



## Openers and seed treatments investigated in ultra-early wheat

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*In ultra-early seeding systems, a disc opener performed marginally better than a knife opener. Few benefits were realized from insecticide/fungicide seed treatments.*

Previous research found that seeding wheat ultra-early at a soil temperature trigger of  $>0^{\circ}\text{C}$  provided high, stable yields. The objectives of this subsequent research trial were to examine the effects of seedrow opener configuration and fungicide/insecticide seed treatments in ultra-early seeded wheat.

The five year research trial was conducted near Lethbridge, AB in 2019, 2021, 2022, 2023, and 2024. A narrow knife opener (Conserva Pak) on 9.4 inch (23.8 cm) row spacing and a disc opener (Pillar Laser) on a 10 inch (25.4 cm) row spacing were compared in the trial.

Seed treatments included Raxil Pro +Stress Shield (fungicide: tebuconazole, prothioconazole, and metalaxyl; insecticide neonicotinoid imidacloprid) and an untreated control.

Seeding took place at five soil temperature triggers of 0, 2.5, 5, 7.5 and 10C when collected mid-morning at a two-inch (5-cm) soil depth.

AC Stettler (CWRS) was seeded into canola stubble at 40 seeds/ft<sup>2</sup> (400 seeds/m<sup>2</sup>) to target a plant stand of 25 to 30 plants/ft<sup>2</sup> (250 to 300 plants/m<sup>2</sup>). A pre-seed herbicide application was not conducted because few weeds were present, and in-crop herbicide applications were applied according to weed spectrum. Fertilizer application was based on soil test recommendations.

Severe drought conditions affected the results in 2021 and 2023.

### **Highest yield occurred at a trigger of 0C**

Seeding at a trigger temperature of 0C produced the highest yield, thousand kernel weight (TKW) and thousand test weight (TWT). The 37.4 bu/ac (2.51 t/ha) yield at the 0C trigger was 23% higher than the yield at the 10C trigger at 30.4 bu/ac (2.04 t/ha). This despite nine nights below 0C in 2023 and 71 nights below 0C in 2022 occurring after seeding. The yield advantage of ultra-early seeding was most notable in the highest-yielding environments, and in lower-yielding environments the practice generally protected yield. Thus, waiting for soils to warm or for a certain arbitrary calendar date later in the seeding window provided no benefit in this study.

The TKW was significantly higher at 30.3 g when seeded at 0C than those of the other seeding trigger dates declining from 29.7 g for 2.5C trigger to 28 g at 10C. The 0C trigger also had significantly higher TWT than the 7.5 and 10C trigger seeding dates.

The soil temperature trigger of 5C produced the highest protein content (15.8%), harvest index, head density and heads/plant, and these were the lowest at the 10C trigger.

### **Seed treatment ineffective**

In this trial, there was no difference in the early season plant density between the seed treatment and the untreated control. The untreated seed had higher yield and harvest index than the Raxil +Stress Shield treatment. The researchers attributed the lower seed treatment yield “to the reduced head density and reduced heads/plant.” And that “The ultra-early planting system, coupled with high seeding density and a healthy, vigorous seed lot, may have masked the benefits of seed treatment compared to weaker agronomic systems.”

At the time of this study, the dual seed treatment cost approximately \$11.75/ac (\$29/ha) and a fungicide-only treatment was \$7.28/ac (\$18/ha). The decision to use a seed treatment as a buffer against biotic and abiotic stresses comes down to a cost/benefit analysis – the results from this trial

indicate they would not be beneficial in a southern Alberta environment with persistent drought pressure.

### **Disc opener performed marginally better**

The disc opener had a numerically higher grain yield of 33.4 bu/ac (2.24 t/ha) compared to the knife at 34.6 bu/ac (2.32 t/ha), although it was not statistically significant ( $p=0.05$ ). However, the yield varied by year with the disc opener having significantly higher yield in 2021 and 2022, but similar yield in the other years.

The disc opener also had higher TKW, TWT, harvest index, head density, heads/plant, and plant height. The knife opener produced the highest protein content. The disc opener also had earlier emergence, heading, and flowering, with earlier maturity by two to three days compared to the knife opener.

A biplot analysis of the treatments found that the disc opener produced seven out of 11 above average yield responses, while the knife opener produced six out of 10 below-average yield responses. The slightly lower yields of the knife opener may be due to increased soil disturbance and moisture loss.

The researchers concluded that, “overall, spring wheat grain yield and protein concentration were optimized when planting occurred at soil temperatures between 0C and 7.5C using the disc opener with or without seed treatment. The results of this study further the evidence that the adoption of an ultra-early spring wheat seeding system provides tangible benefits around grain yield and yield stability protection or improvement.”

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Beres, B. L., Wang, Z., Dyck, R., Simmill, S., Taylor, W., Heidinger, K., & Stevenson, F. C. (2025). Influence of no-till furrow opener and seed treatment on ultra-early wheat seeding systems. *Agronomy Journal*, 117, e70084. OPEN ACCESS: <https://doi.org/10.1002/agj2.70084>