

Impact of preceding crops on incidence and severity of disease in canola (2004)

A four-year rotation study was initiated in 2000 to determine the impact of preceding crops on disease incidence and severity in canola. Six rotations were evaluated and every phase of the rotation is present every year in a randomized complete block design replicated four times. The rotations consist of canola every one, two, three, or four years preceded by either canola, flax, or wheat. Half of each canola plot was treated with fungicide to prevent *Sclerotinia stem rot* (SSR). Plots were evaluated for SSR risk; SSR and blackleg incidence and severity; and yield and test weight.

Sclerotinia ascospore levels detected by petal and Steadman tests indicated very low disease risk in 2000. Low ascospore levels in 2000 were likely due to lack of inoculum in the area as the field history was cereal grains for twenty years prior to the initiation of the study.

In 2001, increased inoculum and favorable environment resulted in moderate disease risk, 65, and 100% incidence, detected by the early Petal and Steadman tests, respectively. However, little precipitation between the first and second evaluation caused a dramatic drop in disease risk. Risk is considered low at 0 to 45%, moderate at 45 to 95%, and high at 90 to 100% incidence on the petal test (Morrall and Thompson 1991).

In 2002 and 2003, the petal test indicated very low disease risk at both evaluation dates. However, the Steadman test in 2002 detected a higher level of ascospores than the petal test, possibly due to the microclimate within the crop canopy being more favorable for sporulation. In 2004, petal tests indicated moderate SSR disease risk, 56 % incidence; and weather conditions have been more favorable for plant infection than in previous years of the study.

To date, general observations on disease risk indicate it is more dependent on environment than rotation.

SSR disease incidence on standing canola plants adjacent to canola swaths was too low to detect any significant differences throughout the study. SSR disease incidence peaked at 5% in canola on canola rotations in 2001, where risk test indicated the highest level of ascospores, but canola yield was not adversely affected. In 2000 through 2004, there was little risk or incidence of SSR, regardless of rotation or fungicide treatment, in this study.

Blackleg incidence has gradually increased each year, until 2004. There was very little blackleg detected in 2000, the first year of the study. In 2001, blackleg incidence was up to 8% in canola on canola rotations. In 2002, the third year of the study, blackleg incidence was 37% in canola preceded by two years of canola, 24% in canola on canola, and less than 10% in first year canola or canola preceded by wheat preceded by canola (canola every other year). Although blackleg incidence in canola every other year was slightly higher than in first year canola, it was not significantly different. In 2003, canola once in four years and canola once in three years had similar blackleg incidence, 22%. Blackleg incidence was higher in canola preceded by three consecutive years of canola, 45%, which was similar to canola preceded by canola, and canola preceded by wheat preceded by canola (canola every other year). Blackleg severity did not increase with the occurrence of canola in the rotation and yield was not affected by blackleg incidence in 2002 or 2003. The lack of yield response to higher blackleg incidence is likely due to the blackleg resistance of the canola variety planted, as well as below-normal precipitation and high temperatures during flowering in 2002 and 2003. In fact, overall canola yields were down in 2002 and 2003 compared to 2000 and 2001. However, in 2004, blackleg incidence

was variable, and not related to rotation. This is likely due to heavy rain and hail in early June which damaged young canola plants that had shown symptoms of blackleg. The canola had recovered, but the blackleg lesions did not reoccur.

Literature Cited

Morrall, R. A. A. and J. R. Thomson. 1991. Petal test manual for Sclerotinia in canola. University of Saskatchewan, Saskatoon, SK 25pp.