DRILL SPACING AND
Wheat Yields:
10" Edges Out 12"
Producers are faced with many different options to consider when looking for a new seeding implement. One of the key decisions producers must make is choosing which row spacing will work best for their operation. For increased flexibility, Bourgault offers their XTC (Extra Terrain Contouring) and QDA (Quick Depth Adjust) ParaLink™ Hoe Drills on both 10" and 12" spacing.

While the 10" option is still the more popular of the two, if the focus is to increase efficiency, producers may consider moving to a wider spacing to reduce problems in clearing residue as well as reduce horsepower requirements and decrease the number of openers which will reduce maintenance requirements and operating costs. But do these benefits equate to the best investment in the long run? It is important to include the agronomic implications of this decision and its effect on overall profitability.

Row Spacing Study with Wheat

Over the years, there have been many conversations between producers, agronomists and manufacturing companies debating as to whether narrower spaced wheat out-yields wider spaced wheat. Many studies have been conducted and published comparing various row spacings, many of which found that a narrower row spacing displayed a greater potential for higher yield. While many efforts have been made to draw a conclusion on the best row spacing, most of these were done in the days prior to one-pass seeding and a few were done with side-banding. None of the studies conducted compared the Mid Row Bander® (MRB) fertilizer application system to other popular single-pass seeding techniques. This season, the Bourgault Agronomy Team set out to conduct side-by-side, replicated field scale trials near St. Brieux SK., to help determine which row spacing will bring the most value to your farm’s bottom line.
The Trials

Equipment Used
Bourgault 3320 30’ ParaLink™ Hoe drills were used to compare row spacing; one on 10’ spacing and the other on 12’ spacing. ¾” openers paired with 4.5” round packers were installed on both seed drills. The same L7550 tank was used for both drills to ensure consistency in the trials. A dual-knife side-banding drill on 12” was also used.

Seeding Conditions
The seeding conditions on May 17th, when the trials were conducted, were ideal with moisture present ½” below the surface. After seeding, there was very little rain until June 14th.

The Process
All treatments were replicated 3 times in a randomized block design. Only the center 25’ of each 30’ wide strip, at a length of 400’, was harvested to reduce anomalies that would be present at the edges. Grain from each treatment was individually weighed via a weigh wagon, and then samples were collected so that moisture, dockage and protein could be analyzed. Once harvest was completed, the moisture content was equalized to 13.5% and dockage was removed from all of the samples to neutralize their effects on the data. The final analysis determined that the least significant difference (LSD) for yield was 3.1 bu/acre, for plant stand LSD was 3.5 plants/ft² and for protein LSD was 0.6%.

While the difference in yield between the 10’ machine and the 12” may not appear to be great, it is statistically significant. A yield difference of 3.8 bushels at $6/bushel equates to just under $23/acre. The plant stand and the protein levels were not significantly different and there was very little difference in maturity, dockage or lodging. Essentially, the only difference documented was yield, everything else was unaffected.

2019 Wheat Results - Drills and Row Spacing

<table>
<thead>
<tr>
<th>Treatment</th>
<th>3320 - 10”</th>
<th>3320 - 12”</th>
</tr>
</thead>
<tbody>
<tr>
<td>MRB: 12N</td>
<td>77.4</td>
<td>73.6</td>
</tr>
<tr>
<td>P: 3N + 35P + 15K</td>
<td>27.9</td>
<td>28.1</td>
</tr>
<tr>
<td>Plant Stand</td>
<td>12.2</td>
<td>12.1</td>
</tr>
<tr>
<td>Protein %</td>
<td>20.0</td>
<td>20.0</td>
</tr>
<tr>
<td>Yield (bu/acre)</td>
<td>90.0</td>
<td>90.0</td>
</tr>
</tbody>
</table>

LSD
Yield: 3.1 bu/acre
Plant Stand: 3.5 plants/ft²
Protein: 0.6%
With only one location and one growing season under our belts, our findings cannot be considered comprehensive, however, it is interesting that our the results do reinforce other comparative studies reporting that cereals seeded on the narrower row spacing tend to achieve higher yields. This is in contrast to other crops such as canola, where the plant’s physiology allows it to fill in the gaps, typically overcoming the ill effects of wider spacing.

The MRB® Factor

The question of: “Are mid row banders too far away from the seed making the nitrogen inaccessible for the plant’s development?” often comes up. If this were the case, a move from 10” to 12” would exacerbate the situation, increasing the seed to nitrogen distance from 5” to 6”. Anticipating this question, a third drill was included in our study that placed the nitrogen in the side-band via a dual-knife system. The fertilizer was placed in the typical dual-knife arrangement of 1½” down and to the side away from the seed on 12” spacing. All fertilizer was placed in the side-band as this is the recommended practice from the manufacturer of this style of opener. The same L7550 air cart was used as with the two previous drills for consistency.

<table>
<thead>
<tr>
<th>Treatment</th>
<th>Yield (bu/ac)</th>
<th>Plants /ft²</th>
<th>Protein %</th>
</tr>
</thead>
<tbody>
<tr>
<td>SR: 3N + 35P + 15K MRB: 122N</td>
<td>77.4</td>
<td>27.9</td>
<td>12.2</td>
</tr>
<tr>
<td>SR: 3N + 35P + 15K MRB: 122N</td>
<td>73.6</td>
<td>28.1</td>
<td>12.1</td>
</tr>
<tr>
<td>SB: 125N + 35P + 15K</td>
<td>72.3</td>
<td>25.1</td>
<td>12.2</td>
</tr>
</tbody>
</table>

The results show that there was no significant difference in yield, plant stand or protein levels between the side-band 12" machine and the mid row band 12" machine. However, the yield was still significantly less than the mid row band 10" machine. These findings suggest that row spacing is playing a larger role in yield than nitrogen placement in this year’s growing conditions.

Why The Yield Difference?
The most likely explanations for the yield differences are:

1) the crop seeded on the narrower spacing competes better with the weeds,
2) the root system on the narrower spacing can more quickly and extensively harvest the moisture and nutrients that are located in the center of the row, and,
3) the crop covers the area between the row sooner reducing moisture losses to the atmosphere.

Some farmers adopt a wider row spacing and then select wider openers to reduce the gap between the rows. However, with a wider opener, seed depth precision starts to decrease as it produces more draft than a narrower opener thereby eliminating one of the benefits of selecting a wider row spacing. Also, more soil is thrown to the side, which may lead to higher
moisture loss, and the back rows are more prone to throw soil on the front rows, both of which can become very problematic in a given year, especially with canola.

The ultimate in row spacing may be a narrow opener on narrow row spacing. The world record holder for highest wheat yield was seeded with a 6" spaced machine using disk openers. There are many differences from New Zealand, where this record was set in 2017, to here in the Great Northern Plains including varieties, moisture and growing season. However, this does not take away from the fact that these differences were exploited using narrower row spacing instead of wider.

Making Narrower Work

The challenge to narrower row spacing is getting through the crop residue from the previous season. In some cases the advantage of conserving moisture trumps working in the residue to get through with narrower row spacing. Management options are often deployed by producers by the way of multiple harrow passes, baling, or setting a match to the field. If these options do not work, many producers choose to simply go wider to get through the residue.

Bourgault operators decrease these compromises by equipping their 3320 drills with Mid Row Bander® fertilizer applicators to deliver excellent residue clearance. The MRBs not only cut the residue and safely place fertilizer, but they also allow a narrow single-shoot tip to be placed on the seed opener for greater residue clearance. This makes the 10" spacing the most common opener configuration on Bourgault 3320 seed toolbars. This zero-till configuration is unique in the marketplace, as it allows farms to successfully use the narrowest row spacing, achieve a commendable level of residue clearance and provides optimal fertilizer placement to reduce risk to germination and emergence.

Narrower a Winner

The results from 2019 large scale study on row spacing in wheat are very exciting and support what the majority of past studies documented. Narrower row spacing statistically provides the highest yield potential when compared to a wider arrangement. Mid Row Banders® are the best complement to narrow row spacing by helping to cut through the residue, minimizing moisture loss and providing the safest way to place all of the crops nutrient requirements in a one-pass system.