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Demonstrating 4R Nitrogen Principles in Canola

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Developing best management practices (BMPs) for nutrient applications has long been focused on the 4R principles which refer to using the: 1) right formulation, 2) right rate, 3) right placement and 4) right timing. A trial was established in the spring of 2017 to demonstrate canola response to the 4R nitrogen principles in comparison to side-banded, untreated urea as a control.

The warm temperatures and lack of precipitation throughout the growing season likely skewed our results somewhat and may have misrepresented certain treatments. Data showed sidebanding urea at the 1.0x rate provided the highest yield, followed by the pre-seed broadcast of SuperU. The 1.5x rate of side-banded urea having a significantly lower yield (1166 kg/ha) may have stimulated larger leaves early on when moisture conditions were good. When the drought hit, increased transpiration and poor soil moisture resulted in added stress for flowering, pod production, and seed fill. Even though sidebanded treatments are considered safe, we may have seen some early emergence problems at the 1.5X rate that may have had a negative effect on yield. This often happens if high rates of N are allowed to contaminate the seed row. A split-broadcast of urea provided the third highest overall yield, which could be attributed to adequate spring moisture, enabling the break-down of urea into plant available nitrogen compared to SuperU and Agrotain that release nitrogen at a slower rate, delaying N availability during a period when conditions were very dry.

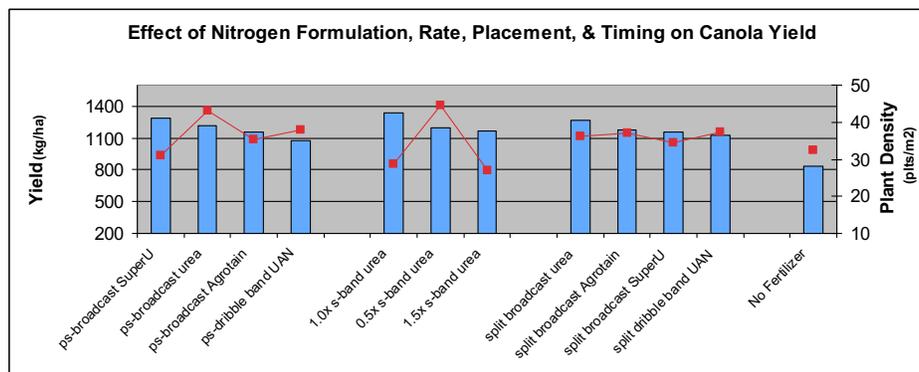


Figure 1. Nitrogen Formulation, Rate, Placement and Timing on Canola Yield and Density. ps (pre-seed), split-broadcast (split-application of urea –50% at seeding, 50% at 4-6 leaf in the form of either Urea, Agrotain, SuperU, UAN),

Broadcasting urea fertilizer on the surface may have performed better in terms of yield if more than 6mm of precipitation would have been received shortly after application reducing volatilization losses. To reduce this loss into the atmosphere, producers must do everything they can to ensure efficient placement into the soil, as fertilizer applied too shallow into a dry soil bed will prevent surface area contact with the seed and promote poor emergence. A urease inhibitor such as SuperU, or Agrotain is available and used in conjunction with rate, place and timing could improve sustainability and lead to long-term profitable success.

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