

Activity 10 Factsheet

Integrated Canola Disease Management: The effect of crop rotation, nutrient management, planting date and plant density on the incidence and severity of stem rot and black leg of canola

Objectives

The objective of the activity is to study the effect of crop rotation, nutrient management, planting date and plant density on the incidence and severity of stem rot and black leg in canola. It is expected that this research will lead to identification of cropping practices (e.g. crop rotation, seeding rate, time of planting) that could significantly influence the incidence of stem rot and black leg disease.

Methodology

Stem rot of canola is a disease that has a large impact on the crop. Environmental factors play a major role in the incidence and severity of this disease. The aim of this activity is to study the effect of cropping practices, crop rotation and nutrient management (N, S and B) on stem rot disease.

The field trial was conducted at Canning, Nova Scotia. The effect of nutrients: nitrogen, sulphur and boron on the incidence of Sclerotinia stem rot was studied. Boron was applied at rates of 0, 0.5 and 2 kg on canola hybrids, Invigor 5440 and Invigor L150. Nitrogen was applied twice during the growing season on two hybrids of canola: Invigor 5440 and Invigor L150. Sulfur and nitrogen were applied in combination treatments on canola. Each treatment had 4 replication plots. In 2016 boron was applied at rates of 0, 500 (foliar) and 2,000 (seedling) g/ha on canola hybrids InVigor 5540 and InVigor L140P. Each treatment had 4 replication plots.

The crop rotation experiment was conducted for four consecutive seasons with soybean, maize, wheat and canola. The rotations were canola-canola-canola-canola; soybean-maize-wheat-canola; wheat-maize-soybean-canola; and wheat-soybean-maize-canola. In 2016, the rotations were canola-canola-canola-canola; canola-soybean-maize-wheat; canola-wheat-maize-soybean; and canola-wheat-soybean-maize.

Results

The 2014 cropping season was dry, therefore there was less disease present. It was hard to draw a conclusion from the results due to this lack of disease. However, some trends were evident. For example, in the crop rotation trial, the canola only rotation recorded the maximum level of disease.

In the nutrient management trial with nitrogen application, InVigor L140P showed the least disease incidence in general. Significantly reduced disease incidence was observed with application of 50 N followed by 0 N with InVigor L140P. Disease severity % was lowest with InVigor 5540 when nitrogen was applied at the rate of 100 and 200, respectively. However, the two lowest doses alone gave significantly

less disease severity in comparison to split doses.

Application of sulfur in all the combinations with 150 nitrogen showed reduced disease incidence as compared to other combinations. A similar pattern was observed for disease severity % when treated with sulfur. With the increasing boron dose, disease incidence increased in InVigor 5440, but there was no difference for disease incidence with InVigor L140P. However, there was no difference for disease severity % with boron application. The crop rotation trial showed significantly less disease incidence with Canola- Soybean-Maize-Wheat as compared to other rotations.

The weather conditions during 2014 cropping season in Canning, NS were very dry. Dry conditions do not favour stem rot disease. As expected the disease incidence was low, about 2% in most fields. Therefore, it was difficult to draw any conclusion from the results obtained this season. In the crop rotation trial, the incidence of stem rot was greater in CCCC (canola only) plots (10%) and least in SMWC (S – Soybean M – Maize - W – Wheat C – Canola) rotation (less than 1%). The nutrient management trial was inconclusive.

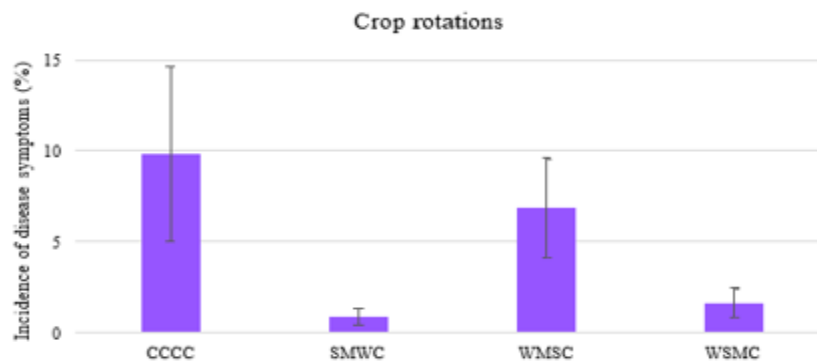


Fig 1. Sclerotinia stem rot incidence in canola among various crop rotations (S – Soybean M – Maize - W – Wheat C – Canola). Values represent mean \pm standard error. n=4

In general, nutrient management with the two lowest doses (0 and 50 N) of nitrogen gave significantly less disease incidence with InVigor L140P. Application of sulfur (all combinations) with 150 N yields less disease incidence as compared to other combinations. 100 series plot had shown three times less disease incidence (10 %) as compared to 400 series plot. Sulfur management shown significantly reduced disease incidence with 400 series plot (6 %) than 200 series plot. Application of boron had a positive correlation with disease incidence percentage for both hybrids.

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