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DIGGING INTO RESEARCH

Higher canola and wheat yields with diverse rotations

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Averaged over 6 years from 2010 to 2015, growing canola in rotation with other crops produced 19.4% (9.4 bu/ac) higher yield over continuous canola. Wheat yields were 4.7 bu/ac (7.2%) higher than continuous wheat. When a rotation included pea once every three years, a saving of 172 to 214 lb/ac nitrogen was achieved.

Two-year rotations of wheat-canola, and even continuous canola, are common across western Canada. A six-year study at Donnelly in the southeast Peace Region of Alberta from 2009 through 2015 compared the yield of crops and use of fertilizer in rotations that included canola, wheat, pea, barley and flax in comparison to continuous canola or continuous wheat. Most of the rotations compared in the study either closely mimicked those used by producers or have the potential to succeed in the area.

The site had been direct seeded since 2002. The soil was a clay loam soil with 4.8% organic matter in the top 6 inches. Crops were direct seeded with a Fabro plot seeder, equipped with double shoot hoe type openers. An appropriate seed treatment was used for each crop. Recommended agronomic and pest management practices were used.

The 10 rotations were:

- Wheat-Canola (WC),
- Pea-Wheat-Wheat (PWW),
- Canola-Wheat-Wheat (CWW),
- Canola-Canola-Wheat (CCW),
- Pea-Canola-Wheat (PCW),
- Canola-Pea-Wheat (CPW),
- Wheat-Barley-Canola (WBC),
- Barley-Wheat-Canola (BWC),
- Flax-Wheat-Canola (FWC), and
- Flax-Canola-Wheat (FCW).

There were 2 cycles of the three year rotations, 3 cycles of a two year rotations and 6 years of CC and WW.

Canola yields in rotation

In all 6 years, canola yield was lowest in CC and when canola was grown on canola stubble in the CCW rotation in 2010. The canola yield advantages in crop rotations with wheat, barley, pea and flax did not show a consistent trend, although all stubbles produced higher yields than continuous canola.

When canola was grown on pea stubble in 2010 and 2013, canola yield was improved over CC by 8.6 and 18.2 bu/ac, respectively. This was an average of 13.4 bu/ac for a 31.4% yield increase over the average CC yield of 42.7 bu/ac yield.

Growing canola in a three-year rotation that included pea, flax or barley almost always yielded significantly higher than CC and frequently more than a WC rotation.

Wheat yields in rotation

Comparison of 25 rotation treatments to continuous wheat showed that wheat yield was significantly greater in 12 (48%) of the rotations. The 2010–2015 average wheat yield increase from all rotations compared to the continuous wheat rotation was 4.6 bu/ac (7.2%).

Wheat yield tended to be greater on pea stubble compared with canola, wheat, barley, and flax stubbles. The wheat yield on pea stubble was greater by an average of 7.5 bu/ac compared to the average of all other stubbles. This was 11.5% higher than the average 65.0 bu/ac yield of WW.

Nitrogen savings

Major reductions were observed for N when a rotation included pea, with a saving of 172–214 lb/ac over the 6 years in PWW, PCW, and CPW.

The research indicates that diversified rotations can improve yield over continuous cropping of canola or wheat, or a shortened canola/wheat rotation. Including field pea in a crop rotation reduced the amount of N used and tended to increase seed yields of subsequent wheat and canola.

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