Canadian Agronomist

DIGGING INTO RESEARCH

Strip tillage and precision planting of canola

CATEGORY agronomy | *July 22, 2025*

When strip tillage was combined with a disc-hoe opener, a high and stable canola yield was achieved. No-till improved water conservation and helped to mitigate yield losses in rainfed conditions of southern Alberta.

Strip tillage has been adopted for planting crops in wider row spacing because it helps to manage crop residue while seeding crops such as corn and soybean. However, limited research has been conducted on narrow-spaced crops such as canola. The objective of this study was to determine the effect of different tillage practices and different sowing methods on canola emergence, growth and yield in the irrigated and rainfed production systems of southern Alberta.

Research was conducted at four locations in southern Alberta at Lethbridge (2021-2023), Bow Island (2022), Brooks (2022) and Stirling (2023). All sites include irrigated and rainfed plots. The preceding crops were durum at Lethbridge, wheat at Bow Island, fall rye at Brooks and barley at Stirling.

The four seeding treatments compared were a precision planter (PP) and three types of air drill openers; Pillar Laser disc-hoe (DH), 1-inch Narrow Knife (NK) and 3-inch Barton Spreader (SP). The Monosem precision planter was on a row spacing of 15 inches (38.1 cm) and the other drills were on a row spacing of 12 inches (30.5 cm). Canola seeding rate targeted 6 seeds/ft^2 (60 seeds/m^2) These seeding treatments were combined with three tillage practices of strip tillage (ST), no-till (NT) and conventional tillage (CT). Strip tillage and conventional tillage were performed before seeding

More uniform stand establishment with precision planter

Precision planting improved stand establishment especially under irrigated conditions. Under irrigation, the precision planter improved stand establishment by 23% (3.5 plants/ft^2) compared to the disc-hoe opener (2.8 plants/ft^2), and by 9% compared to the narrow knife and spreader openers (3.2 plants/ft^2).

Under rainfed conditions, precision planting (3.3 plants/ft^2) improved stand establishment by 12 to 25% over the other openers (2.6 to 2.9 plants/ft^2). The improved stand establishment was attributed to consistent seed placement, better depth control and better seed-to-soil placement. The precision planting system also had the highest late-season plant stands in both seeding systems and tillage practices compared.

Tillage practices did not influence early-season plant density except at Bow Island 2022 where conventional tillage had significantly higher stand establishment.

Lower yield with precision planting

The disc-hoe yielded 15% higher (77 bu/ac) than the precision planter (67 bu/ac) under irrigation, while the narrow knife (71 bu/ac) yielded 7% higher and the spreader opener (72 bu/ac) 8% higher than the precision planter system.

Under rainfed conditions, the disc-hoe opener (29 bu/ac) had yield 18 to 24% higher (24 – 25 bu/ac) than the other sowing methods. The lower precision planter yield was attributed a higher than optimum seeding rate for the precision planter combined with the wider row spacing, which can increase inter-plant competition.

Under irrigation, tillage method generally had no significant impact on yield, although there was some variation by site-year. Conventional tillage provided the highest seed yield at Lethbridge 2021 and 2023, while no-till produced the best yields at Stirling 2023. Otherwise, yields were similar for the three tillage systems at the remaining site-years.

Under rainfed conditions, no-till produced significantly higher yield at Stirling 2023, with the remaining site-years having statistically similar yields for the three tillage systems. Numerically higher yields, although not statistically significant, were observed with no-till at Lethbridge 2021, 2022, and 2023 compared to strip tillage and conventional tillage.

The yield results show that strip tillage could be adopted without sacrificing yield.

A stability analysis found that disc-hoe combined with all three tillage practices produced higher than average and stable yield under irrigation. The narrow knife opener combined with conventional tillage also produced higher than average and stable yield. No-till with the three inch spread opener also produced higher yield but with lower stability.

Under rainfed conditions, the disc-hoe opener combined with conventional tillage, and the narrow knife opener combined with no-till, produced higher-than-average and stable yields. However, conservation tillage increases the risk of soil erosion, and cannot be recommended as a sustainable practice. The combinations of disc-hoe with no-till and strip-till, spread-opener with strip tillage, and precision planter with no-till also produced higher-than-average yields but with low stability.

Overall, when strip tillage was combined with a disc-hoe opener, a high and stable canola yield was achieved. Compared to conventional tillage, strip tillage provides lower energy consumption, improved moisture retention and reduced carbon footprint. While the precision planter had superior stand establishment, canopy uniformity and early season canopy closure, it did not consistently yield higher than the other seeding methods.

This research was funded by the Natural Sciences and Engineering Research Council of Canada (NSERC) Agronomy Research Development (ARD) program.

Dr. Thierry Fonville, Mr. Mike Gretzinger, Mr. Carlo Van Herk, Dr. Gurbir Singh Dhillon, and Mr. Ken Coles. Evaluating strip tillage and precision planters in irrigated and rainfed canola production systems in southern Alberta. *Canadian Journal of Plant Science*. **Just-IN** Open Access https://doi.org/10.1139/cjps-2025-0045

