

Peola vs. Mono-Crop Seeding Rates and Fungicide Application

While there are multiple research studies focused on intercropping peas and canola, or better known as “peola”, there is little to no consistency regarding seeding rate recommendations. This is one of the many concerns that have been addressed by producers. Therefore, showing producers disease pressure at the different seeding rates can assist them in deciding which combination of canola and pea seeding rates best suits their farm. Essentially this project will demonstrate to producers a more precise, clear picture of multiple seeding rates and how disease pressure and yield is affected, along with how the new recommended (lower) seeding rates of canola can affect disease pressure and yield.

The demonstration was arranged as a split-block design with four replicates and twelve treatments at Scott, SK 2019. The trial was split, for ease of spraying, into fungicide application versus non fungicide application, with seeded buffers of the canola monocrop (5 plants/ft²) separating the different canola seeding rates for maturity timings. The canola was seed placed, while the peas with the inoculant were side banded.

The seeding rate of peas had a significant effect on crop emergence ($P < 0.001$) while canola seeding rate did not ($P = 0.1084$). These results indicate that the field pea seeding rates targeted of 80 and 40 plants/m² were achieved as densities varied between the 60 and 30 plants/m². Canola plant density varied greatly throughout the trial and this resulted in a non-significant effect between the two seeding rates. The variability in canola emergence is likely attributed to three factors: (1) the canola was seeded deeper than normal (1 inch) to ensure that the field peas were seeded at an acceptable depth, (2) the field was rolled following seeding to aid in harvesting the field peas, 3) the dry spring conditions restriction canola germination. These factors likely caused poor canola emergence throughout the trial.

Canola disease ratings were conducted prior to the fungicide applications; however, disease pressure was low (< 20%) and did not result in any significant responses. Disease ratings conducted one week after application indicated that the unsprayed treatments had a slightly higher (19%) disease pressure compared to the sprayed treatments. Disease ratings two weeks after application indicated that the disease pressure increased by 47% in the unsprayed treatments compared to the sprayed treatments. The canola monocrop treatments had two of the three lowest canola disease ratings at both one and two weeks after the fungicide application. One week after the fungicide application the canola monocrop had the same disease pressure with or without a fungicide application (5%). Intercropped pea and canola treatments tended to have a higher disease pressure than the canola monocrops at both disease ratings (Figure 1).

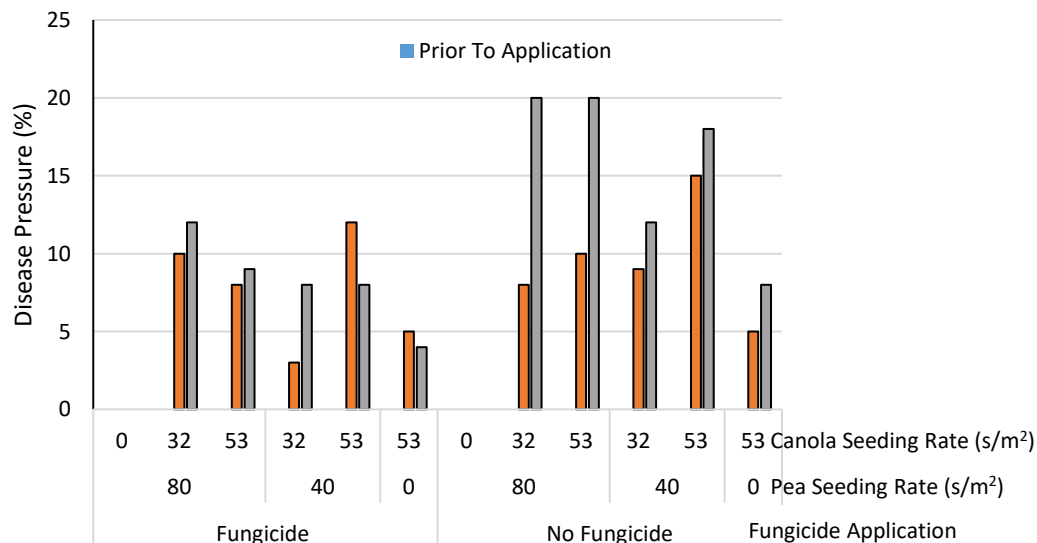


Figure 1. Disease rating pressure (%) on canola seeded as a mono-crop and intercropped with canola at a high canola seeding rate (53 seeds/m²) and low canola seeding rate (32 seeds/m²) with and without fungicide application in Scott, SK in 2019

The highest pea disease pressure recorded two weeks after the fungicide application with pea seeding rate of 80 plants/m², canola seeding rate of 53 plants/m² and without a fungicide application. This treatment had the same amount of disease as the treatment with a pea seeding rate of 80 plants/m², canola seeding rate of 0 plants/m² and no fungicide applied. Therefore, the presence of canola had little effect on the pea disease pressure (Figure 2).

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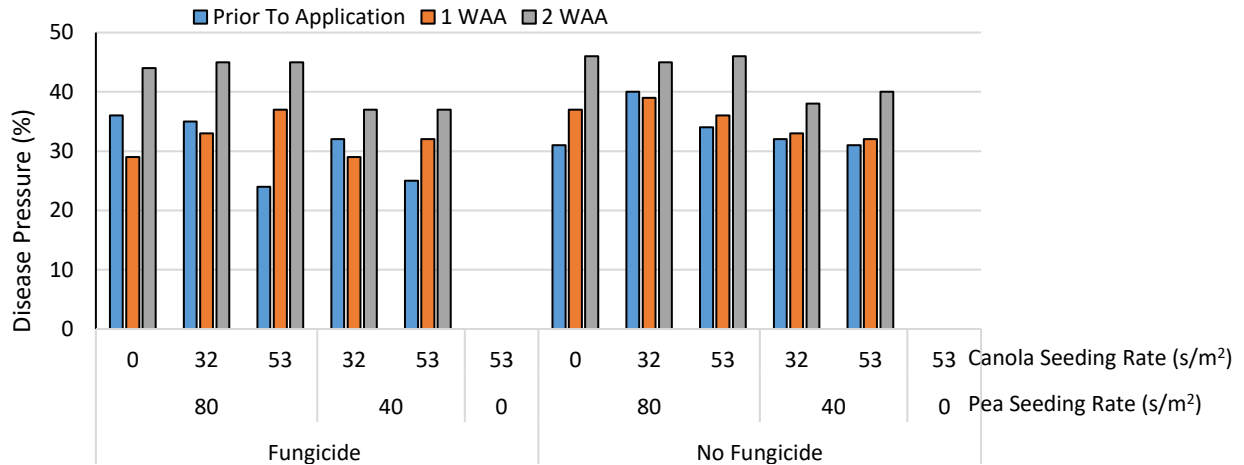


Figure 2. Disease rating pressure (%) on field peas seeded as a mono-crop and intercropped with canola at a high pea seeding rate (80 seeds/m²) and low pea seeding rate (40 seeds/m²) with and without fungicide application in Scott, SK (2019)

The highest NDVI was recorded with a pea seeding rate of 80 plants/m² at the 2-3 and 4-6 leaf stage. At both leaf stages the canola monocrop treatments had the lowest NDVI, which correlates to the thinner plant density from the drought and poor emergence. The fungicide application was applied later in the growing season so therefore had no effect on NDVI.

The two highest yields of 83 bu/ac and 82.3 bu/ac occurred at the high pea seeding rate (80 seeds/m²) intercropped with canola at 53 plants/m² and 32 plants/m² with a fungicide application, respectively. Peas seeded as a monocrop had a similar yield of 80.1 bu/ac the with a fungicide application. A substantial drop in yield occurred at 74.9 bu/ac with the field pea monocrop without a fungicide application. The two highest canola yields occurred when canola was seeded as a monocrop at the highest seeding rate of 53 seeds/m². The highest yield of 31.5 bu/ac occurred when no fungicide was applied and a slightly lower yield of 27.1 bu/ac when a fungicide was applied. The effect of fungicide on canola was inconsistent and did not influence canola yield. The low seeding rate of 32 seeds/m² resulted in the lowest yields, regardless of the intercrop combination (Figure 3).

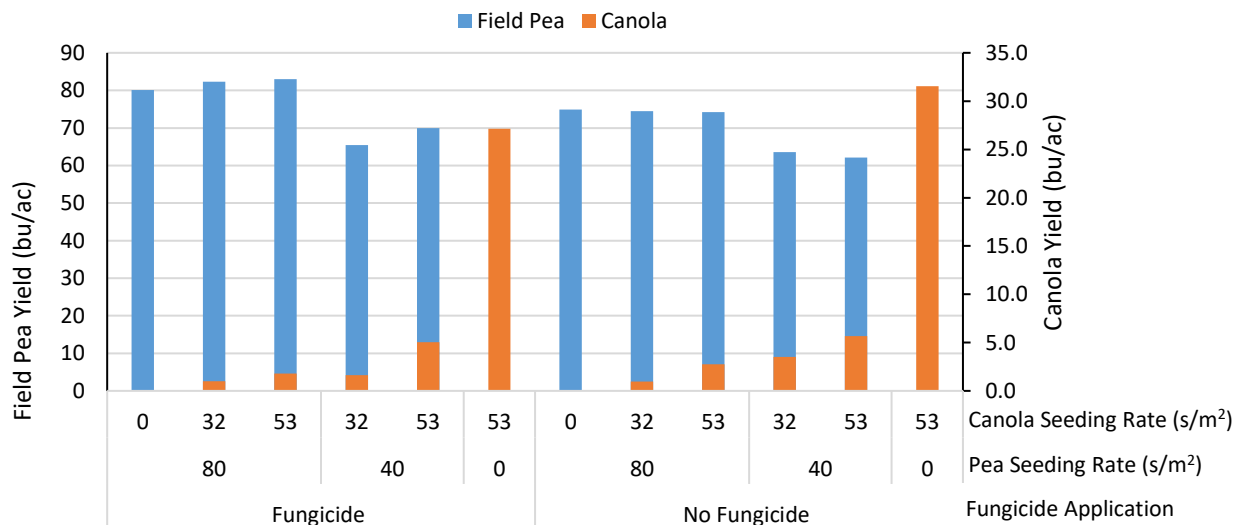


Figure 3. Comparing the yield (bu/ac) of field pea and canola seeded as an intercrop and monocrop at two different seeding rates of field pea at 80 vs. 40 seeds/m² and canola at 53 vs. 32 plants/m² with and without fungicide application in Scott, SK (2019)

The full report will be available at: www.warc.ca. This project was supported by the Agricultural Demonstration of Practices and Technologies (ADOPT) initiative under the Government of Saskatchewan and the Government of Canada under the Canadian Agricultural Partnership.