



## Inter-row seeding into wheat stubble improves field pea standability

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Inter-row seeding field pea into 8 to 12 inch (20 to 30 cm) tall wheat stubble significantly improved standability between 6 to 23% when lodging occurred, and would be a low cost method of improving pea harvestability. The three plant growth regulators compared were of little value for improving standability.

Under highly productive growing conditions, field pea lodging is a major challenge. Research led by Alberta Agriculture and Forestry investigated the potential for inter-row seeding into standing wheat stubble and the use of plant growth regulators to see if lodging could be reduced with either agronomic practice. Currently, there are no PGRs registered for use on field pea in Canada.

Field experiments were conducted over three years near Bon Accord, Lacombe and Falher, Alberta from 2015 through 2017. These are highly productive field pea areas where lodging is common.

AC Foremost wheat was grown the previous year and harvested at 0, 8, and 12 inch (0, 20 and 30 cm) stubble height. Pea seeding rates targeted a plant stand density of 10 plants per square foot (97 plants/square metre). Pea seed was treated with Apron Maxx RT, and direct seeded between the rows of wheat stubble. In 2017, there were no inter-row seeding treatments in order to compare the effects of PGR treatments on different cultivars.

PGR treatments included an untreated control and six to seven treatments at different rates and tank-mixes. The lower PGR rates correspond to registered rates for these PGRs on wheat and the higher PGR rates correspond to recommended PGR rates for other crops.

In 2015 and 2016, PGR treatments were tested on the yellow field pea cultivar, CDC Meadow. In 2017, both CDC Meadow and AAC Lacombe varieties were tested for their response to all seven PGR treatments and a control at only the 0 cm stubble height, resulting in 16 treatments.

The PGR treatments were applied at growth stage 201, when flower buds are enclosed within leaflets of the growing point and are visible only when these leaflets are folded back.

### **Inter-row seeding improved standability**

Over the three years, moderate lodging occurred 38% of the time and extreme lodging 25% of the time, for a total of 63% of the time when growers would have been challenged with difficult harvesting. Drier conditions at some sites meant that field peas did not lodge 38% of the time.

At five of six site-years (83%), the height of pea plants was significantly taller at maturity by 0.4 to 1.5 inch (1 to 4 cm) when seeded into 8 or 12 inch standing stubble compared to the 0 stubble height. This was likely because plants elongated at early growth stages to find light between the stubble rows.

Inter-row seeding into 8 to 12 inch stubble significantly improved standability between 6 to 23% where lodging occurred. Days to maturity were also reduced and 1000-kernel weight improved. There were no significant impacts on yield while protein content was slightly reduced. Yields ranged from 47 to 100 bushels per acre (3.16 to 6.65 t/ha).

Differences in agronomic responses between the 8 and 12 inch stubble height treatments were rare.

### **PGRs ineffective**

Three plant growth regulators were compared with small and inconsistent impacts on plant height, standability, lodging, yield and seed quality, and had little value as an agronomic tool to improve field pea standability.

Manipulator (Chlormequat chloride) PGR, which is registered on wheat, was ineffective at reducing pea plant height when applied alone. Other PGRs treatments did not consistently impact plant height.

Slight variety differences were observed between CDC Meadow and AAC Lacombe, with CDC Meadow slightly more responsive to the PGR treatments.

Overall, plant growth regulators had minimal impacts on yield. However, when growing season precipitation was about one-half of the long-term average, PGRs tended to reduce yield, and are not recommended when plants are under any type of abiotic stress.

In summary, inter-row seeding into taller standing stubble was a simple and cost-effective way to reduce lodging under highly productive conditions without impact on yield. PGRs did not reduce lodging, and caused yield loss under moisture stress conditions.

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