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PAMI *Research Update*

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Mid Row Band or Side Band?

An Agronomic Comparison of Mid Row Banding and Side Banding Systems

The shift in farming practices over the past decade has been dramatic with the move to one-pass, low-disturbance direct seeding systems. In Saskatchewan direct seeded acres in 1990 were less than 10% of seeded acres compared to about 40% in 2002, and the trend is continuing.

Direct Seeding Trials.

Direct seeding equipment has evolved rapidly to meet the challenging seeding/fertilizing needs of prairie farmers. Two systems, mid row band and side band, are both popular with prairie farmers, and producers want to know their relative performance. The objective of this project was to provide an agronomic comparison of mid row band/side band seeding and fertilizing systems.

At a Glance

The Bourgault mid row band and Flexi-Coil Stealth side band systems were compared for agronomic performance with wheat, canola, and flax at four Saskatchewan sites over three years (2000, 2001, and 2002).

Urea and anhydrous ammonia (NH_3) were the nitrogen (N) sources and 11-51-0 was the phosphate source. All N fertilizer was side banded with the Flexi-Coil Stealth system while all N fertilizer was mid row banded with the Bourgault system. Phosphate fertilizer was seed placed with the mid row band system, side banded when used with side band urea, and seed placed when used with side band NH_3.

Overall there were no grain yield differences between the systems 84% of the time, and where there were differences there was almost an even split between the systems. Similarly, there were no differences in grain protein due to mid row band or side band. Urea provided slightly higher grain yields compared to NH_3 at Indian Head but not at Swift Current, Scott, or Star City.

The good news is that with both seeding/fertilizing systems the agronomic results are excellent.

THE PROJECT

The project was conducted jointly by PAMI, Agriculture and Agri-Food Canada, and the Department of Soil Science at the University of Saskatchewan.

The project was conducted over three years at Swift Current (Brown soil zone), Scott (Dark Brown soil zone), Indian Head (Black soil zone), and Star City (Gray soil zone) to represent a wide range of soil-climatic zones.

Plots were direct seeded in standing stubble to wheat, flax, and canola using the PAMI 10 foot (3 m), 4 rank pneumatic plot seeder configured to apply anhydrous ammonia (NH_3) or urea in addition to seed and phosphate fertilizer (Figure 1).

Figure 1. PAMI's Pneumatic Plot Seeder.

A modified Raven NH_3 cooler/control system was used for accurate NH_3 metering. Openers were bolted to heavy duty C-shanks at 10 inch (25 cm) row spacing using Flexi-coil Stealth side band openers for one series of treatments and Bourgault knives with Bourgault mid row coulter banders (placed between every second set of knives) for the second set of treatments (Figure 2 & 3).

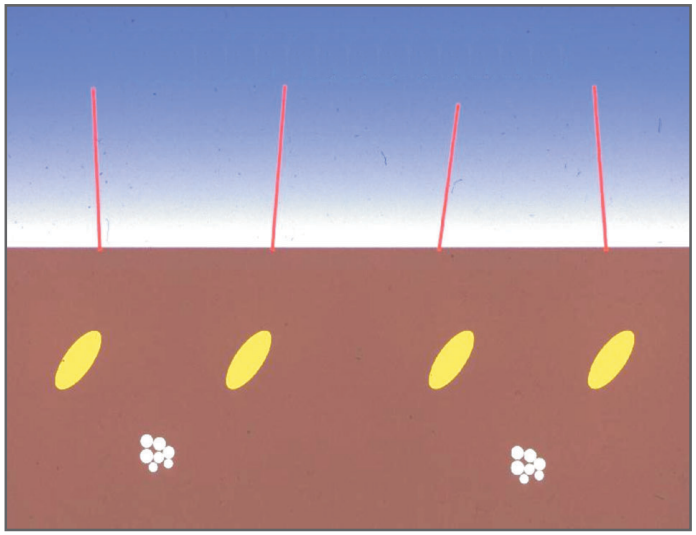

Figure 2. Mid Row Banding System Showing Seed and Urea Placement.

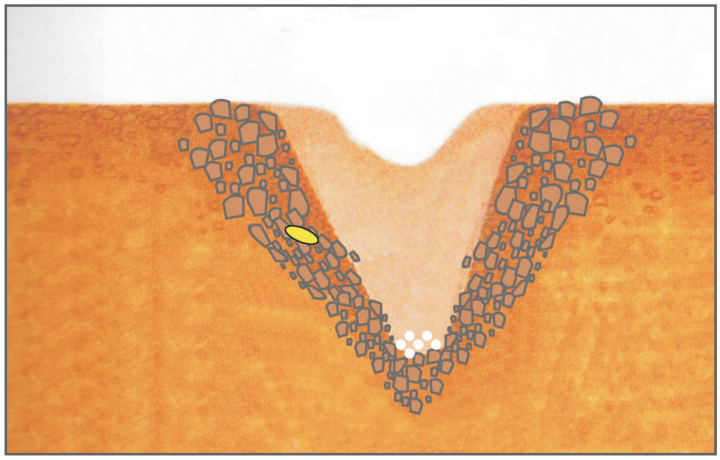

Figure 3. Side Banding System Showing Seed and Fertilizer Placement.

On-row packing with v-shaped semi-pneumatic packers was used for packing on seed rows.

All nitrogen fertilizer was side banded (1 inch (2.5 cm) below and 1 inch (2.5 cm) to the side of the seed row) with the Stealth opener. In addition, phosphate fertilizer was side banded when using urea (46-0-0) and seed placed when the system was switched to NH_3 (82-0-0). In contrast, urea and NH_3 was mid row banded (5 inches (12.5 cm) to the side of the seed row) and the phosphate was seed placed with the mid row band system. Nitrogen fertilizer rates for both systems were 0, 36, 71, and 107 lb N/acre (0, 40, 80, and 120 kg N/ha) at Star City and Indian Head, and 0, 27, 54, 80 lb N/ac (0, 30, 60, and 90 kg N/ha) at Scott and Swift Current.

The Results

An Explanation of "Significant Difference"-
The word "significant" can mean different things to different people. However, in this discussion "significant difference" refers to the statistical probability of a difference being real. In this case, if the grain yield of urea Treatment A is significantly greater than the grain yield of urea Treatment B, that means the probability of the difference being real is statistically true 95% or more of the time. From an agricultural research point of view, the convention is that differences are only significant if the probability of it being true is 95% or greater.

Growing Conditions

At Swift Current temperature and overall precipitation were above normal in 2000, very dry with above average temperatures in 2001, and in 2002 very low soil moisture and precipitation in May followed by above normal rainfall for the rest of the growing season. Temperature was near normal in 2002. At Scott precipitation was low in the early part of the growing season in 2000 followed by severe drought in 2001 and 2002. All three crops failed in 2002 due to severe drought. At Star City growing conditions were close to normal in 2000 followed by severe drought in 2001 and 2002. The wheat crop was a failure at Star City in 2002. At Indian Head temperatures were unusually cool and precipitation above average during May and June in 2000. Conditions were very dry in the whole 2001 season and the early part of 2002. Precipitation was near normal at Indian Head from June to August 2002.

Overall there was a wide range of climatic conditions at the four locations over the three years of the project. Due to crop failure, the wheat crop in Star City and all crops at Scott in 2002 were not considered in the overall conclusions.

Nitrogen Source

NH_3 provided similar yield results compared to urea with both the mid row band and side band systems.

This research confirms other research results that NH_3 can be safely side banded without crop damage. Note that under some conditions, there could be a small risk of seedling damage with side band NH_3.

Grain Protein

At the time of writing, protein data was only available for 2000 and 2001. Based on two years data, there were no significant differences in grain protein due to mid row banding or side banding.

Grain Yield

Overall there were no significant grain yield differences between mid row band and side band systems 84% of the time. Where there were significant yield differences, the mid row band system had higher grain yields 6% of the time and the side band system had higher grain yields 9% of the time.

Other Observations

Under dry soil conditions during the first few weeks after seeding, access to the nitrogen from the mid row band is limited due to the distance between the seed row and the nitrogen band.

Side band openers are more difficult to adjust for optimum seed depth, compared to a knife opener, due to soil disturbance in the seeding zone with the side band opener. Overall soil finish is also rougher with the side band system compared to the mid row band system.

Conclusions

Results from this three-year project indicate that mid row band and side band systems both do an excellent job of direct seeding, and provide identical yield results 84% of the time.

Mid Row Banding System.

Side Banding System.

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