sites located at CDCN and Namao.

To assess the relationships of blackleg on pod number and yield, the plants within a 1 square metre area were sorted according to their disease severity on a 0–5 scale:

0 = no disease in a cross-section of the stem base:

1 = decay on <25% of the cross-sectional area of the crown

2 = decay on 25%–50% of the cross-section

3 = decay on 51%–75% of the cross-section

4 = decay on >75% of the cross section

5 = death of the plant

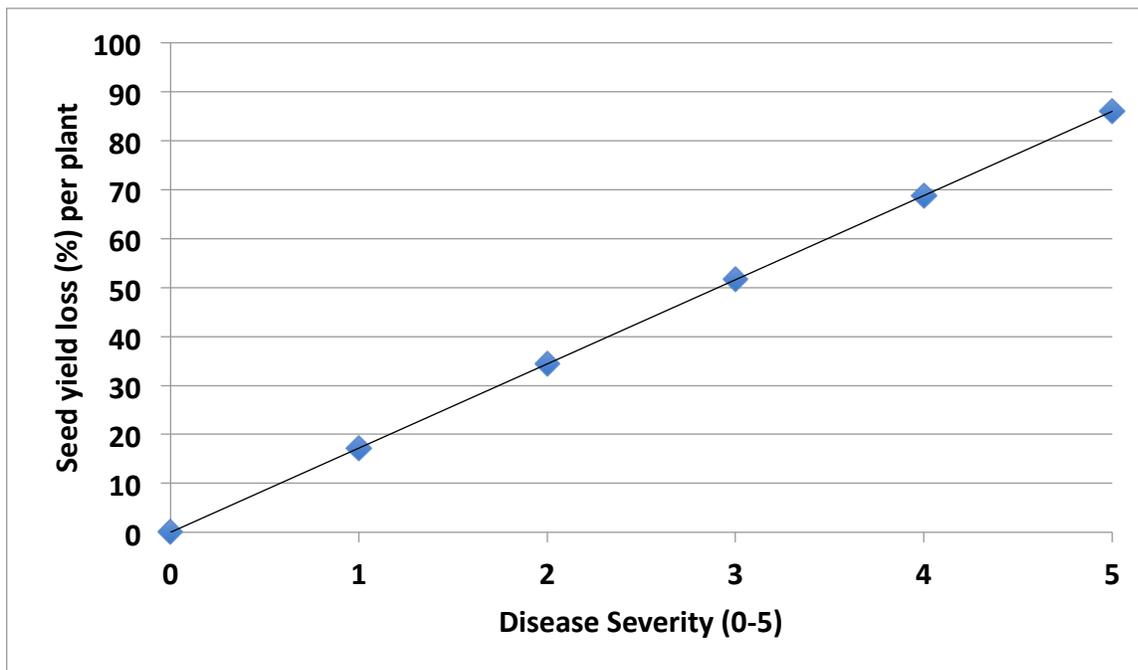
Disease rating scale



From left to right: 0 to 5

Yield decreased linearly with increasing disease severity. The study found that seed yield per plant was reduced by 17.2% for each unit increase in disease severity. Although the relationship between disease severity and seed yield is linear and negative, the total yield loss under field conditions is dependent on the proportion (incidence) of plants in each disease category. The higher the proportion of plants with greater disease severity, the greater the expected yield loss.

Relationship between blackleg severity and yield loss in the susceptible cultivar Westar



Source: Hwang et al. 2016.

Foliar fungicide application

In another trial, Headline (pyraclostrobin) foliar fungicide was sprayed at different frequencies and at different growth stages on the moderately resistant variety 1950RR to measure the impact of blackleg on canola yield. The fungicide trials were conducted at CDCN in 2014 and 2015, and Namao in 2015. Headline was applied as a foliar spray at the seedling stage (2-leaf or less), seedling stage + early (10%) flowering stage, or at the seedling stage + early flowering stage + late flowering (80%) stage and compared to a no-fungicide control.

Headline reduced disease severity and increased yield compared with the control. Three applications of Headline were the most effective for reducing disease severity, but would not be economical since yield was not significantly different between the three application timings. Repeated applications of Headline would also exert selection pressure for insensitivity in *L. maculans* populations.

The foundation of blackleg control continues to be the utilization of moderately resistant to resistant canola hybrids. If growers observe that blackleg disease ratings are increasing over time, a switch to a variety with a different source of resistance to help manage the disease would be the first choice.

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Hwang, S.-F.; Strelkov, S.E.; Peng, G.; Ahmed, H.; Zhou, Q.; Turnbull, G. Blackleg (*Leptosphaeria maculans*) Severity and Yield Loss in Canola in Alberta, Canada. *Plants* **2016**, *5*, 31.

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