



Canadian spring wheat varieties suited to ultra-early seeded wheat

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All cultivars in spring wheat classes CWRS, CWSWS, CPSR, CWSP and CNHR had similar yields between the 2C and 8C trigger planting temperatures. However, the ultra-early planting date had improved grain yield stability and improved growing system stability.

Research from 2015 to 2018 by Collier et al (2020) found that seeding wheat as soon as feasible after soil temperatures reach 0C, and prior to soils reaching 7.5 to 10C increased grain yield and stability compared to current seeding practices. The research used one CWRS cultivar and three experimental cold-tolerant spring wheat lines. <https://canadianagronomist.ca/higher-more-stable-yield-with-ultra-early-seeded-wheat/>

Following up on that study, research was conducted to determine if other cultivars in western Canadian spring wheat market classes were suitable for ultra-early wheat seeding systems on the Canadian Prairies.

The research was conducted at three sites in 2017 and 2018 at Edmonton and Lethbridge, Alberta and Scott, Saskatchewan, and at Lethbridge in 2019. Seeding was conducted when soil temperatures reached either 2C or 8C in the top two inches (5cm) of soil.

Nine registered wheat cultivars were selected based on a combination of popularity among growers, and wide genetic variation for vernalization, photoperiod and height. Three experimental cold tolerant (CT) varieties were also included in the research:

- 5700PR (CPSR)
- AC Andrew (CWSWS)
- Conquer (CNHR) Formerly CPSR
- AC Foremost (CNHR) Formerly CPSR
- Pasteur (CWSP)
- CDC Plentiful (CWRS)
- CDC Stanley (CWRS)
- AC Stettler (CWRS)
- AC Sadash (CWSWS)
- LQ1282A (CT)
- LQ1299A (CT)
- LQ1315A (CT)

A low seeding rate of 20 seeds per square foot (200 seeds/m²) was used to help assess the sensitivity of cultivars to ultra-early seeding.

In 2017, planting was earlier with more cold stress than in 2018 and 2019. After planting, each site-year had multiple nights of freezing temperatures. The Scott site in 2017 suffered 27 nights of temperatures below freezing after planting with the lowest temperature of -9.4C. Lethbridge had 17 nights below freezing after planting in 2017 with the lowest temperature of -7.6C. Edmonton had 14 nights below freezing with a low temperature of -6.1C.

Registered cultivars suitable for ultra-early seeding

Planting trigger temperatures of 2C and 8C did not have a significant effect on plant establishment, grain protein content, grain test weight, thousand kernel weight, or grain yield. This result differs from the earlier research by Collier et al (2021) that found using 0 to 2.5C as a soil temperature trigger for seeding produced six bushels per acre higher yield than when soils reached 10C for the wheat varieties used in that study.

The researchers also analyzed the effect of planting date, cultivar and wheat class on grain yield stability and growing system stability. All wheat classes had similar yields between the 2C and 8C

trigger planting temperatures. However, the ultra-early planting date had improved grain yield stability and improved growing system stability for each market class.

In this current study, a low seeding rate was used to identify wheat cultivars that might be susceptible to a decrease in yield or stability due to ultra-early seeding. It confirms the earlier research on ultra-early seeding wheat, and shows that registered cultivars in spring wheat market classes, including CWRS, CWSWS, CPSR, CWSP and CNHR, can be successfully planted in ultra-early wheat growing systems. For optimum results, ultra-early seeded wheat should use seeding rates of at least 40 seeds per square foot (400/m²) when soil temperatures reach 2C to 6C in the top two inches of soil.

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Mr. Graham Robert Stephen Collier, Dr. Dean Spaner, Dr. Robert J. Graf, Ms. Cindy A Gampe, and Dr. Brian L. Beres. Canadian spring hexaploid wheat (*Triticum aestivum* L.) cultivars exhibit broad adaptation to ultra-early wheat planting systems.. *Canadian Journal of Plant Science*.
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