

Smart Ag Research

Comparison of Precision Planter and Conventional Air Seeder for Sowing Canola

Olds College Centre for Innovation (OCCI) teamed up with Trochu Motors and Precision Planting in 2024 to evaluate the agronomic and financial impact of using a precision planter to plant canola compared to the conventional method of using an air seeder. Canola is one of the most expensive crops in Western Canada due to high input costs, and in 2022, it was the most expensive crop to plant in Alberta.

INTRODUCTION

Despite high-quality seed with germination rates of more than 90 per cent, actual emergence can be as low as 50 per cent. Yield depends on several factors such as nutrient availability and uniform plant distribution.

Precision planters use singulation technology allowing for seeds to be placed individually, improving seed-to-soil contact and emergence compared to air seeders, which spread seeds via a fan. Using a paired sampling method, numerous crop assessments like compaction, germination, plant competition, soil moisture, soil temperature, insect pressure and disease pressure took place throughout the growing season.

OBJECTIVES

- Determine the agronomic impact of using a precision planter for canola as compared to a conventional air seeder.
- Calculate and compare the economic impact of using a precision corn planter to a conventional air seeder to seed canola.

STUDY DETAILS & RESULTS

The trials were conducted during the 2024 growing season across 67 acres in a partner producer field west of Olds, Alta. Researchers developed a paired sampling trial design. Eighty foot by 120 foot grids were developed for implementing the paired sampling protocols. Each grid contained each of the two seeding treatments, precision planter and conventional air seeder.

Throughout the growing season, various measurements were collected to compare the two treatments and evaluate their differences, including:

- **Soil conditions:** moisture, temperature, electrical conductivity and compaction.
- **Seeding and emergence:** Seed depth, plant emergence, plant stand and spacing between plants.



- **Growth and development:** Growth stage, canopy cover, crop height, stem diameter, leaf area, number of branches and number of pods.
- **Pest and damage assessment:** Flea beetle damage.
- **Yield indicators:** Pod length and seed weight.
- **Vegetation indices:** Normalized Difference Vegetation Index (NDVI) and Normalized Difference Yellowness Index (NDYI).

Metrics such as seed depth, flea beetle damage, stem diameter, growth stage, soil temperature, soil moisture, soil electrical conductivity, NDVI, pod length and canopy cover showed no significant difference.

Initial germination for the precision planter was 98 per cent and the air seeder was 94 per cent. However, survivability showed that the percentage of plants that survived until

flowers for the precision planter was reduced by three per cent, whereas the air seeder population declined by 19 per cent.

The mean distance between plants for the precision planter increased by 0.47 cm, whereas the air seeder distance between plants grew by 4.94 cm throughout the growing season. This shows that there was increased plant competition within the air seeder treatment, resulting in plant mortality.

Canopy cover was 8.45 per cent higher, there were 39 per cent more branches, leaves were about 10 cm² larger, NDVI values were higher, and there were 38 per cent more pods on the plants within the precision planter treatment, resulting in an average of 1.9 bushels more per acre. Although many measured variables were similar, the precision planter used 35 per cent less seed than the air seeder, leading to a cost savings of \$20.92 per acre.

NEXT STEPS/FUTURE RESEARCH

- Evaluating the agronomic impact of precision planters for wheat.
- Optimizing planting speed, seed depth and row spacing for yield.
- Conducting multi-year trials to assess performance across varying conditions.
- Determining the lowest effective seeding rate for canola using a planter.

