



## Wheatland Conservation Area Inc.

P.O. Box 2015, Swift Current, Saskatchewan. S9H 4M7

Ph. # (306) 773-4775

### Demonstrating 4R Phosphorus Principles in Canola

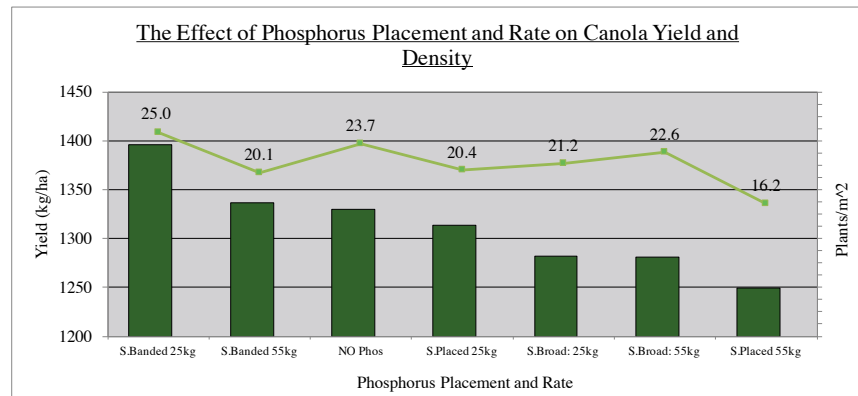
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Developing best management practices (BMPs) for nutrient applications has long been focused on the 4R principles which refer to using the: 1) right formulation, 2) right rate, 3) right placement and 4) right timing. A trial was established in the spring of 2017 to demonstrate canola response to the 4R phosphorus principles in comparison to side-banded, untreated urea as a control. Formulations are not a part of this demonstration because our drills are not equipped for liquid products and the non-traditional granular alternatives are either not widely utilized or contain multiple nutrients

With the drier than normal growing season, we expected to see problems with plant emergence when seed placing the high rate (55 kg/ha) of P. The negative response in plant population using the high rate of seed placed phosphorous translated to reduced yield, significantly lower than all other treatments. Seed placing 25 kg/ha may also have been affected by environmental conditions, yielding significantly lower than both sidebanded treatments and the no phosphorus check. Under average growing conditions seed placing 25 kg/ha is considered a safe practice and would likely result in a positive yield response.

Side-banding 25kg/ha P resulted in the highest plant density and best yield significantly higher than all the other treatments. Side-banding 55kg/ha P showed a drop off in both plant density and yield, which could be attributed to seed injury due to drier than normal conditions in combination with higher P rate. However, sidebanding 55 kg/ha of P still performed better than seed placed, surface applied, and the no phosphorus treatments.

Nitrogen (130 lbs/ac) and sulfur (20 lbs/ac) were side-banded and balanced over all treatments. According to the Canola Council of Canada, when choosing to dual band N & P, using "N rates above 80 lbs/ac, the concentrated N in the band can reduce early season P uptake due to ammonia and nitrite toxicity that hinders root entry into the band. This P uptake interference appears to be strongest in recent band applications, and could be a problem with dual spring banded N and P fertilizer applied immediately before or during seeding." To avoid this risk a split application of seed placing P fertilizer up to 20 lbs/ac and placing the remainder in the band with the N and S would be preferential. This method is the best placement option for crops that are sensitive to seed-placed phosphate fertilizer.



In summary, side-banding 25kg/ha P<sub>2</sub>O<sub>5</sub> was the right rate, placement, and timing and provided the highest overall yield. In future demonstrations, a split application of phosphorus (seed placed and side-banded) could be included.

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