

Investigation of Seeding Systems in 1997

RL 0597
March 1998



by

Lawrence Papworth, Project Engineer
Blaine Metzger, Technologist
George Ragan, Technologist
Edward Griffiths, Technologist

Abstract

Farmers have many choices for seeding systems. Very little agronomic data is available on the newer seeding systems. A study was conducted to compare some new seeding systems to conventional systems that use wheel packers. The emergence and yield of canola and wheat were measured.

Generally, the type of seeding system did not affect the emergence or yield of canola and wheat. The one exception was the emergence of canola at the Lethbridge site. The Burr Packer Systems had difficulty seeding at the Lethbridge site due to the clay soil. The use of the Burr Packer Systems resulted in lower emergence than the other seeding systems.

The type of packing did not affect the emergence or yield of canola and wheat. Rain after seeding may have resulted in good germination at both sites regardless of the seeding system or packing method.

Introduction

Farmers have many choices for seeding systems. Very little agronomic data is available on the newer seeding systems. Performance data is needed for farmers to make informed purchasing decisions. Information is also needed by manufacturers to market their systems. This project will compare some new seeding systems to conventional systems that use wheel packers.

Experimental Procedure

Experimental sites for the project were a clay soil south of Lethbridge and a loam soil south of Edmonton. CDC Teal wheat and Hysyn 110 canola were direct seeded into moist soil on May 9 at the Lethbridge site and on May 15 at the Edmonton site. Both sites were sprayed with Roundup prior to seeding. The seeding rate was 112 kg/ha (100 lb/ac) for wheat and 9 kg/ha (8 lb/ac) for canola. Phosphate, in the form of 11-51-00, was placed with the seed at a rate of 34 kg/ha (30 lb/ac).

Crop emergence counts were taken on June 11 at the Edmonton site and June 24 at the Lethbridge site. One count was taken for each row of every plot. MCPA Amine and Afolan F were sprayed on the wheat, and Poast and Muster were sprayed on the canola at the Lethbridge site on June 16. MCPA Amine and Afolan F were sprayed on the wheat, and Poast and Lontrel were sprayed on the canola at the Edmonton site on June 17.

The Edmonton canola plots were not harvested due to weeds. The Edmonton wheat plots were sprayed with Roundup on September 10 and harvested on September 24. The Lethbridge plots were harvested on August 28.

The plots were replicated six times in a randomized complete block design experiment.

The plots were 2.43 x 15.24 m (8 x 30 ft). A 13.7 m (45 ft) strip was left between each block to allow for turning and starting implements. Border effects were controlled through plot randomization and winter crops on sides.

Seven different systems were used to place the seed and fertilizer:

Burr Packing System:

The system, Figure 1, consisted of an Atom-Jet knife followed by a spring loaded burr to pack the seed. A seven link chain followed the burr to incorporate fertilizer, roughen the surface and break up lumps of

soil. The granular urea was divided into two delivery hoses. Half was placed with the seed and half placed behind the burr and incorporated by the chain.

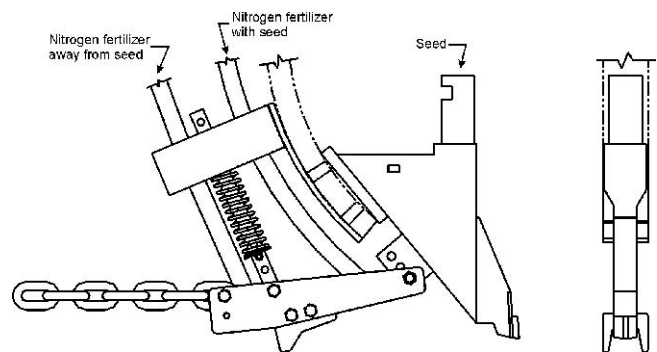


Figure 1. Burr Packing System.

Burr Packing System with Wheel Packer:

The system consists of the Burr Packing System described above followed by a 4 in (10 cm) wide wheel packer.

Poirier Opener Without Chain:

The Poirier opener is a single row side band type opener, Figure 2. The system consisted of a front point angled back at the top and a backswept knife. The front point places the seed and the backswept knife places the fertilizer. The backswept knife is operated at the same depth as the front point. The fertilizer is placed at a slightly shallower depth than the seed.

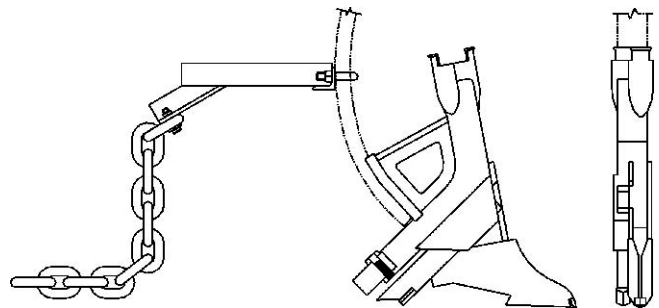


Figure 2. Poirier Opener.

Poirier Opener with Chain:

The system consisted of the Poirier Opener followed by an eleven link, heavy duty chain for packing.

**Poirier Pair Row Opener with Chain
(N banded below seed):**

The system consisted of the Poirier Opener with a wing welded to the side of the backswept knife to create a pair row, Figure 3. The front point was set 0.75 in (19 mm) below the backswept knives. The front point placed the fertilizer and the backswept knives placed the seed. An eleven-link, heavy duty chain was used for packing.

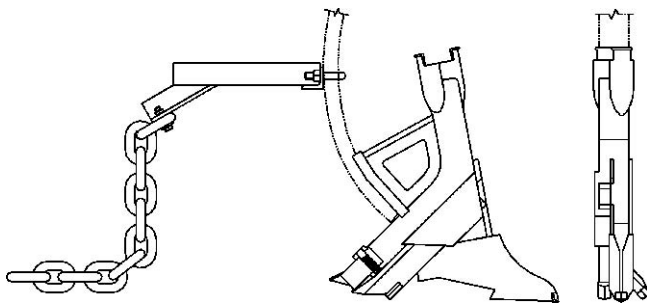


Figure 3. Poirier Pair Row Opener.

**Poirier Single Row Opener with Chain
(N banded below seed):**

The system consisted of the Poirier single row side band opener followed by an eleven-link, heavy duty chain for packing. The front point was set 0.75 in (19 mm) below the backswept knife. The front point placed the fertilizer and the backswept knife placed the seed.

Flexi-coil Side Band Double-Shoot Opener:

The system consisted of the Flexi-coil Side Band Opener followed by a 4 in (10 cm) wide wheel packer. A front point placed the fertilizer below and to the side of the seed. A side blade placed the seed.

Table 1 outlines the levels of the factors used in the experiment.

Table 1.

Factor	Level
Seed Type (2)	Canola Wheat
Seeding System Type (7)	Burr Packing System Burr Packing System with Wheel Packer Poirier Opener without Chain Packer Poirier Opener with Chain Packer Poirier Pair Row Opener with Chain Packer (N Banded) Poirier Single Row Opener with Chain Packer (N Banded) Flexi-coil Side Band Double-Shoot Opener
Replications	

The following experimental constants were used for the study:

- Implement:
- Travel Speed - 6.4 km/h (4 mph)
 - Tractor - 63 kW (85 hp)
 - Row Spacing - 24.5 cm (10 in)
 - Seeder - AFMRC plot seeder

Results

An analysis of variance (ANOVA) was used to analyze the results.

Mean plant counts for the Lethbridge site are presented in Figure 4. Differences in crop emergence between seeding systems were highly significant with canola and not significant with wheat. For canola the use of both Burr Packer Systems resulted in lower emergence than the use of other seeding systems.

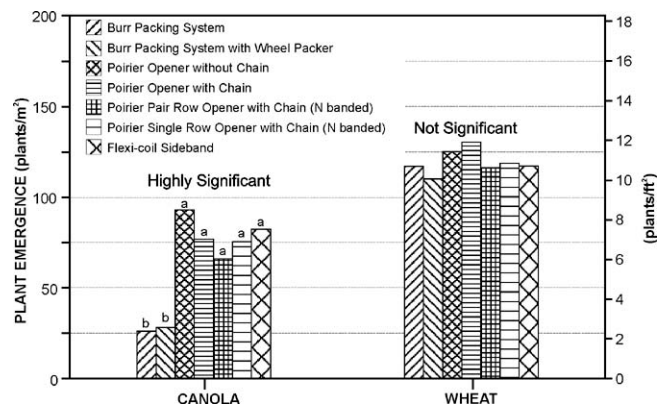


Figure 4. Effect of Seeding System on Crop Emergence - Lethbridge Site.

Mean plant counts for the Edmonton site are presented in Figure 5. Differences in crop emergence between seeding systems were not significant for both canola and wheat.

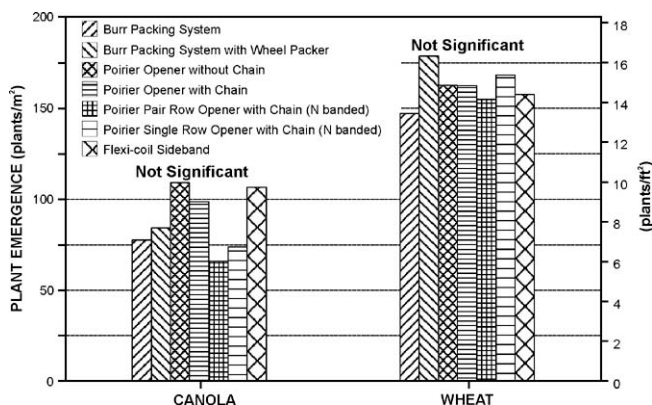


Figure 5. Effect of Seeding System on Crop Emergence - Edmonton Site.

Mean crop yields for the Lethbridge and Edmonton sites are presented in Figures 6 and 7. Differences in yield between seeding systems were not significant at both sites.

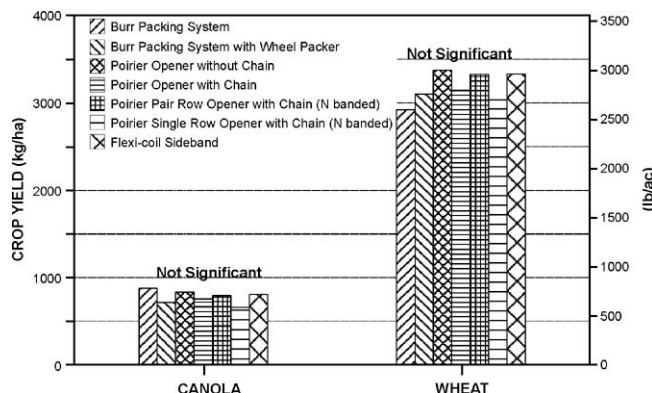


Figure 6. Effect of Seeding System on Crop Yield - Lethbridge Site.

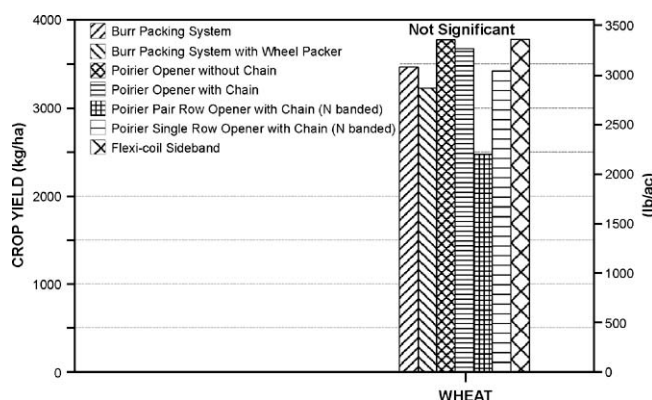


Figure 7. Effect of Seeding System on Crop Yield - Edmonton Site.

Discussion and Observations

Generally, the type of seeding system did not affect the emergence or yield of canola and wheat. The one exception was the emergence of canola at the Lethbridge site. The use of the Burr Packer Systems resulted in lower emergence than the other seeding systems. The Burr Packer Systems had difficulty seeding at the Lethbridge site due to the clay soil. The clay soil did not flow under the burr.

The type of packing did not affect the emergence or yield of canola and wheat. Rain after seeding may have resulted in good germination at both sites regardless of the seeding system or packing method.

A lack of moisture at the Lethbridge site during the majority of the growing season caused depressed yields.

The Poirier Pair Row Opener did not separate the seed and fertilizer adequately. Mixing the seed and fertilizer was frequent.

All the seeding systems performed better at the Edmonton site compared to the Lethbridge site due to drier soil and less clay content.

The front fertilizer tube on the Burr Packer Systems plugged constantly at the Lethbridge site and very often at the Edmonton site. This resulted in most of the granular urea being delivered through the rear fertilizer tube.

Summary and Conclusions

Generally, the type of seeding system did not affect the emergence or yield of canola and wheat. The one exception was the emergence of canola at the Lethbridge site. The use of the Burr Packer Systems resulted in lower emergence than the other seeding systems. The Burr Packer Systems had difficulty seeding at the Lethbridge site due to the clay soil.

Packing type did not effect the emergence or yield of canola and wheat. Rain after seeding may have resulted in good germination at both sites regardless of the seeding system or packing method.

References

Alberta Farm Machinery Research Centre (1996). "The Effect of Urea and Cold and Hot Flow Anhydrous Ammonia on Emergence and Yield on Wheat, Barley and Canola".

Alberta Farm Machinery Research Centre (1995). "Effectiveness of Double Shoot Openers for Applying Anhydrous Ammonia While Seeding Wheat, Barley and Canola".

Alberta Farm Machinery Research Centre (1994).
"Effectiveness of Double Shoot Openers for Applying
Anhydrous Ammonia and Urea While Seeding Wheat
and Canola".

Acknowledgements

The Alberta Farm Machinery Research Centre would
like to express appreciation to the following people for
their assistance during the project.

Walter Schoenhofer of Technotill
J & G Poirier Family Farm
Darius Walter of Felger Farming Co. Ltd.
Ray Holowach and Cliff Therou
of the University of Alberta