

Determining the economic plant density in canola

Dr. Steve Shirtliffe, Department of Plant Science, University of Saskatchewan

Project Code: CARP 2006-08

Final Report: December 2009

Canola farmers seeking to maximize returns should target populations so that even under adverse conditions they will have more than 50 plants per square metre (5 plants per square foot). Plant populations lower than this will almost always have yield loss. Generally, hybrid canola reaches its maximum yield at lower densities than open pollinated canola, with hybrid canola achieving 90% of its yield at 45 plants per square metre compared to 90 plants per square meter for open pollinated canola.

The high seed costs for canola are prompting many growers to seed at reduced rates. Canola has been traditionally seeded at 5 to 6 lbs/acre (4.4 – 5.3 kg/ha). Canola emergence on farmer's fields is often low, with typical field emergence being 50%. Although there have been many seeding rate studies done for canola, the optimum seeding rate and plant population for recent hybrids has not been studied as much.

The objective of this study was to conduct a metaanalysis of canola seeding rate and plant population trials in order to determine the optimum seeding rate and plant population. Metaanalysis offers a way of combining data from different experiments to conduct a combined mixed model analysis. A total of 35 canola seeding rate experiments, representing 176 site-years of experiments, were selected for inclusion in the dataset.

A categorical analysis was conducted first, comparing yields from seeding rates of approximately 3 versus 5 kg/ha. The analysis showed that canola seeded at 5 kg/ha had on average a 4% higher yield than canola seeded at 3 kg/ha. The site years that had the greatest yield reduction were those where emergence on the 3 kg/ha treatments was lower than 45 plants per square metre.

A second analysis examined the effect of canola population density on yield. In contrast to the categorical analysis, the second analysis found that the yield response of open pollinated canola differed from that of hybrid canola. Generally, hybrid canola reaches its maximum yield at lower densities than open pollinated canola. Hybrid canola achieved 90% of its yield at 45 plants per square metre compared to 90 plants per square meter for open pollinated canola. Hybrid canola appears to maintain a large proportion of its yield at low plant densities.

The results from both analysis show similar trends, indicating that on average, canola seeded at below recommended seeding rates will have lower seed yield. The yields of canola begin to decrease substantially as plant densities get lower than approximately 45 plants per square meter. On average, canola seeded at 5 lbs/acre yielded 4% greater than canola seeded at 3 lbs/acre. However, reducing seeding rates can result in much greater yield losses. Therefore, canola farmers seeking to maximize returns should target populations greater than 50 plants per square metre (5 plants per square foot).